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Swedish University of Agricultural Sciences

Department of Economics

Developing sustainable solutions for future food production

- a case study of the industrial cluster initiative Food Valley of
Bjuv

Marcus Höök & Carl Österman

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Marcus Höök & Carl Österman

Summary

Sustainable development, defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, is considered as one of the major challenges of our time. The food industry is one of the domains associated with particularly pressing challenges when it comes to sustainable development. With a growing world population and affluent class, in combination with unsustainable production and consumption patterns, it is clear that the need for new solutions in this industry is imminent.

The theoretical point of departure for this study is sustainability transitions, which is a relatively new field of research, where the overarching question is how to go about to achieve sustainability in a wider systems perspective. Research on this area largely draw on models developed to study socio-technological transitions. These models are often comprehensive and abstract, why research within this field has also been criticized for being too abstract. Because of this, there is an increased interest of incorporating geographical concepts such as place, space and geographical proximity into the research to bring it closer to reality. More specifically, there is increasing demand for in-depth studies of local initiatives, such as industrial clusters, with an explicit focus on establishing sustainable production systems. Therefore, the theoretical framework used in this study combines more traditional theory on sustainability transitions with theory on clusters, cluster functions and social capital to allow for more in-depth analysis of a real world case.

The aim of this study is to explore Food Valley of Bjuv; a cluster initiative with a dedicated focus of contributing to sustainable development by paving way for innovative sustainable solutions for future food production. The idea is to create a meeting place for innovators and entrepreneurs to come together and develop new solutions, and to establish recycling-based production for food. This initiative has its base in Bjuv, Scania, and is made up of a number of actors with different business orientations. The study is conducted as a single case study and builds on primary data collected through interviews with actors that are, or have been, involved in the development of Food Valley of Bjuv, and secondary data from articles and other documents.

The contributions of this study lays in extending and complementing existing literature on sustainability transitions with more in-depth insights into a cluster initiative with a dedicated focus of developing sustainable solutions for future food production. The results of this study provide valuable inputs for practitioners that seek to further develop Food Valley of Bjuv and those that want to establish similar initiatives. Combining practices of industrial symbiosis with open innovation processes shows great potential in creating a protective environment for development of innovative and sustainable solutions for future food production. Also, it is shown that timing, contextual settings and key individuals are important in shaping an initiative like Food Valley of Bjuv. Finally, due to the complexity of establishing and collaborating in a planned cluster initiative, it is important to have an entity in place that focuses on maximizing the utility of the cluster as a whole.

Sammanfattning

Hållbar utveckling, definierat som utveckling som tillgodoser dagens behov utan att äventyra kommande generationers möjligheter att tillgodose sina behov, anses vara en av vår tids största utmaningar. Livsmedelsindustrin är ett av de områden som står inför särskilt stora utmaningar gällande hållbar utveckling. Med en växande världsbefolkning samt en ökande medelklass i kombination med ohållbara produktions- och konsumtionsmönster står det klart att behovet av nya lösningar i denna industri är betydande.

Den teoretiska utgångspunkten för denna studie är *sustainability transitions* som är ett relativt nytt forskningsområde där den övergripande frågan handlar om hur man går tillväga för att uppnå hållbarhet i ett större systemperspektiv. Forskningen på detta område bygger till stor del på teoretiska modeller som har utvecklats för att studera socio-teknologiska förändringar. Dessa modeller är ofta övergripande och abstrakta, varför också forskningen på detta område har kritiserats för att vara alltför abstrakt. På grund av detta har det vuxit fram ett intresse av att inkorporera geografiska koncept som plats, utrymme och geografisk närhet i forskningen för att ta den närmare verkligheten. Mer specifikt har efterfrågan på djupgående studier av lokala initiativ, exempelvis industriella kluster, som har ett explicit fokus på att etablera hållbara produktionssystem ökat. Det teoretiska ramverket som används i denna studie kombinerar därför mer traditionell teori om *sustainability transitions* med teori om kluster, klusterfunktioner och socialt kapital för att möjliggöra en mer djupgående analys av ett verkligt fall.

Studiens syfte är att utforska Food Valley of Bjuv, som är ett klusterinitiativ med ett uttalat fokus att bidra till hållbar utveckling genom att bana väg för nya innovativa och hållbara lösningar för framtidens livsmedelsproduktion. Här vill man skapa en mötesplats där innovatörer och entreprenörer inom livsmedelsbranschen ska kunna samlas för att tillsammans utveckla nya lösningar, samt att etablera kretsloppsbasead produktion av livsmedel. Detta initiativ har sin bas i Bjuv, Skåne, och består av ett antal aktörer med olika verksamhetsinriktning. Studien utförs som en fallstudie och bygger på primärdata som insamlats genom intervjuer med aktörer som är eller har varit involverade i Food Valley of Bjuvs utveckling samt sekundärdata från artiklar och andra dokument.

Studiens teoretiska bidrag ligger i att komplettera befintlig litteratur på *sustainability transitions* med djupgående insikter om ett klusterinitiativ med en särskild inriktning på att utveckla hållbara lösningar för framtidens livsmedelsproduktion. Resultaten från denna studie ger värdefulla empiriska bidrag som kan användas för att vidareutveckla Food Valley of Bjuv och som underlag för att etablera liknande initiativ. Kombinationen av industriell symbios och öppen innovation visar stor potential för att skapa en skyddande miljö för utveckling av innovativa och hållbara lösningar för framtidens livsmedelsproduktion. Studien visar också att *timing*, kontextuella faktorer och nyckelpersoner är viktiga för att forma ett initiativ som Food Valley of Bjuv. På grund av komplexiteten som ligger i att upprätta och samarbeta i ett planerat klusterinitiativ, är det viktigt att ha en sammanhållande kraft som fokuserar på att maximera nyttan av klustret som helhet.

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1 Introduction

This chapter offers an introduction to the sustainability issues that characterize society in general, and the food industry in particular. Then follows a presentation of the theoretical and empirical problems that this study seeks to address. Finally, the delimitations and an outline of this study are presented.

1.1 Background

Sustainable development, defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 43), is considered to be one of the major challenges of the 21st century and has become an important question that permeates many parts of society (e.g., Farla *et al.*, 2012; Fuenfschilling & Truffer, 2016; Markard *et al.*, 2012). Today our civilization consumes resources faster than the planet can regenerate them, which means that we have developed a system that is unsustainable in a long-term perspective (Wackernagel *et al.*, 2002). The food industry is one of the domains associated with several sustainability challenges (e.g., Aiking, 2011; Godfrey *et al.*, 2010; Farla *et al.*, 2012; Morrissey & Dunphy, 2015; Richert, 2013; Sayer & Cassman, 2013; Tilman *et al.*, 2011). With a world population likely to reach nine billion by the middle of the current century and with a growing affluent class (Godfrey *et al.*, 2010), the challenges in this industry are bound to increase. This development means both increasing demand for food and increasing environmental impacts from food production (Godfrey *et al.*, 2010; Tilman *et al.*, 2011). In order for the food industry to develop in a sustainable way, production must improve to meet the estimated increase in demand (Tilman *et al.*, 2011), without any significant increase in inputs such as water, fuel and land (Sayer & Cassman, 2013). To solve this seemingly impossible equation, fundamental changes in both food production and consumption are needed (Morrissey & Dunphy, 2015).

In addition, the food industry is also marked by the trends of globalization and liberalization of markets, which increases the possibilities for businesses to exploit economies of scale (Hansen, 2013). Consequently, there is also an increased concentration of food production to geographical areas where it can be carried out more cost efficiently (Hansen, 2013). Such structural conditions make it hard for new start-ups and innovative businesses to enter the market, as they often face high entry barriers that protect the market position of established players (Porter, 1998). This situation is apparent in the food industry, which is characterized by small incremental changes initiated by large established actors (Zukauskaite & Moodysson, 2016).

In the light of these challenges, there is a growing interest for localities (e.g., national regions) around the world in finding novel solutions that are sustainable in a long-term perspective and has the potential of retaining local food production. In Sweden, this growing interest is also reflected in the new national food strategy that is under development by the Swedish Government. This strategy “aims at increasing employment, production, export, innovation capacity and profitability in the food chain, while reaching relevant national environmental targets” (translated from Swedish, [www, Government of Sweden](http://www.government.se), 1, 2016).

1.2 Problem background

One form of local initiative that has shown great potential for stimulating productivity, increasing innovation capacity and facilitating new business formation is cluster development (Porter, 1998). In clusters, local actors such as governmental institutions and private companies are connected through commonalities and complementarities (Porter, 2000). Central to the idea of clusters is that it revolves around geographical proximity between collaborating actors, why it helps retaining production locally (Porter, 1998). Because of this, cluster development has been recognized as a well functioning strategy for local economic development. Lately, clusters that focuses on sustainable use of resources have also been recognized as a possible alternative to meet the increasing sustainability challenges that are facing society today (McCauley & Stephens, 2012). Local clustering can thus be seen as a concrete strategy that may contribute to both local economic and sustainable development.

Food Valley of Bjuv (**FVoB**) is an ongoing cluster initiative, in southern Sweden designed to develop innovative sustainable solutions for future food production (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). Behind the design of this cluster initiative is the Swedish food producer Findus Sverige AB, which is supported by Bjuv's municipality. Today, the cluster is made up of several food producing businesses and some actors that are oriented towards offering services to those businesses. The vision for FVoB is to create a natural meeting place for innovators and entrepreneurs in the food industry to come together to jointly develop future food production (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). An integral part of this cluster initiative is the establishment of a recycling-based system for production of food, *i.e.* a system that focuses on sustainable use of resources (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). One goal of this recycling-based system is to develop a model that later can be transferred to other locations, both nationally and internationally (www, Vinnova, 1, 2016). If this goal is achieved, it may contribute to changing the food production system towards more sustainable practices.

This type of system-wide changes has been conceptualized as sustainability transitions – a research topic that has gained increased attention during the past decades (van den Bergh *et al.*, 2011). The overarching question addressed in this field of research is how to go about to achieve sustainability in a wider systems perspective (*e.g.*, Markard *et al.*, 2012). Research on sustainability transitions is largely based on theoretical perspectives drawn from work on socio-technical transitions, which is a field of research concerned with understanding transformations of technology used for different social functions. Here, change is considered to begin with technological innovation that is different from the widely adopted technology for various social functions (Geels, 2002). Over a long timespan, incremental changes occur gradually, which can affect and transform entire systems (Farla *et al.*, 2012). For strongly institutionalized structures, like the food industry, fundamental changes take particularly long time (Farla *et al.*, 2012; Kemp *et al.*, 1998). Due to the urgent nature of different sustainability issues that characterize this industry, finding ways to disrupt the current unsustainable modes of production is imminent.

1.3 Problem

Although sustainability transitions research contributes to the understanding of how systems-wide transformation towards more sustainable practices occur, it is generally based on abstract models and has recently been criticized for not giving “sufficient attention to the

actual places and contexts in which transitions unfold” (McCauley & Stephens, 2012, p. 217). Consequently, *the geography of sustainability transitions* has recently emerged as a new field of research (for literature reviews, see Hansen and Coenen (2015) and Truffer *et al.* (2015)). In this field, scholars seek to extend and complement existing literature by integrating concepts such as space, place and geographical proximity into research on sustainability transitions (Truffer *et al.*, 2015). Scholars in this field call for more studies on environments or spaces that can function as a loci of innovation (Longhurst, 2015). Similarly, Smith *et al.* (2014) point out that there is a lack of studies that seek to contribute to the understanding of niches (*i.e.*, spaces that act as incubators for novel ideas) and how their characteristics influence sustainability innovations. Recent contributions in this field emphasize the importance of industrial specialization of places, such as geographical clusters, in advancing sustainability transitions (Hansen & Coenen, 2015). Still, there is a need for more in-depth studies that highlight the concrete functions and social dynamics of such places (McCauley & Stephens, 2012).

FVoB, which is a cluster initiative with an industrial specialization of sustainable food production makes an interesting case for achieving in-depth insights that may advance research on sustainability transitions by extending and complementing current literature. Due to the urgent need for developing sustainable solutions for future food production, there is a need for places that can facilitate such development. Studying this case may lead to valuable insights on how this type of cluster initiative emerge and function. Such insights may lead to concrete know-how knowledge on how to go about to achieve the goals of the forthcoming national food strategy of Sweden.

1.4 Aim and research questions

The aim of this study is to explore a cluster initiative designed for contributing to sustainable development by paving way for innovative sustainable solutions for future food production. In order to reach this aim, the following research questions are phrased:

- How can the design of the cluster initiative facilitate development of sustainable solutions for future food production?
- How has the cluster initiative emerged?
- What are the conditions for collaboration in the cluster initiative to work?

1.5 Delimitations

Empirically, this study is limited to a single case study of the industrial cluster initiative FVoB. Also, due to the nature of this particular case, the study is also limited to the Swedish food industry and organizations that are involved in FVoB. Furthermore, the perspectives of all actors that are or have been connected to FVoB are not represented in the empirical study for two main reasons: 1) they either do not fulfil the criteria of being explicitly focused on food production; or 2) due to practical complications such as difficulties of getting in touch with previously involved actors, and some unforeseen events further explained in section 2.2.4 in the method chapter. Moreover, the interviews in this study are in all cases but one (a

personal interview) conducted by phone. Finally, the results mainly build on the researchers' own interpretations of the narratives offered at a specific point in time.

Theoretically, the domain for this study is the field of sustainability transitions. Within this field of research, there are many possible models from which one of the more prominent has been adopted. As this field of research is generally considered as abstract, theory on clusters, along with theory on concrete functions of clusters have been adopted in order to conduct an in-depth study of this real world case. Furthermore, there are multiple theoretical tools available to study the social dynamics of an environment from which the concept of social capital has been chosen.

1.6 Outline of the study

The first chapter (Introduction) of this thesis offers an introduction to the empirical and theoretical problems and how this study aims to address these. This chapter is followed by an account for the methodological choices (Method) that are made throughout the study, and what implications these choices may have on the results. Chapter three (Theory) presents the different theoretical perspectives, which are then combined in a theoretical synthesis. The fourth chapter (Empirics) presents the empirical data collected throughout the study, which is analyzed and discussed in chapter five (Analysis & discussion), which is structured based on the research questions of the study. Finally, in chapter six (Conclusions) the conclusions and future research suggestions are presented. For a schematic illustration of the outline for this thesis, see figure 1.



Figure 1. Schematic illustration of the outline for the thesis.

2 Method

This chapter provides an account of the methodological choices that have been made in the study. Throughout the chapter, these choices are presented, motivated and problematized. The study is carried out with a flexible research design and as a single case study. Also an account for the data collecting and literature review processes are presented. Finally, an explanation of how the collected data has been analyzed is offered.

2.1 Research design

The aim of this study is to “to explore a cluster initiative designed for contributing to sustainable development by paving way for innovative sustainable solutions for future food production”, where in-depth insights about its potential, emergence and functionality are sought. Therefore, a qualitative and flexible research design is used, which means that the proceedings in the research process are not specified in exact detail before the process is initiated (Robson, 2011). In this research design, sources of data and theoretical insights are not predetermined, but may continuously extend and develop over time. Employing a flexible design therefore allows for new ideas to be brought in as data is collected, which makes it possible to constantly review the theoretical approach to create a good fit with the overall aim of the study (Robson, 2011). In this way, the study is empirically driven (*i.e.*, inductive) which is preferable when the phenomenon in focus is relatively unexplored (Robson, 2011).

An alternative approach is the fixed research design, where the research process is planned in detail beforehand (Robson, 2011). This approach may be useful if the objective is to test causal relationships between different variables and to draw conclusions about a population from tests on a smaller sample. Although, when studying unexplored and complex phenomena this is often not the goal, as variables first need to be distinguished, for which a flexible design is better suited (Robson, 2011). While the choice of a flexible research design is considered suitable for the overarching aim and research questions of this study, it does imply some challenges that need to be addressed. As this design involves a number of choices that have to be made continuously throughout the process, the subjective interpretations of the researchers will inevitably affect the outcome of the study (Robson, 2011). Although this is something that can be said to apply to all research, to some degree (Bryman & Bell, 2013), it is particularly true when a flexible design is adopted, as this design relies on researchers' interpretations to a great extent (Robson, 2011). Questions regarding how to secure a high degree of trustworthiness thus become imperative (Denzin & Lincoln, 2005). Since it is difficult to determine what effects the researcher might have had on a study, openness about the whole research process becomes vital to achieve trustworthiness (Golafshani, 2003). Therefore, in this study, the different steps in the data collection process are disclosed in a logbook (see appendix 1), to increase transparency and be as elaborate as possible regarding the different steps in the research process. Further, the trustworthiness of a qualitative study depends on the concepts of credibility and dependability (Golafshani, 2003). To ensure credibility it is important to have clearly stated and well underpinned research questions, a research design that corresponds well with the questions, appropriate methods of sampling, a systematic management and correct analysis of data (Baxter & Jack, 2008), all of which are argued for throughout this chapter.

Dependability (*i.e.*, consistency of the findings), can according to Baxter and Jack (2008, p. 556) be ensured by “having multiple researchers independently code a set of data and then meet together to come to consensus”. By performing this study as a pair of researchers enabled a process where data could be reviewed independently at first and later compared. This has also allowed for a process where one another’s subjective thoughts and ideas could be challenged constantly, ultimately leading to more refined results than could have been achieved if both had worked independently.

2.2 Case study

This thesis is based on a single case study, which is appropriate when existing theory seems inadequate, partly for its potential in generating new theory (Eisenhardt, 1989). In this type of study, the number of study objects are generally few, which allows the researcher to study these objects in detail. Case study research is also appropriate when the study focus is on a contemporary phenomenon, *i.e.* a continuous and evolving process (Yin, 2013). Case study research is applicable when there is a need to understand the complexity of social phenomena (Yin, 2013). From these arguments it becomes clear that the case study format is rooted in the research paradigm of constructivism. According to Golafshani (2003, p. 603), within this research paradigm knowledge is seen as “socially constructed” and something that “... may change depending on the circumstances”. Based on this short review, the case study format seems well suited to obtain in-depth insights of a continuously evolving real-world case as is the focus in this study.

While case study research implies little scope for statistical generalization (*i.e.*, drawing conclusions about larger populations from smaller samples), this is usually not the intention (Yin, 2003). Instead, the emphasis lays on creating a deeper understanding of a phenomenon in its specific context (Robson, 2011) leading to rich insights. However, in this type of study it is possible to achieve analytical generalization, which means that the theoretical framework that is developed throughout the data collection process may be adopted by other scholars and applied to similar cases (Yin, 2003).

The case of this study is the industrial cluster initiative FVoB, which is communicated as a unique initiative focused on developing solutions for future food production (www, Bjuv’s municipality, 1, 2015; www, Findus, 1, 2016). Due to the daunting challenges that characterize the food industry, it is important to seek new solutions for this industry. Because of the current political focus of the Swedish government to develop a new food production strategy, which in part focus on strengthening the innovation power of the industry and meeting environmental goals, the Swedish context is particularly suitable for this study. The idea of FVoB is for multiple actors to come together and through collaboration develop such solutions. The case study format, where the cluster as a whole represents the unit of analysis is thus appropriate as it allows to consider the influences from several different actors.

According to Bhattacharjee (2012, p. 93), “case research can help derive richer, more contextualized, and more authentic interpretation of the phenomenon of interest than most other research methods”. Because of this, performing a case study on an ongoing initiative that aims at finding new solutions for the food industry like FVoB, allows for obtaining concrete and valuable insights.

2.2.1 Data collection

In order to ensure the quality of this study, data is collected from multiple sources. This procedure is referred to as triangulation and is recommendable in the case of using a flexible research design as it increases the credibility of the study (Yin, 2013). The primary data has been collected through semi-structured phone interviews, and in one case, a personal interview. In addition, secondary data comes from several other sources that have been used in order to complement the data derived from the interviews. These sources include internal documents, web pages, press releases and news papers.

Interviews are valuable sources of information in case studies, as they allow for capturing detailed and rich explanations (Yin, 2013). For this study, semi-structured interviews have been chosen, as this type of interview ensures that important issues are covered, while allowing respondents to get into things that they perceive as important (Robson, 2011). In preparation for the interviews, an interview guide with general themes and open-ended questions was therefore developed (see appendix 2). Prior to the interviews, the respondents have been contacted by email or phone. During this initial contact, following the recommendations of Bhattacharjee (2012), respondents are given an introduction to the purpose of the study, information on how the interview material will be used, who else is interviewed, and how much time needs to be set aside for the interview. However, the introduction is kept on a comprehensive level, as disclosure of more detailed information may lead to a bias of the responses (Bhattacharjee, 2012). Because of this, specific questions have not been disclosed before the actual interview to avoid bias and to ensure that the responses are spontaneous.

All of the other interviews, except for the personal interview where it was not possible, were recorded and then transcribed to make sure it would be possible to return to the material and to maintain the respondents' own formulations. The process of transcribing the interviews also involves a careful review of the material (Bryman & Bell, 2013). Despite popular consent, a conscious decision was made to not perform any formal respondent validation (*i.e.*, where the transcript as a whole is sent to the respondent for validation), except for the personal interview that could not be recorded. Instead, validation was made orally and continuously during the interviews, in order to reduce the risk of misinterpretation. Mainly, this decision was made with the intention of maintaining the unprocessed perceptions of the interviewees, which may otherwise have been lost if the respondents were to alter their responses in retrospect. However, this decision puts high demands on the researchers to avoid misinterpretation, why extraordinary care has been taken into account during the process of transcribing the interviews. Furthermore, both researchers of this study have carefully gone through every transcript, and when there was any detail that needed to be clarified, follow-up emails or phone conversations were made. If any detail within the material has remained unclear after this process, it has finally been disregarded.

Phone interviews have many advantages, such as reducing the bias that may come as a result of personal characteristics of the interviewer (Bryman & Bell, 2013; Robson, 2011), and that they are generally easier to arrange due to their potential of eliminating requirements to travel (Robson, 2011). However, this type of of interview also come with some disadvantages, such as ruling out the possibilities of observing the context and being able to respond to subtle visual signals (Robson, 2011).

2.2.2 Choice of interviewees

In this study, interviewees were chosen based on their involvement in FVoB, and with the intention of getting a broad variety of different perspectives that could help depict a comprehensive picture of the cluster initiative. For an overview of the interviews that were performed in this study, see table 1. In the process of seeking potential interviewees, it was clear that Findus Sverige AB (Findus) and Bjuv's municipality were portrayed as the main driving forces behind the initiative. Also, a Vinnova project with the objective of carrying out a "meeting place project" within the boundaries of FVoB was identified.

Other organizations were contacted too, where the main selection criterion was the level of involvement of developing sustainable solutions for future food production, but also the recommendations from other respondents. In addition, Nyberg (see table 1) was contacted, based on his current and previous commitments in FVoB. During this interview, the perspective offered was mainly that of his previous role as Operational Director at Findus, as it was clarified that he currently does not have an active role in FVoB. Two additional organizations were contacted, but could not participate.

Table 1. Interviews conducted in the case study.

Organization	Respondent	Role	Interview type	Date
Findus Sverige AB (Findus)	Henrik Hjalmarsson	CEO	Phone	February 24th, 2016
Bjuv's municipality	Bengt Fellbe	Business coordinator	Phone	March 1st, 2016
Söderåsens Bioenergi AB	Rudolf Tornerhjem	Chairman of the board and owner	Phone	March 7th, 2016
Vegafish Bjuv AB (Vegafish)	Matilda Olstorpe	CEO	Phone	March 7th, 2016
WA3RM AB	Fredrik Indebetou	Co-founder and team member	Phone	March 9th, 2016
Ceres i Skåne AB (Ceres)	Henrik Nyberg	CEO (also Findus' former Operations Director)	Phone	March 23rd, 2016
Meeting place project	Christina Skjöldebrand	Project manager	Personal interview	April 5th, 2016

In most cases, it was clear which representative from each organization who was best suited to participate in the study. However, there were also cases where it was less obvious. In those cases, where it was less clear who was the best suitable representative, contact was made with the organization asking who this person may be. For example, this was the case with Findus why contact was first made with the company's telephone exchange which further diverted to the company's executive assistant. This person explained that most informed person on the subject was the CEO and an interview was booked.

2.2.3 Ethical considerations

Ethical issues are important to consider in qualitative research where interviews are performed (Bryman & Bell, 2013). Such issues are especially important to consider when discussing matters regarding the respondent's private life (Bryman & Bell, 2013). In this study, all questions strictly concern professional matters, why the material can be considered as less sensitive than in the case of asking respondents about their personal life. Before every interview, contact was established with the organization through email or phone where the purpose of the study was declared. Also, after given consent, all but one interview could be recorded. As aforementioned, in the case where a recording was not conducted, careful notes

were made to reduce the risk of losing any important information. Furthermore, the material from this particular interview was validated by the respondent.

2.2.4 Significant occurrences during the research process

During the research process of this study, an event took place that will arguably have major effects on the dynamics within FVoB. On March 31st, Findus announced that it was to shut down its operations in Bjuv, based on a decision made by its owning company, Nomad Foods Ltd. (Findus, 2016). In large, the FVoB initiative revolves around Findus production, and losing that production will likely affect the other actors in different ways. In part because today, it accounts for many important inputs of other businesses such as Vegafish (www, ATL, 1, 2016) and Söderåsens Bioenergi (www, Land, 1, 2016). All in all, this makes the future of FVoB uncertain and there are now ongoing discussions about finding solutions that may mitigate the impacts of the announcement that Findus is shutting down (*e.g.*, www, ATL, 2, 2016, www, HD, 1, 2016; www, SR, 1, 2016). Even the Swedish Government has been engaged in this issue (www, 8till5, 1, 2016).

The announcement that Findus will close down its production in Bjuv pose an example of an event that has been out of control for the researchers. Naturally this event has had consequences for the research process, which is always a risk when conducting a case study like the one performed in this thesis. Although these events cannot be affected by the researcher, the important thing is to show awareness of their possible effects (Robson, 2011).

Since all interviews, apart from the one with Skjöldebrand, were held prior to this announcement, we deem it unlikely to have affected the responses of the respondents. As Skjöldebrand no longer had an active role in FVoB, this interview dealt exclusively with her experiences from previous activities, why the results from this interview is deemed to be unaffected by the announcement. However, it is possible that the interview with Hjalmarsson may have been affected by the forthcoming announcement, in the case that this decision had already been settled prior to the interview.

These circumstances led to a difficult decision on whether the announcement should be included in the study or be left out entirely. This announcement also led to a difficult decision regarding the continuation of the data collection process. It was decided that it should mark the end of collecting primary data through interviews, due to the risk that the announcement would shape the respondents' responses and create a peculiar balance in relation to the material derived from previous interviews. It was decided that this event will be included in a closing discussion but will otherwise not be addressed further, as this is beyond the scope of this study. It should be noted that the results obtained in this study are based on findings collected before the announcement. However, the results are still valuable as they offer insights about the potential of the cluster design, its emergence and functionality.

2.3 Literature review and theoretical framework

Beginning the research process by conducting a literature review of the overarching theme makes it possible to conclude what has already been studied, identify trends in contemporary research, and finding gaps where there are opportunities to make eventual contributions

(Robson, 2011). From this review, a broad aim and research questions can be developed, which is necessary to clarify the focus of the case study (Eisenhardt, 1989).

Following the identification of the FVoB case, a literature review was conducted on the Internet, using several databases for academic articles: Google Scholar, Primo, Scopus and Web of Science. In this initial search process, the focus was to identify trends and potential gaps in research concerned with development of initiatives that aim at creating sustainable solutions for future food production. In conjunction with this initial literature review, a first brief outline of the theoretical framework was developed to place the case in a theoretical context from which research questions and aim could be developed. The theoretical field of sustainability transitions was identified as a suitable theoretical context as it corresponds with the initial focus. Within this field of research, *Environmental Innovation and Societal Transitions*, could be identified as one of the leading journals why it was studied more thoroughly for insights on the current state of research.

After the interviews were conducted, a second stage of the literature review was performed. Now, the focus was to find theory more specifically suited for depicting the chosen case. This search process mainly focused on four themes: industrial agglomeration; recycling-based production; inter-organizational collaboration; and innovation management. Screening of the results lead to the identification of the theoretical concepts of clusters, industrial symbiosis and open innovation. The last two were identified as processes occurring within the comprehensive concept of clusters. Finally, after identifying these concepts it became clear that for collaborative efforts in clusters to function, some form of social structure needs to be in place. Following these insights, further literature was sought to find theory that could explain the social dynamics of clusters for which the concept of social capital was chosen. These last two stages of the literature review illustrate an iterative process of continuously developing the theoretical framework, based on the empirical insights obtained throughout the data collection process. Although this procedure makes it possible to give a rich explanation of the case, it also poses a risk of drifting away from the original topic, why it is important to continuously check and possibly refine the intended purpose of the study (Yin, 2013). To maintain a high degree of trustworthiness of the theoretical framework, all stages of the literature review are primarily based on academic articles published in peer-reviewed journals, and in some cases also academic textbooks.

2.4 Data analysis

Qualitative data analysis refers to an analysis of non-numerical data where the main objective basically is "... making sense of relevant data gathered ..." (Caudle, 2004, p. 417). In this thesis, most of the data used in the analysis comes from semi-structured interviews which generated a large amount of raw data. To be able to analyse this large amount of data it needed to be processed in order to make sense of it. Here this process meant a breakdown of the data obtained from the interviews which then were sorted and labeled based on similarities. This process can be referred to as thematic coding, which is an effective method when trying to make sense of qualitative data (Robson, 2011). First, a broad division where stories of historical events and perceptions of the present situation was made. Secondly, these two broad categories were sorted into subcategories and complemented with the other empirical data sources used in the study. These subcategories are reflected in the empirical chapter, which in combination with the theoretical framework constitutes the basis for analysis. As aforementioned, this process was at first carried out independently by both

researchers from which the findings were later compared. This can, according to Baxter and Jack (2008) increase the dependability of the findings.

As previously noted, the subjective features pertaining to the flexible research design and process of gathering qualitative data will always be a factor that the researcher needs to reflect upon (Robson, 2011). The subjective features permeate the whole research process and therefore also the process of data analysis. The process of dividing and analyzing data is in large dependent on the subjective interpretation of the researcher which will affect the final results (Bergman & Coxon, 2005). Bergman and Coxon (2005, p. 8) argue that the subjective character, pertaining to empirical research in general, is usually dealt with in three different ways by the researcher who can: “accept subjectivity as an unavoidable shortcoming; consider this a fault that can be partially eliminated through careful research design; or embrace this phenomenon as a natural part of research”. In this thesis, all of these ways of dealing with subjectivity are reflected upon.

3 Theory

In this chapter the theoretical perspectives that are later used in the analysis are presented. First, a brief introduction is given to the research field of sustainability transitions. In this section, an account is given of multi-level perspective (MLP), which is a comprehensive model often used to study sustainability transitions. Then follows a presentation to cluster theory, and the concepts of industrial symbiosis and open innovation, that may be understood as functions within clusters. Furthermore, the concept of social capital is presented, which is divided into three dimensions. Finally, this is followed by an account of some drawbacks associated with social capital.

3.1 Sustainability transitions

Sustainability transitions is a relatively new and growing area of research that has emerged in recent decades (van den Bergh *et al.*, 2011). The overarching question addressed in this field of research is how to go about to achieve sustainability in a wider systems perspective (*e.g.*, Markard *et al.*, 2012). For the purpose of this thesis, the concept of sustainability transitions is used as an introduction to place the case study into a wider context, where innovation activity at the micro-level is considered the starting point for societal development (Geels, 2002). This field of research highlights a problematic situation where such activities are constrained by institutionalized structures (*e.g.*, Geels, 2002).

Transitions as a concept was first coined in the 19th century when it was used to explain the systemic change regarding the abolition of slavery, and has since then been adopted in a number of different disciplines (Lachman, 2013). In the 1990s the concept was embraced within socio-technical research, partly due to the growing recognition of sustainability issues that emerged during the late twentieth century (Lachman, 2013). With the Brundtland report, published by the United Nations (UN) in 1987, sustainability was brought up as an overarching goal on the global agenda and a popular definition to the concept was presented: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 43). In the following decade, the ideas of sustainability gained increased interest in academia, where there was an increased interest of studying transitions towards sustainability, *i.e.*, sustainability transitions (Lachman, 2013). Such transitions have been defined as “... long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption” (Markard *et al.*, 2012, p. 956). Examples of such established socio-technical systems are transport, manufacturing and agriculture (van den Bergh *et al.*, 2011).

Throughout the years several approaches of studying socio-technical transitions have emerged (Lachman, 2013). Among the more prominent approaches in this branch of research is the MLP model presented by Frank Geels (2002) (see figure 2), which highlights innovation as the starting point for such transitions (van den Bergh *et al.*, 2011). The model is divided into three levels: 1) socio-technical landscapes (macro); 2) socio-technical regimes (meso); and 3) technological niches (micro), which are intertwined and affect the trajectory of a transition in different ways. These three levels are illustrated in figure 2.

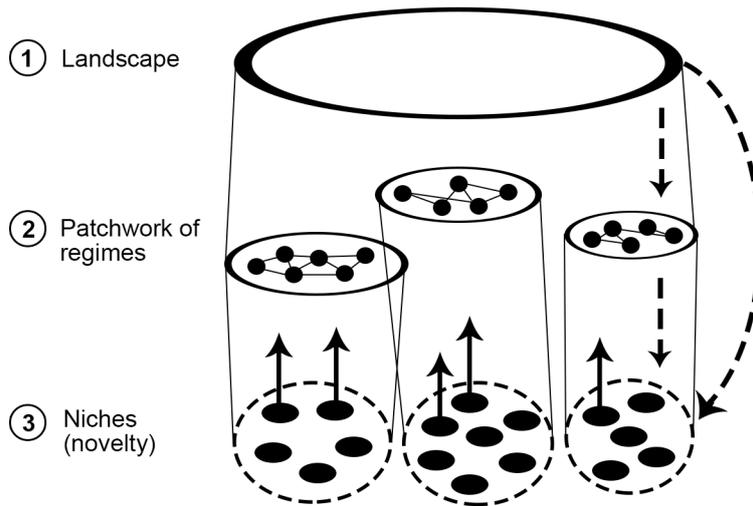


Figure 2. Illustration of the MLP model (based on Geels, 2002, p. 1261; own modification).

Technological niches, at the micro level of the model, are spaces that provide protection for novelties (Geels & Schot, 2007). However, despite the societal importance of niches and the novelties they foster, they are often subject to pressures (illustrated by the dotted arrows in figure 2) from the socio-technical regime and socio-technical landscape (e.g., decisions made on the basis of short-term profitability thinking). Because of such pressures, innovations often have a hard time developing to a point where they contribute to societal change.

Within the MLP, technology is not regarded as independent entities, but rather that structures evolve around it. These structures are depicted as “patchwork of regimes” in figure 2. Such structures are referred to as *socio-technical regimes*, which consists of a “semi-coherent set of rules carried by different social groups” (Geels, 2002, p. 1260). Together, those rules determine the stability of the system by offering behavioral direction to relevant actors (Geels, 2002), for example through cognitive routines, infrastructure, regulations and standards (Geels & Schot, 2007). Structures that co-evolve and build up around specific technologies help protecting these technologies (e.g., the infrastructure built around personal transportation), which makes it difficult for novelties to take off even though they may constitute a valid alternative.

The socio-technical landscape represents the macro level and forms an external context in which the other levels are situated in (Geels & Schot, 2007). This level is made up of more deeply rooted structures such as informal institutions, customs and traditions. Although the landscape level can create pressure on and affect the socio-technical regime and niche levels, it is more resistant to influence from these levels, and can not be influenced by actors in the short term (Geels & Schot, 2007). Changes in the landscape cause pressure on the present socio-technical regime and thus provide the basis for its restructuring. When the socio-technical regime is disrupted, a “window of opportunity” opens up, allowing niches to break into the regime (Geels & Schot, 2007). The trajectory of niches that are breaking into the regime are illustrated by the solid arrows in figure 2.

Within the research field of sustainability transitions, there is an increasing attention towards studying actual places where innovations take off (i.e., niche spaces) (Hansen & Coenen, 2015). More specifically, there is a need for more in-depth studies on concrete functions and social dynamics of actual places that can promote sustainable transitions (McCauley &

Stephens, 2012). To develop a toolbox that allows for in-depth analysis of such places, the following sections therefore present theory that can be used analyze such places.

3.2 Cluster theory

Following the development of globalization, increased mobility of resources and new demands regarding sustainability, the business environment has become more complex (Porter, 2000). Because of this, traditional ways of doing business are slowly being replaced by new alternatives (*e.g.*, Cohen & Kietzmann, 2014; Porter & Kramer, 2011). Porter and Kramer (2011) argue that companies are “trapped in an outdated approach to value creation” (p. 64) and that they must reduce their short-term thinking and increase their openness towards stakeholders. In this spirit, collaboration across organizational borders is becoming more common in dealing with overarching societal challenges such as environment issues and economic development (Huxham & Vangen, 2000). The basic idea of inter-organizational collaboration is that individual actors, by joining forces, can improve the possibilities to effectively deal with common problems – something Huxham (2003) refers to as the “collaborative advantage”. One collaborative concept that builds on this idea is cluster theory, developed by Michael Porter (1998).

Cluster theory builds on the notion that much of the competitive advantage that a company has lies outside of the boundaries of the organization and is strongly dependent on the physical location in which a business is set up (Porter, 1998). A cluster is defined as: “a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities” (Porter, 2000, p. 16). Porter (1998) argues that the potential of clusters lies in their stimulating effects on productivity, innovation and new business formation. Clusters create added value for those involved in the sense that their accumulated strength becomes greater than the sum of those actors’ individual strengths (Porter, 1998).

Applied to a real world case, cluster theory can be used to shed light on business activities as it depicts a bigger picture that is not offered in traditional industry categorizations (Porter, 2000). As can be inferred from the definition of a cluster, this perspective goes beyond focusing on individual firms in the sense that it also emphasizes their surroundings and connections to nearby actors. Although Porter’s idea of a cluster can facilitate the understanding of how collaborations can lead to a competitive advantage for its involved actors, it must be considered as fairly comprehensive. In reality the appearance of a cluster can vary in many ways (*e.g.*, size, characteristics of involved actors and clarity regarding cluster boundaries). In the following sections, two types of inter-organizational collaboration that may be the purpose or the result of a cluster, are described.

3.2.1 Industrial symbiosis

One concept that has emerged relatively recently and holds many similarities to Porter’s definition of a cluster is that of “industrial symbiosis”. Industrial symbiosis can be understood as a type of cluster which “engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water, and/or by-products” (Chertow, 2000, p. 313). The basic idea is to create an industrial ecosystem where one actor’s output can be utilized as another actor’s input (Frosch & Gallopoulos, 1989).

Through collaboration, businesses can generate value from resources that is originally treated as waste. In this way, industrial symbiosis builds on synergetic effects that create added value that would be impossible to achieve alone (Chertow, 2000). By reusing waste streams, industrial symbiosis can be understood as a more environmentally sustainable mode of production (Chertow, 2000). Improved resource efficiency also improves the economic performance for those involved (e.g., Chertow, 2000; Porter & van der Linde, 1995) and at the same time give rise to other, less tangible benefits such as improved social relationships and conditions for collaboration (Chertow, 2000). Kalundborg is a city in Denmark that is often pointed out as the first example of a cluster that builds on the ideas of industrial symbiosis (e.g., Chertow, 2000; Chertow, 2007; Chertow & Ehrenfeld, 2012). In this practical example, the symbiosis has had positive effects on both environmental and economic performance of the involved actors (Chertow, 2000).

When discussing the emergence of an industrial symbiosis, a main distinction between "planned" and "self-organized" industrial symbiosis systems is often made (Chertow & Ehrenfeld, 2012). The former implies that there have been conscious efforts to construct a symbiosis, while the latter occurs more organically and without any intention to consciously obtain symbiotic effects (Chertow & Ehrenfeld, 2012). When symbiosis emerges organically, it does so based on mechanisms for collaboration and interaction that have developed beforehand (Chertow & Ehrenfeld, 2012). This suggests that when trying to *construct* a cluster, some form of governance or orchestration principles needs to be in place.

Regardless of whether a cluster emerges organically or becomes the result of a planning process, it is evident that geographical proximity is essential. Therefore, the possibilities to establish this kind of cluster also depend on the ability to bring actors together to reach critical mass to commence. In order to obtain such concentrations of actors, scholars have pointed out the importance of "magnet organizations", described by Harrison *et al.* (2004) as "high-reputation technically oriented organizations, offering positions in a range of functional areas" (p. 1066). Similarly, in the industrial symbiosis literature, Chertow (2000) points out the importance of "anchor tenants" which refers to large industrial actors, such as power plants, that are central for attracting and later retaining an agglomeration of actors.

Also, establishing an industrial cluster based on symbiosis requires some form of capability to recognize the potential value in by-products and waste streams. In entrepreneurship literature such capabilities have been conceptualized as bricolage, which in short can be described as *creating something from nothing* (Baker & Nelson, 2005). A popular definition to this concept reads "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker and Nelson, 2005, p. 333). These authors point out that actors depend on the social context in which they are embedded, and explain that social skills and networking are important factors for bricolage (Baker & Nelson, 2005). This also suggests that in further development of an existing industrial symbiosis, the process of identifying new ways to utilize various waste streams depends on social interaction.

3.2.2 Organizing for innovation in clusters

Innovation is a word derived from the Latin "innovare", which means "to make new, alter" (Goodman & Dingli, 2013, p. 167) and was first introduced in the 1920s by Joseph Schumpeter (Hansen & Wakonen, 1997). Following the globalization of the world economy, the ability of firms to adapt fast to changing conditions and to innovate are often highlighted

as important factors for sustaining competitiveness (*e.g.*, Porter, 2000). As a result, the concept of innovation has become immensely popular among management scholars and practitioners (Crossan & Apaydin, 2010). Although there are differences of opinion regarding the meaning of the concept, innovation is generally linked to *novelty* and *originality*, and can be defined as: “a process of turning opportunity into new ideas and of putting these into widely used practice” (Tidd & Bessant, 2009, p. 16).

In the literature on innovation management, “open innovation” is a concept that has attracted a lot of attention lately (Huizingh, 2011). According to Huizingh (2011) one of the most commonly used definitions for the concept is: “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively” (Chesbrough *et al.*, 2006, p. 1). This closely relates to the concept of absorptive capacity, which refers to an organization’s ability to absorb external information, and in turn affecting its innovative capacity (Cohen & Levinthal, 1990). Furthermore, firms that engage in inter-organizational collaboration can get access to additional resources and do not solely have to rely on their in-house capacities in order to innovate (Chesbrough, 2003). In this way, collaboration can help smaller firms overcome obstacles for innovation (*e.g.*, lack of absorptive capacity, financial resources and how-to knowledge) (Omta & Fortuin, 2013).

Like the name entails, open innovation stands in contrast to closed innovation, which historically has been the common practice among businesses (Chesbrough, 2003). Closed innovation represents an innovation process that is inwardly focused in the sense that R&D (research and development) activities take place within the borders of individual businesses. In pace with the changing knowledge landscape (*e.g.*, increased knowledge mobility), this mind-set is being replaced with that of open innovation (Chesbrough, 2003). Within this paradigm, actors are more open for influences from outside their own business’ borders.

Territorial agglomeration is considered to provide “the best context for an innovation-based globalising economy because of localised learning processes and ‘sticky’ knowledge grounded in social interaction” (Asheim & Coenen, 2005, p. 1174). Because of the close proximity that characterizes clusters, the conditions for cluster firms to partake in open innovation processes are favorable. Also, based on Porter’s notion that “The health of the cluster is important to the health of the company” (2000, p. 16), these environments are likely to foster a collaborative mentality. In industrial symbiosis clusters, where firms develop interdependencies and are physically bound to each other, this mentality ought to be further reinforced.

Although the open innovation process described above demonstrates several potential positive effects on a single firm’s ability to innovate, there are also some challenges in getting the process to take off and work as intended. For example, managers often have preconceptions and fears of what it will mean to open up their organization to others, which can hamper collaboration (Gould *et al.*, 1999). This raises questions about how knowledge should be transferred between actors in a way where every part is satisfied.

Due to the issues related with establishing functional collaboration, it has become increasingly common with specialized actors such as network orchestrators, intermediary organizations or innovation brokers (Omta & Fortuin, 2013). Winch and Courtney (2007, p. 751) define the latter as “an organization acting as a member of a network of actors in an industrial sector that is focused neither on the organization nor the implementation of innovations, but on enabling other organizations to innovate”. This definition emphasizes that

it is an actor that is specifically oriented towards facilitating the process, without itself actively being a part of it. Research on open innovation highlights the importance of connectivity between actors in enhancing innovation performance. The reason to why actors specialize in orchestration of networks is generally due to a perceived lack of connectivity between actors that needs to be addressed (Omta & Fortuin, 2013). Because of the need for connectivity, an important task for such actors is the networking function which includes pairing suitable partners and facilitating the activities (Omta & Fortuin, 2013).

This subchapter on inter-organizational collaboration has mainly focused on describing some of the possible advantages that can be obtained by businesses working in clusters. The advantages that have been brought up are mainly related to knowledge exchange and flows of different types of resources between the actors of clusters. However, the functionality of a cluster should not be taken for granted.

Porter (1998, p. 19) early pointed out that “social glue binds clusters together”. Similarly, scholars on industrial symbiosis have begun to focus on the social aspects of the otherwise technologically oriented area of research. This has been highlighted in a recently published PhD dissertation by Spekkink (2016), where he describes industrial symbiosis as a social process. Within the field of innovation management, scholars frequently point at the importance of intermediary organizations in enhancing connectivity and facilitating innovation processes of clusters (*e.g.*, Omta & Fortuin, 2013). Something that becomes clear is that social interplay constitutes a crucial factor in understanding the complex reality of a cluster of interconnected companies. In the following subchapter, the concept of social capital is therefore introduced to shed light on some of the theoretical ideas on social structures and its linkage to economic activity.

3.3 Social capital

Barney (1991), famous for his contributions on the resource-based view of the firm (**RBV**), argues that a firm’s competitive advantage depends on its control of resources with specific characteristics. Wu (2008) argues, however, that the increased dynamic of today's business environment makes it difficult for businesses to rely exclusively on the resources and capabilities contained within the borders of individual businesses. He argues that there are increasing needs and opportunities to seek cooperation with other businesses, as this can provide access to complementary resources and capabilities that can help sustain competitiveness. Based on this logic, studies covering the emergence, development and processes of networks and different types of collaboration become more important.

Even though classical and neoclassical theories have made considerable contributions in explaining collaborative actions and networks (*e.g.*, Williamson, 1979), some shortcomings can be identified. Granovetter (1985) presents a broad critique of the neoclassical view for failing to capture the importance and influence of social aspects in economic activity. According to Granovetter, the neoclassicist view tends to treat “the social” as a standalone element in the periphery. In his opposing view Granovetter (1985) argues that economic activities are embedded in a social structure which he calls social embeddedness. By understanding the social structure one can better explain why certain economic actions take

place. A concept that has grown in popularity for its ability to highlight the importance of the social structure is social capital.

During the past three decades, in part following the aforementioned ideas of Granovetter, the concept of social capital has gained popularity. The concept was early adopted by economist Glenn C. Loury (1977) who, like Granovetter, was critical towards the individualistic orientation of neoclassical theory. Loury pointed out that an individual's ability to acquire human capital (skills and knowledge) in part depends on the social forces that surrounds the individual. Coleman (1988; 1990) later developed the concept further. Based on Granovetter's idea of social embeddedness Coleman explained that if economic action in a specific context depends on the social structure (*i.e.*, personal relations and network relations (Granovetter, 1985)), then those relations can be viewed as resources (Coleman, 1990). By treating relations as resources, a concrete concept was established that can function as the starting point for analysis on the effects of social structure on economic activity. Coleman (1990, p. 302) described social capital in the following way: "Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure." From this broad definition it becomes evident that social capital is a more evasive concept than other forms of capital like physical capital (*e.g.*, buildings and tools).

Since Coleman's definition, the concept has been used to shed light on a variety of issues such as public health, economic development and collective action (Adler & Kwon, 2002). Many definitions have been proposed which all share broad similarities but also possess some different nuances (Adler & Kwon, 2002). Adler and Kwon (2002) divide the definitions by their focus on either external relations (bridging form of social capital) and internal ties (bonding form of social capital). A definition of social capital that incorporates both types of ties reads: "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p. 243).

Nahapiet and Ghoshal (1998) use this definition in their study on social capital and intellectual capital. In this study, the authors develop a model that seeks to explain how different dimensions of social capital (structural, cultural and relational) relate to the creation of intellectual capital. In reality, these dimensions are often intertwined but are here separated in order to facilitate analysis (Nahapiet & Ghoshal, 1998). Building on this model, Inkpen and Tsang (2005) further develop a framework that seeks to explain the relation between social capital and knowledge exchange in different network settings (intracorporate networks, strategic alliances and industrial districts). For the purpose of this thesis, the focus is on the latter: industrial district, which holds many similarities to Porter's definition of a cluster, and is defined as "a network comprising independent firms operating in the same or related market segment and a shared geographic locality, benefiting from external economies of scale and scope of agglomeration" (Brown & Hendry, 1997, p. 133).

3.3.1 The structural dimension

The structural dimension of social capital can be explained as the architecture that outlines how different nodes are linked (or not) to other nodes in that network (Nahapiet & Ghoshal, 1998). This dimension also comprises the characteristics of networks and of the linked nodes

that constitute them. Some measures that can be used to describe network configurations are density (average tie strength), connectivity (how well connected nodes are) and hierarchy (strong ties to one central actor).

One of the more central aspects of this dimension of social capital is the notion of network ties (Nahapiet & Ghoshal, 1998). Network ties symbolize the social relations between different nodes within the same network. While it is possible to make a binary division of the concept (either present or absent), additional layers of information can be added to it, such as tie strength. Granovetter (1973) define tie strength as “a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie” (p. 1361). Like Granovetter, Melamed and Simpson (2016) mean that tie strength increases over time, and that it leads to increased cooperation propensity even when incentives to pull out also increase (Melamed & Simpson, 2016).

Scholars in the literature on innovation have emphasized the importance of weak network ties in generating novelty (*e.g.*, Granovetter, 1973). Rost (2011), however, points out that strong ties are also an important element of innovation in that they are potent in recognizing and realizing the opportunities that are often made visible through being embedded in a weaker network architecture. For networks seeking innovation capacity, it may therefore be fruitful to seek a balance between strong and loose ties (Rost, 2011).

For individual firms of industrial districts, the geographical proximity is beneficial as it helps forging ties and thus facilitates knowledge exchange between network members (Inkpen & Tsang, 2005). Because of the geographical proximity, network ties within industrial networks are often developed through informal and spontaneous encounters (Inkpen & Tsang, 2005).

Network configurations can also be described in terms of stability, explained by the rate at which members of a network join or leave (Inkpen & Tsang, 2005). In industrial districts this rate is generally high, resulting in relatively unstable networks. This instability can impose negative effects and at the same time be an opportunity for the individual firms that remain in the district when others leave. A negative effect of one actor leaving the network is the potential loss of knowledge and contacts. However, one actor’s exit could also bring about something positive. As connections between actors in this type of network are typically made up of personal contacts, they are often maintained even after a member has left. For those who stay in the district, the sustained relationship provides a source for new influences from outside, *i.e.*, improving absorptive capacity (Cohen & Levinthal, 1990). Similar to the potential effect of weak ties, this is something that may enhance innovative capacity by offering fresh perspectives (Inkpen & Tsang, 2005).

3.3.2 The cognitive dimension

Nahapiet and Ghoshal (1998, p. 244) define the cognitive dimension as “those resources providing shared representations, interpretations, and systems of meaning among parties”. Following this explanation, the authors identify two main assets of this dimension which they label *shared language and codes* and *shared narratives*. Sharing language and codes in the way Nahapiet and Ghoshal explain it refers to network members having a common understanding of the context in which they operate. This common understanding can benefit from network members having a shared vision of how to act (common values) and what should be the future outcomes (sharing goals) (Tsai & Ghoshal, 1998).

Inkpen and Tsang (2005) argue that when network members have an overarching shared vision or shared goal, a form of interaction logic can occur. This logic can function as a bonding mechanism which can facilitate knowledge transfer between network members (Inkpen & Tsang, 2005). However, for actors in an industrial district to want to participate in collaboration and exchange knowledge, it is essential that the benefits of collaboration are explicit (Inkpen & Tsang, 2005). Only when actors believe that such efforts can create value and strengthen their competitive position, the interaction logic occurs.

Shared narratives, or shared culture as Inkpen and Tsang (2005) put it, can be understood as informal norms and rules of a network. Since actors within the same industry are often subject to similar outside pressures, like that of an increased demand for responsibly produced products, a shared understanding tend to evolve over time. In industrial districts, individual actors have their own unique cultures, but tend to share a more comprehensive “industry recipe” with other actors in the district (Inkpen & Tsang, 2005). Unspoken codes of conducts tend to develop over time and can function as protective mechanisms against opportunistic behavior; actors who violate these codes of conduct may face the risk of severe social sanctions (Inkpen & Tsang, 2005). As the risk of opportunistic behavior decreases, the potential for collaboration is facilitated.

3.3.3 Relational dimension

The relational dimension described by Nahapiet and Ghoshal (1998) describes the personal relationships that evolve through repeated interactions between individuals. Based on Granovetter's (1992) concept of relational embeddedness, this dimension is meant to illustrate the role of personal relationship characteristics, such as trust and respect, in influencing the behavior of individuals. Nahapiet and Ghoshal (1998) identify some main assets underpinning this dimension: trust and trustworthiness; norms and sanctions; and obligations and expectations.

To trust and to gain trustworthiness could arguably be the one of the most essential aspects of being part of a network. Levels of trust affect the ease of knowledge exchange between actors in a network; high levels of trust facilitate it, while low levels of trust make an obstacle for it (Inkpen & Tsang, 2005). Like many other aspects of social capital, trust is something that develops over time and with repeated exchanges between actors (Inkpen & Tsang, 2005). The concept of trust has been studied in a variety of fields within the social sciences and from several perspectives (Hardin, 2002). One form that could be argued to be essential to a business relationship is what Hardin (2002) labels “trust as encapsulated interests”. Hardin calls this form a “minimal instance of trust” (p. 3) where one actor trusts another party because their respective interests encapsulate the other’s. Because of this, the trusting party expects the trusted party to fulfil certain obligations, based on a perceived understanding of the trusted party’s interests. In this sense, trust is therefore intimately intertwined with the concepts of obligations and expectations. For members of industrial districts, the propensity to exchange knowledge and other resources with other members increases with increased levels of trust (Inkpen & Tsang, 2005). Even though trust in inter-organizational collaborations is something that potentially develops over time it demands a lot of hard work from the different parties of a collaboration. Vangen and Huxham (2003) argue that in order to build trust, and in general making a collaboration work, parties of a collaboration must be involved in a “continuous process of nurturing” (p. 6). This nurturing process builds on the idea that clear, realistic goals must be agreed upon before entering into a collaboration. If these goals are

achieved there is potential for reinforcing trusting attitudes and through that establish a base for more ambitious collaboration (Vangen & Huxham, 2003).

3.3.4 Risks and drawbacks of social capital

Despite the many benefits associated with social capital, its outcomes can not unilaterally be considered positive. Coleman (1990) points out that: “A given form of social capital that is valuable in facilitating certain actions may be useless or even harmful for others.” (p. 302). In their article on the concept, Adler and Kwon (2002) point out the need to balance the risks and benefits of social capital. Just like other types of capital, social capital requires investments that cannot be reverted without additional costs (Adler & Kwon, 2002). As social capital is embedded in specific relations, investments in this type of capital may be particularly hard or even impossible to revert.

Furthermore, actors in a network can become “overembedded” in the social structure (Adler & Kwon, 2002). This means that actors too heavily rely on members of their immediate circle, which can lead to suppressed innovation capacity as a result of a reduced stream of fresh perspectives and ideas (*i.e.*, absorptive capacity). Relying on information from the same group of actors can lead to groupthink, where new ideas are suppressed by a dominant group logic (Janis, 1972). Powell and Smith-Doerr (1994) put it in the following manner: “the ties that bind may also turn into ties that blind” (p. 393).

Although trust is often seen as essential for building fruitful, well-functioning inter-organizational collaborations (Vangen & Huxham, 2003) it could also bring negative effects (Adler & Kwon, 2002). High levels of trust between, and loyalty among, businesses may for example inhibit innovation as it leads to a reluctance to seek and try out new ideas (Adler & Kwon, 2002).

3.4 Theoretical synthesis

The MLP model is frequently used in research on sustainability transitions to describe trajectories of system-wide technology transformations towards more sustainable modes of production and consumption (Markard *et al.*, 2012). Due to different pressures from the landscape (macro) and regime (meso) levels, innovation is developed in niches (micro), as these offer protection from such pressures (Geels, 2002). The current regime may be disrupted when it is subject to pressures from the landscape level, allowing for novel technology to break into the regime to replace old alternatives (Geels & Schot, 2007). This can contribute to changing the system to become more sustainable in a long-term perspective. Recently, research on sustainability transitions has been criticized for being too abstract (McCauley & Stephens, 2012), which can be seen as a result of using abstract models such as the MLP. Critics mean that there is a need for in-depth studies with an extended focus on actual places where innovation takes place (McCauley & Stephens, 2012). By complementing the MLP model with theory that offers tools for in-depth analysis of activities that occur in actual places, that represent the niche level in the model, the understanding of sustainability transitions can be extended and the level of abstraction reduced.

Cluster theory describes how geographically proximate actors collaborate and complement each other, leading to added value as the accumulated strength of these actors are greater than

the sum of each actor’s individual strength (Porter, 1998). Industrial symbiosis can be seen as a function of certain clusters where the basic idea is that one actor's output can be utilized as another actor's input (Chertow, 2000). This function enhances resource efficiency and may thus improve environmental and economic performance of those actors involved (Chertow, 2000). The geographical proximity between firms in a cluster, in combination with the physical interdependencies inherent to industrial symbiosis, create favorable conditions for firms to partake in open innovation; a paradigm within innovation management that can be seen as another function inherent in certain clusters. In open innovation processes, the boundaries of firms are blurred out to allow inputs from external sources, which leads to increased absorptive and innovative capacity for those firms involved, as they do not solely have to rely on their in-house capacities to innovate (Chesbrough, 2003).

Theory on social capital can be used to create a comprehensive understanding of the social dynamics of clusters. More specifically, social capital can be considered as a resource (Coleman, 1990) that is important for the functionality of clusters. The concept of social capital can be divided into three dimensions: structural, cognitive and relational (Nahapiet & Ghoshal, 1998). In different ways, these dimensions affect actors’ willingness to share knowledge (Inkpen & Tsang, 2005). Because of this, social capital is important for open innovation and industrial symbiosis, as these functions largely build on knowledge exchange.

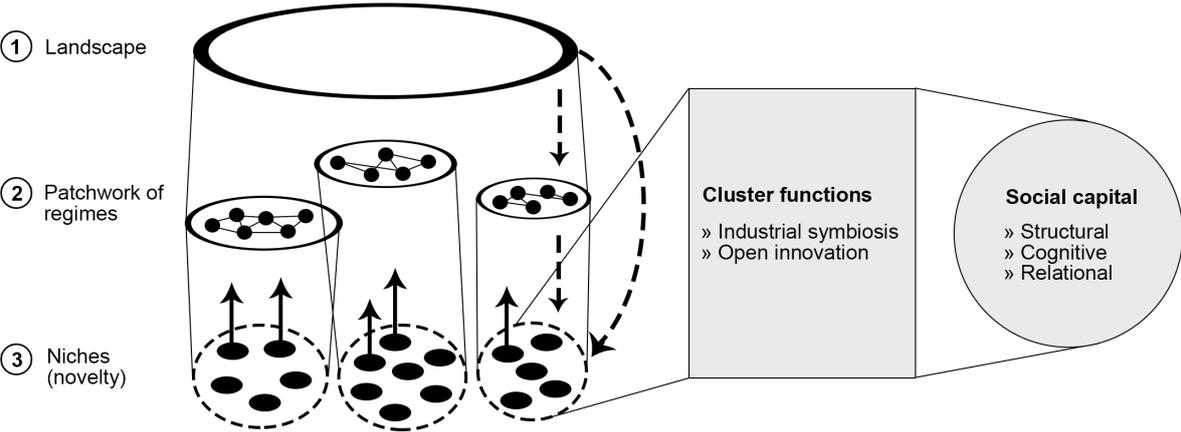


Figure 3. An outline of the theoretical framework (based on Geels, 2002, p. 1261; modified by adding complementary illustration of theory on cluster functions and social capital).

Figure 3 offers an outline of how the theoretical concepts described in this chapter are linked together. In this outline, the MLP is complemented with theory on clusters; industrial symbiosis and open innovation, which can be seen as specific cluster functions; and social capital. By doing so, a toolbox is developed that allows for in-depth analysis of the concrete functions and social dynamics within a niche space.

4 Empirics

This chapter begins with a presentation of the basic ideas of FVoB, as communicated on the websites of Findus and Bjuv's municipality. Then follows a background story, mainly based on the narratives of the respondents, that describes the steps behind the development of FVoB and its two areas of focus on recycling-based production and establishment of a "meeting place". Finally, the last part of the chapter offers the respondents' perceptions of FVoB and their experiences of being part of it.

4.1 The basic ideas of Food Valley of Bjuv

Among the actors in FVoB, Findus and Bjuv's municipality can be considered as its front figures. Both of these actors use their websites as channels for external communication where they present the vision for the FVoB initiative (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). On these websites, they present coherent views on the underlying motives behind the initiative, the chosen approach and anticipated outcomes.

Findus opens up with the following sentence: "Food Valley of Bjuv may sound like a utopia, but stands for Findus' endeavor to create a meeting place to develop future food production and food companies" (translated from Swedish, www, Findus, 1, 2016). Findus clarifies that this is a joint initiative that they run together with the municipality of Bjuv (www, Findus, 1, 2016). Similarly, Bjuv's municipality explains that this undertaking is something that includes multiple actors (www, Bjuv's municipality, 1, 2015).

On the websites of Findus and Bjuv's municipality, one can read that the overall idea is to create a *meeting place* where actors from academia, entrepreneurs and industry come together to jointly develop future food production (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). In Bjuv, an extensive infrastructure customized for food production is already in place and is provided for new actors that seek to establish themselves in FVoB. By gathering around this infrastructure, the overarching goals are to collaborate in creating sustainable food products, paving way for new innovative solutions and generating new job opportunities. Through the descriptions offered on these pages it is possible to distinguish two different orientations within the FVoB initiative: one that revolves around 1) creating a meeting place for generation of innovative ideas for food production and another that revolves around 2) recycling-based production (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). It is through the combination of these two orientations that FVoB is meant to lead to development of sustainable solutions for future food production.

The following section, based on the narratives of the interviewed actors and in some cases excerpts from news articles and press releases, describes the story behind the emergence and development of the FVoB initiative.

4.2 The development of Food Valley of Bjuv

It has proven difficult, if not impossible, to capture every single event that in some way has influenced the emergence and development processes of what we today know as FVoB. Depending on which one of the involved actors that offers their story on how the initiative has

come about, the picture always tends to look slightly different. However, each story offers something that can help explain these processes and thus also help to depict a more comprehensive understanding of the initiative.

Bjuv is located in Scania, which is Sweden's southernmost province with a history of food production (Martin & Moodysson, 2013, p. 176). Today, this region generates about 45 percent of the total turnover in the Swedish food sector (Martin & Moodysson, 2013, p. 176). This is also where Findus, one of Sweden's largest food companies, resides (www, Findus, 2, 2016). However, the collaboration that can be seen in Bjuv today has a long history and has not always primarily focused on developing solutions for future food production. Fellbe (pers. com., 2016), explains that "This is something that has evolved over quite a long time, but has found its current form in recent years." For about half a decade ago, it was rather energy that was the major focus (pers. com., Fellbe, 2016; pers. com., Tornerhjelm, 2016). Tornerhjelm insists that the ideas of collaboration came about when representatives from the local business community in Bjuv, along with the local government commissioner, went on a field trip to the Austrian town of Güssing (pers. com., Tornerhjelm, 2016). Güssing had been regarded as a dying city characterized by a weak economy and high unemployment rates – something that began to change when the city decided to invest in renewable energy (pers. com., Tornerhjelm, 2016). Becoming self-sufficient in energy enabled Güssing to retain more money and to develop a better prosperity (pers. com., Tornerhjelm, 2016). After seeing the success in Güssing, an interest for similar operations arose in Bjuv (pers. com., Tornerhjelm, 2016). Because of this, the mayor of Güssing, who is also the initiator of the operations in Güssing, was invited to an energy seminar in Bjuv (Findus, 2011). This newborn interest, that was inspired by Güssing, resulted in a collaboration named Söderåsens Biopark, which included the construction of a new biogas plant that could utilize waste from regional production sites and turn it into energy (pers. com., Tornerhjelm, 2016). The idea was to establish an industrial cluster around the renewable energy that the biogas plant could generate (Findus, 2011).

Fellbe (pers. com., 2016) also means that the collaboration in Bjuv started out as Söderåsens Biopark, and explains that it basically involved the same core of local businesses that are involved in FVoB today. Findus has always been a part of Söderåsens Biopark but initially played a more passive role. However, it has been an integral part since the beginning, as it accounted for the vast amount of substrate needed to reach economic viability of the biogas plant (pers. com., Tornerhjelm, 2016). During the period when Söderåsens Biopark developed, Findus was going through some turbulent years with issues related to financial performance, environmental impact and food traceability (www, HD, 1, 2013). By 2013, Findus present CEO Jari Latvanen wanted change and outlined a vision for a cluster (www, HD, 1, 2013). Inspired by Silicon Valley, he wanted to create a cluster for developing new solutions for food production (www, HD, 1, 2013). This side of the story is also confirmed by Skjöldebrand (pers. com., 2016), who prior to her commitments in FVoB had been working with Findus in previous undertakings. She visited Latvanen the same day that the news about food traceability scandal surfaced, and during this visit, she heard Latvanen articulate the ideas of building a Silicon Valley for food for the first time (pers. com., Skjöldebrand, 2016). According to Skjöldebrand (pers. com., 2016), this became the starting point for Findus to initiate what would become FVoB (pers. com., Skjöldebrand, 2016). Findus current CEO explains that there are four main observations behind the initiative, namely: 1) within the Swedish food industry, there are many innovative ideas that never materialize due to high entry barriers; 2) increased demand and need for healthy, sustainably and locally produced

food; 3) an already established infrastructure for food production; and 4) availability of expertise in production and commercialization of food (pers. com., Hjalmarsson, 2016).

Fellbe (pers. com., 2016) explains that it was when Findus stepped up and took a more prominent role that the local cluster was given a major food focus and changed its name to Food Valley of Bjuv. Through the previous initiative, the main resources of the municipality had been identified as large amounts of residual energy and a long history of food production in the region (pers. com., Fellbe, 2016). Because of this Fellbe (pers. com., 2016) means that it was only natural for Findus to take on a more prominent role. Nyberg (pers. com., 2016) explains that Findus had many empty facilities on its site, which also influenced Findus decision to initiate FVoB. This unused capacity had been risen when Findus' previous owner, Nestlé, sold the company in 2008 and left its Centre of Excellence for development and production of frozen food behind (pers. com., Nyberg, 2016). Previously, there had been about 2300 employees working in these facilities (pers. com., Nyberg, 2016), which can be set in relation to approximately 700 Findus employees in 2013 when FVoB was initiated (www, HD, 1, 2016). Hjalmarsson (pers. com., 2016) explains that by doing something with these unused resources, Findus could cover some of their overhead costs and at the same time contribute to generation of new ideas and food products.

Nyberg (pers. com., 2016) means that the ideas of the FVoB initiative originally has its roots in "Heja Skåne", a think tank where different imaginable visions for the future are chosen and for which different scenarios are developed. He tells us that FVoB first appeared as a scenario in that think tank. This scenario was presented by Åsa Josell (formerly Findus' Head of Innovation) and Henrik Nyberg in August 2013. This presentation revolved around four ideas: 1) creating an innovation forum for food producers; 2) smart food production for different needs in elderly care, home care, and schools; 3) installation of a hub that would support the activities in FVoB; and 4) gathering academia relevant for food production and connecting students to the industry. Since then the FVoB initiative has developed and somewhat shifted in focus. According to the current vision, there are two main orientations: one that revolves around establishing a system of recycling-based food production, and another that revolves around creating a "meeting place" for development of new ideas and products within the food industry (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). These two orientations will be further described in the following sections.

4.2.1 Recycling-based production

Today, the main focus of FVoB is to establish resource-efficient and sustainable food production. This is achieved by developing new solutions and products that utilize waste from adjacent production, making the system as a whole more efficient and sustainable. When Indebetou (pers. com., 2016) talks about the sustainability aspects of such a system, he explains that "Unless the system is sustainable from the beginning, there is a need to add something to it." For aspiring actors to become part of and being able to contribute to such a system, they do not necessarily have to be directly connected to any of the existing products, but may instead be a valuable addition in that they can create value from non-valued products such as waste (pers. com., Indebetou, 2016). In this sense, one actor's output becomes the other's input, resulting in a net improvement in terms of resource efficiency and overall sustainability performance (pers. com., Indebetou, 2016).

By making more efficient use of resources, economic performance and competitiveness are also enhanced. Fellbe explains that “By supplying actors with recycling-based fossil free heating at a low cost, production becomes both competitive and sustainable.” Nyberg (pers. com., 2016) mentions similar benefits: “Naturally, the actors that are best positioned to establish production in Bjuv is also those who can exploit the synergies, as this results in lower operating costs.” Besides suggesting enhanced competitiveness, he also points out that the operations within the system affect the future direction of it. In Bjuv, the primary physical resources that have been identified as surplus heat and energy (pers. com., Fellbe, 2016). Because of this, it is natural that the production currently in development in FVoB revolves around these resources. Today, there are essentially two major production orientations under development: the establishment of a shrimp farm and a greenhouse (pers. com., Hjalmarsson, 2016). Both types of productions are dependent on heat and energy, which makes them a good match for FVoB (pers. com., Fellbe, 2016).

Today there are several exchanges of residual streams between different actors in FVoB. At the heart of these streams is Findus, which in this context is by far the largest actor (pers. com., Nyberg, 2016). Findus has been operational in Bjuv since the 1940s (www, Findus, 2, 2016). Today, its production of frozen foods employs hundreds of people and accounts for most of the surplus heat that is generated in FVoB (pers. com., Nyberg, 2016). In addition, the production also generates carbon dioxide and substrate in form of spillovers from different processes of food production, such as pea farming and sawing frozen blocks of fish (pers. com., Fellbe, 2016).

Söderåsens Bioenergi is a company that owns a biogas plant near Findus production plant in Bjuv. As mentioned previously, this was initially the starting point for cooperation around Söderåsens Biopark. Here, many residues from the food production in FVoB are sent to be converted into bio-fertilizer and energy. In addition to making FVoB less dependent on fossil fuels, the bio-fertilizer that this plant generates can be used in the fields where Findus' vegetables are grown.

Vegafish is a company that has been initiated by researchers, mainly within the fields of aquaculture and microbiology (pers. com., Olstorpe, 2016). The business has specialized in development of sustainable solutions for aquaculture (*i.e.*, farming of fish and shellfish). Due to the controversial conditions that often characterize conventional farming of giant shrimp, Vegafish recognizes that there is a demand for a similar product that is produced in more sustainable ways (pers. com., Olstorpe, 2016). During a seminar, hosted by Swedish Surplus Energy Collaboration (SSEC), Vegafish was approached by Findus as it had found Vegafish to be a perfect match to complement their ongoing operations in Bjuv (pers. com., Nyberg, 2016; pers. com., Olstorpe, 2016). By establishing in Bjuv, Vegafish could set up production that allowed for more sustainable shrimp farming by utilizing waste heat and food waste from adjacent production to heat its pools and feed its shrimp (pers. com., Olstorpe, 2016). A waste product that comes from Vegafish's production are shell remnants – something that can be utilized by Söderåsens Bioenergi (pers. com., Olstorpe, 2016).

WA3RM is the latest addition to FVoB. One of its founders, Indebetou (pers. com., 2016), describes it in the following way: “WA3RM is a project company that specializes in recycling of residual currents by guiding them into new infrastructure and then, with the help of other processes, create new commodities.” Its role in FVoB is to coordinate a Vinnova financed project with the goal of building Sweden's largest and most climate smart greenhouse, in which an aquaculture system will be integrated for synergetic effects (pers. com., Indebetou,

2016). Indebetou explains that “We have had a previous collaboration with Findus and were invited to come and look over its operations in Bjuv.” The planned greenhouse is supposed to be heated by residual heat and utilize carbon dioxide from Findus (pers. com., Olstorpe, 2016). Water from the intended aquaculture plant flows through the greenhouse, where it adds nutrients to the plants, and at the same time is purified before it is returned to the aquaculture facility again (pers. com., Olstorpe, 2016). Through photosynthesis, the carbon dioxide added to the greenhouse is converted to oxygen, which is then led into the aquaculture system for better distribution of oxygen in the water (pers. com., Olstorpe, 2016). A waste product from the vegetables grown in the greenhouse is haulm, which can be used in the biogas plant of Söderåsens Bioenergi.

4.2.2 Food Valley of Bjuv as a “meeting place”

The idea of a meeting place where actors can exchange knowledge and help develop each other is something that is supposed to permeate the business environment in FVoB (pers. com., Fellbe, 2016). Fellbe (pers. com., 2016) explains that, because of the recycling-based system, links between the different actors are created which facilitate interaction and increase the chance for new ideas to emerge. Today, it is these natural links that occur between established actors within FVoB, that is primarily understood as a meeting place. However, early on the “meeting place” concept took on a slightly different meaning when it was run as a concrete project to set up something similar to a traditional business incubator. This project had the goal of creating a meeting place for innovators and entrepreneurs in the food industry, where they could come together and develop new ideas with the help of a supportive organization (www, Vinnova, 2, 2014).

Skjöldebrand (pers. com., 2016) recalls that she along with Åsa Josell (Findus’ former Head of Innovation), whom she knew from previous work, were discussing solutions for how to facilitate the development of new innovations in the food industry. Skjöldebrand (pers. com., 2016) explains that during this discussion, she was browsing Vinnova’s website. Here, she stumbled upon an announcement where there was a call for different meeting place projects for entrepreneurs and innovators. Vinnova would fund the implementation of the applications that were accepted. This also excited Josell, and as it was in her interest to continuously improve the innovation apparatus at Findus, she decided to apply. Findus received funding from Vinnova and Skjöldebrand took on the role as project manager (pers. com., Skjöldebrand, 2016).

The project was carried out in three stages: 1) identifying and contacting potential participants; and 2) getting together, identifying needs and jointly develop solutions for those needs. For the former, Skjöldebrand (pers. com., 2016) utilized her own network of contacts within the food industry to gather fifteen participating companies; 3) pilot project of the results from the first two stages. In the getting together stage, Skjöldebrand organized workshops in which different ideas were developed. She (pers. com., Skjöldebrand, 2016) feels that the project was successful, but that it began to fade when Josell left Findus, and was not followed up by anyone else in the company. The implementation of the ideas that were developed within the framework of the meeting place project was therefore carried out elsewhere. Three projects have been carried out separately and are running outside the framework of FVoB.

4.3 Actor perceptions of being part of Food Valley of Bjuv

Within the context of FVoB, every actor plays a unique role and is involved in its development in different ways. While everyone agrees that FVoB is ultimately something good, it is perceived differently among the actors that constitute its building blocks.

With the following words: “What it is is determined by what it becomes”, Hjalmarsson indicates that the vision for FVoB is not set in stone but rather something that is constantly evolving. This open mindset regarding the vision’s development seems to be shared by some of the other actors in FVoB. For example, according to both Fellbe (pers. com., 2016) and Tornerhjelm (pers. com., 2016), FVoB has always been an industrial initiative with the potential of creating new jobs and prosperity in Bjuv. Both of these actors have welcomed the increased commitment from Findus' and believe that the increased focus on food production has also strengthened the initiative by making it more clearly profiled.

Among other actors, however, the floating vision is sometimes perceived as problematic. Olstorpe (pers. com., 2016) feels that currently, the vision is “Yet nothing more than a name on a paper.” She recognizes that there is a lot of hard work behind the vision, but that more could be done in order to realize it: primarily by facilitating the establishment process of new businesses. Likewise, Skjöldebrand (pers. com., 2016) has also encountered problems due to the floating vision: with an increased focus on production establishment, the "meeting place" part of FVoB as it was planned when it started (*i.e.*, as a concrete project) has faded.

4.3.1 Perceived benefits of collaboration in Food Valley of Bjuv

Among the potential benefits of this type of cluster, Hjalmarsson (pers. com., 2016) means that it makes it possible for more innovations in the food industry to reach the market, something that has proven difficult due to high entry barriers. It also offers a way of producing food in more environmentally sustainable ways, which is becoming an increasingly important issue (pers. com., Fellbe, 2016; pers. com., Hjalmarsson, 2016). At the same time, it corresponds with an increased demand for locally produced food (pers. com., Hjalmarsson, 2016), in particular for products that otherwise would have to be imported (pers. com., Olstorpe, 2016).

All of the respondents express that there are many benefits that come from this type of partnership. Something that everyone emphasizes are the benefits that lay in the existing infrastructure. Fellbe (pers. com., 2016) explains that “One of the biggest advantages for new companies is that they do not need to reinvent the wheel. They can take advantage of what already exists, for example logistic solutions and market knowledge.” Although everyone agrees that the existing infrastructure is a major advantage, most also seem to agree that it could be utilized to a much greater extent. Regarding the facilities available on site, Indebetou (pers. com., 2016) explains that “It could easily be utilized much more. There are quite large areas available.”

Several actors point out the synergies of the recycling-based production system as something valuable. This is particularly true for Olstorpe (pers. com., 2016) and Indebetou (pers. com., 2016), whose business ideas are largely built on utilizing the residual streams from other industries. Fellbe (pers. com., 2016) means that “Businesses that come here end up in a context where they get access to some of their basic inputs in a cost efficient and sustainable

way.” Nyberg (pers. com., 2016), too, highlights the cost benefits of being part of FVoB and argues that synergies makes it less costly for new businesses to set up production, and that their operating costs can be lowered. Regarding the fact that the actors who are part of the recycling-based production system become interdependent, Olstorpe (pers. com., 2016) explains that there are two sides to the coin. On the one hand it can be risky, why it is important to always have a backup plan to fall back on, so that you do not put your faith entirely in the hands of others. On the other hand, the interdependency can also facilitate collaboration because actors are dependent on each other’s success, and then become more inclined to find common solutions. However, she means that the benefits outweigh the risks (pers. com., Olstorpe, 2016). In the task of building a greenhouse in combination with an aquaculture facility, WA3RM collaborates with Vegafish, which possesses expertise knowledge in aquaculture (pers. com., Indebetou, 2016; pers. com., Olstorpe, 2016). Olstorpe (pers. com., 2016) explains that she has no problems of helping other actors by sharing the technical knowledge of Vegafish, as she believes it is through dialogue with others one may find different solutions that can help develop both parties. This approach to collaboration is also shared by Indebetou (pers. com., 2016), who means that in today’s society with a globalized economy, challenges are more cross-border in nature, making collaboration between organizations necessary. In a similar way, Fellbe (pers. com., 2016) means that because the idea is to develop a system where everybody is dependent on each other, a natural connection will develop. He explains that different parties have greater incentives to help develop each other, which facilitates communication between them, and with it the possibility to learn from one another (pers. com., Fellbe, 2016).

Despite the strong focus on recycling-based production, finding a place within that system is not an absolute necessity for prospective businesses (pers. com., Nyberg, 2016). Nyberg (pers. com., 2016) explains that no actors seeking to establish in FVoB are met with shut doors, but that it is ideal if they can utilize waste streams from other actors, leading to valuable synergies. In the case of food producing businesses, he means that it is inevitable for such synergies to occur (pers. com., 2016). Nyberg (pers. com., 2016) holds the possible synergies that prospective companies can achieve by coming to FVoB as its primary source of attraction. Because of the dense concentration of producing businesses, there is also a considerable scope for service-oriented businesses to settle in FVoB, as they have the potential of getting more customers in the same small area (pers. com., Nyberg, 2016).

Geographical aspects also give rise to different benefits pointed out by several actors. For example, Indebetou (pers. com., 2016) believes that the proximity to the continent is one of the main advantages. Similarly, Tornerhjelm (pers. com., 2016) argues that the geographical location of Bjuv is optimal when it comes to logistics, and points to the fact that many Swedish logistics businesses are located around this region. Also, that Bjuv is located in a region with a history of food production and houses one of Sweden’s largest food producers, also seem to have made its marks. Here, there are far-reaching plans for food production and Nyberg (pers. com., 2016) explains that one of the advantages lies in the adjacent land that is already scheduled for that purpose, which makes it quick to set up new production.

Another important benefit pertaining to FVoB, highlighted by several actors, is the explicit focus on food production. Fellbe (pers. com., 2016) means that because of this focus and the recycling-based orientation, the connection to and communication with established actors have been improved. FVoB fits with the overall vision that the municipality has for the development of the local industry (pers. com., Fellbe, 2016). He explains that “This [FVoB] is where our focus lies and that in turn facilitates communication because we speak the same

language, we want the same thing!” and concludes that: “Naturally, if you have the same goal in mind and share the same values, communication will be facilitated” (pers. com., Fellbe, 2016). Skjöldebrand (pers. com., 2016) also emphasizes the importance of establishing an environment that has a strong focus on food production in order for new innovations in that area to develop.

4.3.2 Perceived challenges of collaborating in Food Valley of Bjuv

Although the actors in FVoB point to many advantages of the collaboration, it is also associated with some difficulties. The sort of collaboration that goes on in FVoB requires a new type of open mindset (pers. com., Indebetou, 2016; pers. com., Olstorpe, 2016), which is not always present in old business structures where there is a tendency to think in terms of *ours* and *theirs*. Indebetou (pers. com., 2016) explains that “For businesses that collaborate, they often have to think about what their core business is, and I think that is a challenge for many industries today. It requires a completely different mindset and structure to dare being border-crossing between businesses. That is troublesome for many.” Similarly, Olstorpe (pers. com., 2016) says that an old approach to business, where everyone focuses exclusively on their own commitments, is often structured in older companies which can be difficult to change and constitute an obstacle for collaboration. She emphasizes that “It is through dialogue with others one sees that there are different types of solutions that can develop both the own business and that of others. We have a global population that needs good food, and it is only achievable through joint efforts.” (pers. com., Olstorpe, 2016).

Some respondents express that short-term thinking can sometimes be an obstacle to cooperation. Tornerhjelm (pers. com., 2016) means that this sort of thinking characterizes much of today's business environment and makes one of the major challenges for collaborations to work. He argues that “You have to be very persistent to make something like this [FVoB] work.” Skjöldebrand (pers. com., 2016) seems to share this view as she emphasizes the importance of endurance in this type of endeavor.

For Olstorpe (pers. com., 2016), the cooperation in FVoB has so far mainly revolved around Vegafish and Findus, which she explains has not always worked great. She believes that there are small things that are not completely thought through, that could easily be worked over to improve the collaborative environment (pers. com., Olstorpe, 2016). The businesses that make up FVoB today are mainly located within the premises of Findus production site (pers. com., Olstorpe, 2016). Because of this, Olstorpe (pers. com., Olstorpe, 2016) means that it is also important for Findus to develop ready solutions that can facilitate for prospective businesses that wants to establish on site. Olstorpe (pers. com., 2016) also feels that there is a slight mismatch between what Findus communicates and how things work in reality. She had, for example gladly utilized existing facilities to a greater extent, but feels that she has been met by “shut doors” (pers. com., Olstorpe, 2016). This is something she believes has to do with that the ideas pertaining to FVoB might not yet be anchored within Findus' organization (pers. com., Olstorpe, 2016).

Other difficulties that some of the respondents associate with the development of FVoB concern the issue of securing resources for different needs. In part, this is shown when respondents express different opinions on who should be responsible for financing. For example, Skjöldebrand (pers. com., 2016) says that many of the companies that participated in the “meeting place” project expected Findus to invest in it more than they did. Hjalmarsson

(pers. com., 2016) explains that Findus has kept a dialogue with the municipality regarding the issues of financing. Due to the potential of generating new jobs in Bjuv, it has been proposed that the municipality could step up as a sponsor (pers. com., Hjalmarsson, 2016). Nyberg (pers. com., 2016) concludes that for any major initiative, such as the one in Bjuv, financing is a crucial step. He explains that “Raising capital has been the single most difficult issue” and “Despite the many praises and cheers coming from different directions, money did not come until fairly late in this process.” (pers. com., Nyberg, 2016). Nyberg (pers. com., 2016) perceives that things drastically changed for the better when the project, coordinated by WA3RM, received money from Vinnova. He means that this has improved opportunities to bring in people, something that is necessary for FVoB to develop further (pers. com., Nyberg, 2016).

Indebetou (pers. com., 2016), whose company WA3RM specializes in exploiting and creating value in the residual currents, thinks that one of the obstacles in establishing a recycling-based system is the tendency to initiate it as a goal rather than letting the symbiosis evolve organically. Having a clear idea of what should be done beforehand alters the conditions for cooperation and thus likely also the outcome.

4.3.3 Perceptions of driving forces within Food Valley of Bjuv

In discussions with the respondents it is possible to discern a pattern: some names of the people involved in initiating and developing FVoB tend to recur more frequently than others. Among these names, some are also pointed out as particularly important driving forces for the development of FVoB. Primarily, these names belong to former Findus employees, who for various reasons have left the company and work with FVoB behind. This is consistent with Nyberg's (pers. com., 2016) explanation that it is essentially Findus that has driven the initiative. Skjöldebrand (pers. com., 2016) means that it was Findus' former CEO, Jari Latvanen, who formulated the initial vision of FVoB. In addition to Latvanen, she also points out two other former Findus-employees that were actively working with FVoB: Henrik Nyberg and Åsa Josell (pers. com., Skjöldebrand, 2016).

Nyberg's name also recurs more frequently in the discussions with other actors. By many, he is described as one of the key figures of FVoB (pers. com., Fellbe, 2016; pers. com. Olstorpe, 2016; pers. com., Skjöldebrand, 2016; pers. com., Tornerhjelm, 2016). Skjöldebrand (pers. com., 2016) explains that during her time in Bjuv, she perceived Nyberg as Latvanen's right hand. In his role as Operations Director, he was a strong driving force for the part of FVoB that revolved around establishment of recycling-based production (pers. com., Skjöldebrand, 2016). This is confirmed by Olstorpe (pers. com., 2016), who explains that “Henrik was incredibly driven and made sure that things happened. That driving force is not quite there since he left Findus in 2015.” In addition to more production-oriented tasks he was also very involved in other aspects of FVoB. For some time, he set up an office at Ideon Medicon Village to learn more about how to work in incubators (pers. com., Skjöldebrand, 2016). Although he is held up as a strong driving force for FVoB, Nyberg (pers. com., 2016) himself, however, explains that FVoB was something he ran on the side of his regular tasks that were of higher priority.

Josell is also pointed out as one of the initiators and driving forces of the “meeting place” project in FVoB (pers. com., Skjöldebrand, 2016). Like Latvanen and Nyberg, Josell has moved on and left Findus and FVoB behind, which means the loss of yet another important

driving force (pers. com., Skjöldebrand, 2016). Skjöldebrand (pers. com., 2016) believes that these losses have had devastating effects for the further development of the initiative. In a similar manner, Tornerhjelm (pers. com., 2016) expresses that “All the important persons are leaving, all of those that I have been in contact with so many times. Because of this it gets problematic to get a collaboration like this going.”

More recently, WA3RM have been identified as an important resource for the purpose of getting things to happen in FVoB (pers. com., Nyberg, 2016). Nyberg (pers. com., 2016) explains that because its business idea is to drive and implement this type of project, it is natural that with them also comes a stronger driving force than has previously existed.

4.3.4 Coordination and communication within Food Valley of Bjuv

From the interviews it becomes evident that Findus is perceived to have played a big role in the development of FVoB as it is designed today. All of the interviewed actors have a more or less established connection to Findus. Several of the respondents express an expectation that Findus should do more within the context of FVoB. At the same time Hjalmarsson (pers. com., 2016) explains that: “Our intention has never been to be a driving force in this [FVoB], we expect that it will evolve by itself” he continues to explain that “hopefully through networking and other contacts [between established actors] new ideas will develop” and through that process progress is expected to be made. From this it becomes clear that although Findus has had an important role in the development of FVoB, its ambition is not to have an orchestrating role in the future. Fellbe (pers. com., 2016) seems to share this idea and says: “It is natural that Findus has taken on a central role now in the beginning as it has a lot of industrial property and zoned land. But in five to ten years this will revolve around much more than Findus and hopefully include the whole municipality of Bjuv.” Fellbe (pers. com., 2016) also explains that the establishment of new companies takes place on a regular commercial basis. Since establishment is primarily made on a commercial basis, and Findus controls the majority of the zoned land, it has a prominent position in the selection process. Hjalmarsson (pers. com., 2016) explains that currently, Findus is very selective in this process as it wants the ongoing business establishments to root before expanding the cluster further.

Coordination and orchestration was the most common topic that arose when discussing what could be improved in FVoB. Both Indebetou (pers. com., 2016) and Olstorpe (pers. com., 2016) point out the lack of coordination as a weakness that could be improved. Olstorpe (pers. com., 2016) believes that there is no real forum where one can raise issues to jointly develop and improve the efficiency within FVoB. She believes that by establishing some sort of communication platform, coordination of site activities could be facilitated by compiling information on the availability and needs of different resources (pers. com., Olstorpe, 2016). Currently, Olstorpe (pers. com., 2016) feels that contact occurs randomly and sporadically at best. She gives an example by saying: "Like for instance when we develop a new type of feed, we need to have access to residual substances that are not being used. There is a whole lot of it coming from Findus that you don't really think about until you're there and happen to talk to the right person who knows where different waste streams are going." (pers. com., Olstorpe 2016). Olstorpe (pers. com., 2016) believes that one way to enhance coordination is by arranging meetings on a monthly basis, where all actors involved in FVoB are gathered and work together to find new technical solutions. Today, when one actor needs something from another, contact is mostly handled on the phone (pers. com., Olstorpe, 2016). Besides creating a new platform for communication, she would like a better overview of which actors are

actually part of FVoB, along with information on what different actors can offer and what they need (pers. com., Olstorpe, 2016). In this way, she means that you would not have to rely on good fortune to accidentally run into someone who happens to have something you need, or who needs something you have (pers. com., Olstorpe, 2016). Similarly, Tornerhjelm (pers. com., 2016) expresses that he has a lot of ideas regarding the activities within FVoB but feels it is hard to get these ideas through to someone so that they can be realized. He also sees the potential in having some form of platform, like an information center, that could facilitate idea diffusion between actors within FVoB (pers. com., Tornerhjelm, 2016).

Indebetou (pers. com., 2016) thinks that it is important to have an organization in place that can drive the development of FVoB, as he thinks that development will not happen automatically. However, he points out that the need for such an organization has been recognized, and that it is something being worked on for the time being (pers. com., Indebetou, 2016). This is something that has occurred by itself, simply due to having realized that there is a need for an entity that coordinates and leads projects (pers. com., Indebetou, 2016).

Every actor shares the opinion that FVoB is something positive and shows a desire for it to grow. However, the producing actors seem to be quite busy with their own operations, which make it hard for them to engage in the continuous work of developing FVoB. For example, Hjalmarsson (pers. com., 2016) explains that: “For me, the vision is for Findus to be as successful as a food business possibly can be. Whether Food Valley of Bjuv becomes a huge success or a medium success is not as important for us. Although, we are of course very happy with anything good that comes out of it.” Similarly, Olstorpe (pers. com., 2016) believes that “Everyone has so much to do that it is hard to reconnect all the time.” Indebetou (pers. com., 2016) also clearly states that WA3RM’s focus is completing their mission of delivering a fully operational greenhouse in conjunction with an aquaculture facility.

5 Analysis & discussion

This chapter follows the structure of the research questions presented in the first chapter, which are addressed in the first three sub chapters. Then follows a discussion with some final remarks in which, among other things, Findus announcement of closing down its production in Bjuv is brought up.

5.1 The potential of the Food Valley of Bjuv design

In the theory chapter of this thesis, the concept of clusters along with some of the possible processes and functions of those (industrial symbiosis and open innovation) are merged and fit into theory on sustainability transitions. More precisely, it is fit into the micro-level of the MLP model, where they can be considered to constitute niche space. By applying cluster theory and its aforementioned processes and functions, a theoretical lens is developed that allows for zooming in upon the activities and micro processes that takes place within the micro level of niches. Here, this lens is set to work, and is used to place the ideas of FVoB in relation to relevant theory.

The communicated vision of FVoB has many advantages and shows great potential, as is apparent when studied through the theoretical lens that has been developed. In part, these advantages can be explained with the same ideas that Porter (2000) presents in his comprehensive theory of clusters. One of Porter's (2000) main arguments for the potential working in clusters is that actors within the same cluster strengthen one another, leading to added value and enhanced competitiveness. This reasoning goes well in hand with what is sought in FVoB, with a vision that emphasizes that actors should come together and develop solutions by joint efforts (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). In line with Porter's (2000) definition of what a cluster is, FVoB can be understood as one with a special orientation of developing solutions for future food production. In this sense, involved actors are operating within the same field and share a common focus. In FVoB, the idea is to gather businesses that share this orientation into the same physical location: around Findus production facilities in Bjuv. This creates opportunities for actors within FVoB to take advantage of the benefits that Porter (2000) attributes to geographical proximity. Among these benefits, from what is communicated in the vision of FVoB, the more prominent are improved business relationships among actors, increased access to information and access to existing technology (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016).

In FVoB, one of the basic ideas is that actors should be able to utilize the existing infrastructure and benefit from pooled resources and expertise (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). Nyberg (pers. com., 2016) means that the synergies derived from the existing infrastructure in FVoB, along with less tangible resources, are what primarily attract prospective actors to establish there. In line with the ideas that Harrison *et al.* (2004) present on technology based clusters, Findus can be regarded as a magnet organization in FVoB. This also accords with the image obtained through the interviews where it is clear that all respondents in one way or another are linked to Findus. Also, the more recent additions to FVoB express that they have come to FVoB through direct contacts with Findus (pers. com., Indebetou, 2016; pers. com., Olstorpe, 2016). In part, this can be seen as a result of the full-fledged commercial apparatus that is built around Findus' production of frozen foods, which provides a range of features available for other actors to use (www, Findus, 1,

2016). By doing so, there are opportunities for aspiring companies to overcome some problems that are related to the high entry barriers that characterize the food industry (pers. com., Hjalmarsson, 2016). By utilizing the overcapacity that is available in the existing infrastructure, actors within this model do not have to be burdened with heavy expenses from making all the investment that would otherwise have been required to commercialize their products. This means that through collaboration in FVoB, both establishment and operating costs are lower, set in relation to if each company had acted on their own. By bringing together actors with complementary characteristics, the idea is also that actors should be able to focus more on what they specialize in. For example, through collaboration with Findus, the technology-heavy Vegafish is allowed to focus more on the technical bits of production while letting Findus account for many of the steps in the commercialization of the end product. Because of such arrangements, the system as a whole ought to become more efficient and enhance the competitiveness of its actors, which corresponds with the benefits that Porter (2000) attributes to clusters.

Moreover, a major focus within this specific cluster is the establishment of a recycling-based production system (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016), which gives rise to different synergetic effects between its involved actors (pers. com., Nyberg, 2016). In FVoB, many benefits can be attributed to this system, where a central part is that actors work together and utilize each other's residual currents coming from their respective branches of production. This approach follows the same principles of Chertow's (2000) description of an industrial symbiosis. The industrial symbiosis in FVoB creates added value when one actor collaborates with another and is capable of utilizing that actor's output in its own production. In this sense, the recycling-based production system in FVoB thus creates both economic value, by reducing the need of purchasing external inputs; and environmental value, by utilizing natural resources more efficiently. In FVoB, Findus can be described as what Chertow (2000) refers to as an anchor tenant, as it plays a crucial role in attracting actors to and retaining them within the cluster. For example, it accounts for the majority of the substrate that is converted to energy in the biogas plant (pers. com., Tornerhjelm, 2016). Also, its production generates residual currents that are valuable to many actors within the recycling-based production system (pers. com., Fellbe, 2016; pers. com., Nyberg, 2016; pers. com., Olstorpe, 2016).

A consequence from establishing a system that builds on the principles of industrial symbiosis is that it develops interdependencies between its actors. In line with how Porter (2000) describes that "The health of the cluster is important to the health of the company", this seems to be particularly true for clusters that build on such principles. Based on Hardin's (2002) concept of encapsulated trust, the incentives for collaboration and knowledge exchange should improve as a result of the established interdependencies. This is based on the logic that when an actor knows that another will benefit from collaboration; it will generally trust the other to fulfil its end of the bargain (Hardin, 2002). This picture also appears to be shared by some of the respondents who express similar thoughts (pers. com., Fellbe, 2016; pers. com., Indebetou, 2016; pers. com., Olstorpe, 2016). Based on this logic, there should also be incentives to help each other develop new ideas that can strengthen one another.

The vision for FVoB also covers the ambition of creating a meeting place for innovators and entrepreneurs to come together and jointly develop solutions for future food production (www, Bjuv's municipality, 1, 2015; www, Findus, 1, 2016). The practice of gathering forces to jointly develop solutions to common problems corresponds well with Chesbrough's (2003, 2006) ideas on open innovation. In FVoB, the idea is to channel inputs from multiple sources,

which according to Chesbrough (2006) is something that accelerates the innovation processes of those involved. Because of the geographical proximity between the actors in FVoB, chances for spontaneous meetings increases, which help forging ties and thus facilitates knowledge exchange (Inkpen & Tsang, 2005). Through such meetings, the actors within FVoB can share new influences, and thus also increases the chances for new ideas to be born.

By setting up production and rooting in FVoB, actors go beyond participation through short term connections and occasional transactions, increasing the chances of developing long-term relationships. Over time, the ties between actors are strengthened (Granovetter, 1973), which further increases the propensity to collaborate (Melamed & Simpson, 2016). With time and repeated exchanges actors also build trust among themselves, which further facilitates the inclination to exchange knowledge (Inkpen & Tsang, 2005). Following the aforementioned rationale that trust should develop as a result of the interdependencies between actors, the recycling-based production system also seem to provide motives for its actors to participate in open innovation processes.

Within the framework of the meeting place project, there has been a pronounced intention to engage in open innovation (www, Vinnova, 2, 2014). The idea has been to gather various companies from the Swedish food industry to collaborate in identifying needs and finding solutions to satisfy those needs (pers. com., Skjöldebrand, 2016). In this project, workshops are held with the purpose of letting the participants support each other throughout the innovation process. Through initiatives such as this project, the network in FVoB is given opportunities to grow, as it means additional connections to actors that stand outside the immediate circle that constitute the recycling-based production system. In line with Granovetter's (1973) notion of weak ties, practices such as this creates an influx of new perspectives, which is crucial for generating novel ideas. In this way, the absorptive capacity of the actors in FVoB is enhanced, which has positive effects on their overall innovative capacity (Cohen & Levinthal, 1990). Also, following the logic of Omta and Fortuin (2013), for small actors that partake in inter-organizational collaboration such as this project, some of the difficulties associated with acting alone can be resolved (*e.g.*, lack of absorptive capacity, financial resources and know-how knowledge). Realization of new business opportunities is further facilitated due to the access of a full-fledged apparatus for production and commercialization. In FVoB, the strongly intertwined actors that constitute the recycling-based production system, along with a more loosely coupled group of actors in the meeting place project, thus seem to make a powerful combination in generating novel ideas and being able to act on those. This goes well in hand with the logic presented by Rost (2011), who highlights the potential of balancing weak and strong ties.

5.1.1 Summarizing the potential of the Food Valley of Bjuv design

In section 5.1, the first research question “How can the design of the cluster initiative facilitate development of sustainable solutions for future food production?” is addressed. By combining the empirical data on how FVoB is designed, with relevant theory, the potential of this cluster initiative's design can be highlighted (see figure 4).

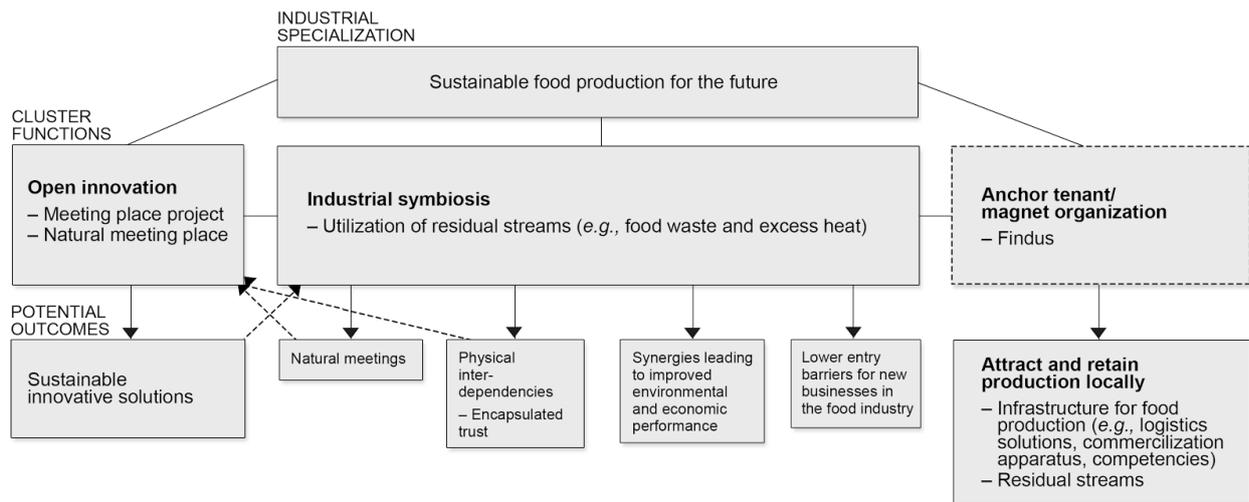


Figure 4. An illustration the design of FVoB and its potential outcomes based on the theory that has been outlined in chapter 3.

Figure 4 offers an overview of the potential outcomes that the concrete cluster functions of FVoB may generate, as has been accounted for throughout chapter 5.1. The dotted arrows in the figure represent how an outcome of one function can affect another. For example, sustainable solutions that are developed through open innovation processes can be fitted into the industrial symbiosis (*i.e.*, recycling-based production system). The dotted line around the “Anchor tenant/magnet organization” box illustrates how this function can be considered subordinated to that of industrial symbiosis.

5.2 Emergence of Food Valley of Bjuv

It is evident that the physical structure (*e.g.*, well-established infrastructure for food production and high levels of residual energy) has played a major part for the emergence and development of FVoB as it is designed today. However, there are several other less tangible factors that seem to have impacted these processes as well. Something that points to this is the fact is that Findus has been operational in Bjuv for over 70 years, without having committed itself to anything similar before. As is concluded in the theory chapter of this thesis, a better understanding of the complexity in inter-organizational collaborations may be obtained by studying social aspects (Granovetter, 1985).

One factor that has played a role in the emergence of FVoB can be attributed to the four observations mentioned by Hjalmarsson (pers. com., 2016). These observations include, among other things, new trends of increasing demand for sustainably and locally produced food; increasing demand for new products that meet the needs of an aging population (pers. com., Hjalmarsson, 2016). By applying the MLP (Geels, 2002), these trends can be understood as a result of different pressures that the landscape level exerts on the current socio-technical regime. In the food industry, the socio-technical regime can be understood as the structure that is built around and protects the current practices, technology and existing food products. The initiative of FVoB, at least in part, can be seen as a result of pressures from the landscape level on the socio-technical regime, that have disrupted it and opened up a window of opportunity. For example, increasing issues related to climate change and environmental disasters can be seen as such pressures on the socio-technical regime, which in part can explain the increasing demand for sustainably produced food. With the recycling-

based production system, various actors have come together for development of a new system that allows for production that responds to new needs and demands.

The different stories on how FVoB came about reveal some interesting factors that seem to have influenced the emergence of the initiative. Early on, there seem to have been favorable conditions for initiating an inter-organizational collaboration in Bjuv. From the stories, it is clear that the connections of the involved actors seem to have been well established. Drawing on the framework on social capital developed by Inkpen and Tsang (2005), this corresponds to a high degree of connectivity between the involved actors. Furthermore, several actors express that they have had far-reaching contacts with at least some of the other actors even before FVoB was initiated (e.g., pers. com., Fellbe, 2016; pers. com., Skjöldebrand, 2016; pers. com., Tornerhjelm, 2016). Fellbe (pers. com., 2016) also explicitly expresses that the collaboration has evolved over a long time. This implies that there were also relatively strong ties between those actors, as tie strength is something that increase over time (Granovetter, 1973; Melamed & Simpson, 2016). Because of the presumed strength of these ties, the inclination to collaborate in Bjuv should have been high (Melamed & Simpson, 2016).

After visiting Güssing, the participants wanted to initiate something similar in Bjuv (pers. com., Tornerhjelm, 2016). During this visit, new social ties were forged, as is exemplified through the invitation of Güssing's mayor to the energy seminar in Bjuv. From these new ties, fresh influences could be obtained (Granovetter, 1973), and it was decided to establish an industrial cluster focusing on fossil free energy (pers. com., Tornerhjelm, 2016). In line with Rost's (2011) logic on the combination of weak and strong ties, the presumed strong ties within the Bjuv network ought to have facilitated the implementation of the business opportunity that could be identified through the new weak ties to Güssing.

The emergence of the collaboration in Bjuv can in part be explained by the common interests that arose after visiting Güssing. Tornerhjelm saw a business opportunity and took the initiative of building a biogas plant on his property. Fellbe, in his role as business coordinator of the municipality, was enthusiastic about the potential of stimulating the corporate climate and prosperity in the region. Also, the initiative meant that Findus would become more climate friendly in its production and at the same time get access to cheaper energy (Findus, 2011). This demonstrates that there were clear incentives for the different parties involved in the collaboration of Söderåsens Biopark. The rationale for collaboration is likely to have been strengthened due to the clear benefits for actors to participate in the initiative (Inkpen & Tsang, 2005). They all saw renewable energy as the right way forward, which became something they could unite around. In line with how Inkpen and Tsang (2005) describe the effects of having a shared vision, an interaction logic between these actors occurred. While collaboration around renewable energy accelerated, it seems like a common logic of recycling-based production began to develop among the involved actors.

Along with the emergence of this collaboration, the turbulent years that Findus went through during these times seem to have created incentives for it to change and do something new (pers. com., Skjöldebrand; www, HD, 1, 2013). Through the collaboration around Söderåsens Biopark, a strategy of developing an industrial cluster based on ideas of long term sustainability and recycling had been established. Because of this, it was natural for Findus to continue in the same spirit when it wanted to take one step further and develop such a cluster niched for food production. Fellbe (pers. com., 2016) recognizes that Findus' increased involvement was a natural step in the evolution of the cluster, referring to the potential of the deep knowledge of food production that permeates Bjuv. In this sense, the explicit focus of

food production corresponds well with the history and culture in Bjuv. This meant that the common understanding between the actors could be strengthened, as can be explained by the logic of Tsai and Ghoshal (1998), where common values are highlighted as beneficial for development of a common understanding. The explicit focus on food production also specified in more detail what the future outcomes were intended to be, which according to Tsai and Ghoshal (1998) further improve the common understanding, and with it, the conditions for collaboration.

5.2.1 Summarizing the emergence factors of Food Valley of Bjuv

In section 5.2, the second research question “How has the cluster initiative emerged?” is addressed. The emergence of FVoB have been affected by several factors, some of which have contributed in forging a common logic between the actors in Bjuv. The visit to Güssing exemplifies an event that has created momentum because it united the participating representatives around the idea of engaging in recycling-based production. The clear incentives for participating in this type of production also seem to have increased the propensity to work together to be able to do so in Bjuv. Also, contextual settings pertaining to the region of Bjuv, such as a history and culture influenced by food production, along with the already established infrastructure built around Findus’ production of frozen food constitute a foundation that has been important for the emergence of FVoB. At the same time, factors pertaining to increased pressures from new societal trends and turbulent times for Findus seem to have created favorable timing for the initiative to be realized. Also, the presence of Findus, which is a large commercial actor, has been important for the emergence of FVoB as it is experienced getting concrete projects going.

5.3 Collaboration in Food Valley of Bjuv

Many of the perceived benefits and challenges of establishing and collaborating in FVoB appear to be of practical nature and often relate to physical features. Some of the recognized benefits are synergies, geographical proximity, the infrastructure and logistics. The perceived challenges include issues of financing, resource acquisition and zoning of land. While these more physical aspects make important factors for the continuous development of FVoB, less tangible factors can also be identified as essential in getting the collaboration to work. In line with the reasoning of Granovetter (1985), these factors can be understood as the social structure in which the economic activities between the actors in FVoB are embedded.

From theory on social capital, it is evident that the element of time plays an important role in forging network contacts and collaborations (*e.g.*, Inkpen & Tsang, 2005). Many of the challenges that the respondents are experiencing can be attributed to the relatively short amount of time that the initiative has been ongoing (pers. com., Fellbe, 2016; pers. com., Skjöldebrand, 2016; pers. com., Tornerhjelm, 2016). In a cluster such as FVoB, which currently largely revolves around the principles of industrial symbiosis, collaboration does not always evolve automatically. In part, this has to do with the processes of how industrial symbioses occur (Chertow & Ehrenfeld, 2012). As Hjalmarsson (pers. com., 2016) expresses that Findus is very selective in the selection process of which actors it allows to establish on its premises, there is an indication that Findus is consciously planning the symbiosis by bringing in external actors to fit what is already in place. This also corresponds with the narratives of Indebetou (pers. com., 2016) and Olstorpe (pers. com., 2016), who express that

Findus has invited them to establish in FVoB. Because of this, the industrial symbiosis in FVoB can be considered what Chertow and Ehrenfeld (2012) refer to as a planned industrial symbiosis. In such symbioses, the collaborative mechanisms that develop naturally over time between actors in organically emerging industrial symbioses are often lacking (Chertow & Ehrenfeld, 2012), which may explain the perceived lack of coordination in FVoB. In part, the collaborative mechanisms that develop naturally in organically emerging collaborations can be explained through the concept of social ties. The strength of such ties increases over time, and with it the propensity to collaborate (Melamed & Simpson, 2016). Because of this, the time aspect can be considered important for any type of collaboration to evolve.

In collaborations and networks that emerge over a long period of time there is room for informal rules and norms to develop (Inkpen & Tsang, 2005). These rules and norms can form unspoken codes of conducts that for example dictate how actors should act, what to expect from each other and what obligations there are towards one another (Inkpen & Tsang, 2005). This highlights one major challenge pertaining to the process of constructing an inter-organizational collaboration – the lack of a well developed social structure that facilitates communication and relations. Therefore, when constructing a cluster with the intention of initiating collaborative actions, unspoken codes of conduct are most likely absent, why the need for an explicit declaration of obligations and other rules become increasingly important. Vangen and Huxham (2003) emphasizes the need for inter-organizational collaborations to be nurtured through a continuous trust-building process if a collaborative advantage is to be developed. Trust, that may develop over time in organic collaborations, therefore needs to be developed through an active nurturing process in the case of constructed collaborations. This seems to apply for FVoB, where actors that sometimes lack prior interaction with one another are invited to collaborate.

In the process of establishing the foundation that constitutes FVoB today, there seems to have been a few individuals which have played an important role in initiating different activities in FVoB. Multiple respondents indicate that when they have faced any issues, they have usually turned to these individuals (pers. com., Olstorpe, 2016; pers. com., Tornerhjelm, 2016). Within FVoB, these individuals can thus be understood as central players with strong ties to others. Since several of these players have disappeared, it has been troublesome to get some of the collaborative activities (pers. com., Olstorpe, 2016; pers. com., Tornerhjelm, 2016). Following their absence, it does not seem like there has been anyone to replace them or to cover their earlier commitments. When these central players have disappeared, natural hubs have also been lost, which has increased the need to do something that can increase the connectivity within FVoB as recognized by Indebetou (pers. com., 2016) and Olstorpe (pers. com., 2016).

5.3.1 Summarizing the conditions for collaboration in Food Valley of Bjuv

In section 5.3, the research question “What are the conditions for collaboration in the cluster initiative to work?” is addressed. So far it does not seem to have developed any substantial collaborative mechanisms between the actors in FVoB. According to theory on social capital (Inkpen & Tsang, 2005), this may be explained by the short amount time that the initiative has been ongoing. As FVoB is still in early development there has not been enough time for unspoken rules and codes of conduct to evolve, that could otherwise have guided the actors in further collaboration. This problem is further complicated when the cluster grows and additional actors without prior interaction with the other actors in FVoB establish. In a

planned initiative, where actors are invited to collaborate, it is therefore necessary with a continuous nurturing process that unites actors around common, clear and realistic goals (Vangen & Huxham, 2003). Through obtaining such goals, the conditions for extended collaboration can be improved as this process builds trust, and with it the propensity to collaborate.

It is possible to identify some confusion regarding who is actually driving the FVoB initiative, what is expected of participating actors and which obligations participation entails. Since Findus has played a crucial role in designing FVoB, and that some of its employees have been engaged and driven in its development, it is natural that some actors expect Findus to maintain this role. The activities carried out by certain driven individuals can be considered as nurturing of the initiative, which may explain why some actors perceive collaboration to be staggering in the absence of these individuals.

5.4 Closing discussion

In the introduction of this thesis, a background is given to the increasing sustainability challenges pertaining to the food industry. Some of these challenges, such as the environmental problems linked to food production, are getting increased recognition in society (*e.g.*, Godfrey *et al.*, 2010; Farla *et al.*, 2012; Morrissey & Dunphy, 2015). This may result in changing people's values regarding how products should be produced. Seen from the MLP, these values can thus be regarded as a type of pressure that the landscape exerts on the current socio-technical regime, urging it to change (Geels, 2002). When this happens, a window of opportunity opens up, making room for new modes of production to replace old practices (Geels, 2002). FVoB can be seen as a niche space that can foster and protect innovations that may later transcend into and transform the socio-technical regime. In this sense, similar to what other scholars have pointed out (Hansen & Coenen, 2015), FVoB with its industrial specialization has the potential of advancing sustainability transitions. Although, in order to getting an initiative like FVoB going, several challenges need to be managed.

On paper, planning and establishing a cluster initiative may seem to be something straightforward that has the possibility of generating several benefits that pertain to geographical proximity (*e.g.*, competitiveness, innovative capacity, synergies). However, as shown by this case study, the establishment of a planned cluster initiative is a process characterized by high complexity. The benefits attributed to working in clusters do not seem to come automatically simply by bringing a number of actors with matching profiles together. In order to obtain those benefits and get a greater exchange from working in clusters, there is a need for the actors to connect with one another (*e.g.*, Chesbrough, 2003; Omta & Fortuin, 2013). In planned cluster initiatives, such as FVoB, connectivity does not always develop "by itself" and may therefore instead be facilitated through the work of an intermediary organization (Omta & Fortuin, 2013). By facilitating the activities of other actors, such organizations may contribute in enhancing the collaborative environment and innovative capacity of the cluster. Typically, the emergence of intermediary organizations come as a result of a perceived lack of connectivity within clusters, why this is a potential next step in the development of FVoB. However, because of the announcement that Findus is closing down its production in Bjuv, the future of this cluster initiative is uncertain.

Findus' announcement highlights the fragility of building a cluster initiative like FVoB around a central actor that is essential to the function of the cluster as a whole. As shown in

this case study, many advantages of the FVoB initiative can be attributed to Findus' presence in Bjuv. It accounts for the majority of the residual streams necessary for the industrial symbiosis to commence. Also, it offers a range of functions within commercialization and production of food that are needed for other actors to reach the market with their products. According to cluster theory, Findus can be considered an anchor tenant (Chertow, 2000) and a magnet organization (Harrison *et al.*, 2004) capable of attracting and retaining other actors in FVoB. This raises the question of what happens when an anchor tenant or magnet organization disappears. Clearly, the design of FVoB that is illustrated in section 5.1.1 will change, and with it the identified potential of advancing sustainability transitions.

Findus decision to close down its production is also likely to have affected the stability of the configuration and collaborative environment in FVoB. Since Findus has previously had a leading role in FVoB, and has been inviting other actors to utilize its own infrastructure, it is natural that those actors expect Findus to keep driving the initiative. Findus new ownership, which lays behind the decision to close down its production in Bjuv, may be seen as an explanation to its fading engagement in FVoB. These events may in part explain why the respondents pointed out the lack of coordination and orchestration as the main issue. What becomes clear is that development of clusters can possibly be facilitated by having a neutral actor which formally owns the concept and whose primary focus is to maximize the utility of the cluster as a whole. The installation of such an actor may provide some clarity regarding the boundaries of the cluster, what other actors can expect from being part of it, and whom they can expect it from. Potentially, this actor could also take on the role of an intermediary organization, as has been discussed in the second paragraph of this section.

6 Conclusions

The aim of this study is to explore a cluster initiative designed for contributing to sustainable development by paving way for innovative sustainable solutions for future food production. This final chapter reconnects with the aim and provides a summary of the key findings, which are then followed by an assessment of the results and suggestions for future research.

By exploring the cluster initiative FVoB and setting its design in relation to relevant theory, it is clear that it shows great potential of being able to accelerate change towards more sustainable modes of production. The combination of industrial symbiosis, open innovation processes, a magnet organization that provides access to an already existing infrastructure for food production and handy logistics solutions, makes the design of this cluster initiative look promising.

It is clear that cultural and historical aspects pertaining to the context of Bjuv have facilitated the development of FVoB. In this region, these factors revolve around food production, and the mental model of actors from this region seem to be shaped by this context, which helps creating a common logic that unites these actors. In this way, building on contextual settings and strengths pertaining to a region, such as culture and history, may thus facilitate implementation of initiatives that require collaboration between multiple actors. In FVoB, the recycling-based system (*i.e.*, industrial symbiosis) for food production have the potential of stimulating collaboration between its actors because they become dependent on each other's success. Because of these interdependencies, mutual trust can be built and with it the inclination for actors to collaborate and exchange knowledge, which in turn provides incentives for helping develop one another. As the products of actors within the recycling-based system build on new technology and innovative solutions, the interdependencies of this industrial symbiosis can thus be considered to create a protective space that promotes innovation.

However, the complexity in developing a cluster initiative such as FVoB is substantial. From the narratives of different actors within this cluster, it is clear that timing and coincidences can play a major role in shaping an initiative like this. In many ways, the development of the initiative can be seen as a social process where some functions fade while other become rooted, much depending on which actor or individual is currently driving the process. Corresponding with theory on social capital that emphasizes the importance of time in establishing collaborations, endurance seems to be essential for the success of FVoB, as time is needed for a social structure and collaborative mechanisms to evolve.

This case study highlights both the strength and the fragility of establishing a cluster with a large private actor as the main initiator and driving force. When it comes to “getting things moving”, there is great potential in having a private actor that initiates the process by getting concrete projects going. However, when the development of a cluster initiative is controlled by the initiating actor's directives and guidelines, there may also be problems if this actor's commitment fades. In FVoB it seems that there has mainly been a few individuals from Findus that have driven the development of the initiative. While the presence of these individuals demonstrates that it is possible to achieve a lot merely due to their strong commitment, the reliance on them have also highlighted some risks and pitfalls. When time is scarce, this type of ancillary business commitment (that FVoB is to Findus) drops on the priority list in favor of tasks with overriding priorities. There is also always a risk that such

individuals, for various reasons, disappear from their professional positions, leaving the initiative hovering. Other actors may be expecting that the original initiating actor will keep driving the initiative, which can lead to confusion that makes the development staggering. For a planned initiative such as the one in this case study, having a clearly stated ownership may also help clarify what expectations involved actors can have from being part of it, reducing the risk of confusion and for collaboration to stagger. For similar reasons, it also seems important to establish a formal structure, particularly in a consciously planned initiative (*i.e.*, one that does not evolve organically), to guide the behavior of its actors when needed, as they generally lack a social structure to fall back on. Because independent actors tend to focus primarily on their own commitments, there seems to be a need for an actor which has the main focus on maximizing the utility of the cluster as a whole. One possible solution would be to install an intermediary organization that formally owns the concept and exclusively focuses on facilitating and coordinating the activities of other actors. By managing and implementing projects based on clearly defined and measurable goals, such an organization can improve the collaborative conditions within a cluster initiative. Also, the presence of such an organization may offer some stability and reduce the risks and drawbacks associated with relying on specific individuals to nurture this type of initiative.

6.1 Assessment of results and future research suggestions

The findings of this study complement and extend existing literature on sustainability transitions by linking the MLP model with theory that allows to obtain more in-depth insights on activities that occur at the micro-level of this model. By doing so, this study is adding to the relatively limited pool of in-depth studies that highlight concrete functions and social dynamics of actual places that may advance sustainability transitions. Also, the findings are of empirical relevance as they offer concrete know-how knowledge on how to go about to meet the increasing need for sustainable solutions for future food production, which corresponds with what is sought in the new national food strategy of Sweden.

As this study is conducted as a single case study, the scope for statistical generalization is limited. However, one of the results of this study is the development of a theoretical framework that can be used to analyze similar cases. In this sense, analytical generalization is obtained and there are opportunities for future research to adapt that framework to analyze similar cases and compare the results. This study is performed during a relatively early stage of FVoB's development. Therefore, there is scope for future research on this particular case, such as longitudinal and follow-up studies regarding its development. Due to Findus' notice of closing its production in Bjuv, there are also opportunities for future case studies on FVoB that seek to shed light on what happens when the anchor tenant of a cluster, that in part builds on industrial symbiosis, disappears. Future studies may also evaluate the technological diffusion of the sustainable solutions that are developed in FVoB, if they have gained acceptance and how far away they are from the current regime. For researchers with quantitative interests, there is opportunity to measure and compare the environmental performance of products developed in FVoB with products that have been produced elsewhere, using more conventional methods.

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Indebetou, Fredrik, Co-founder and team member, WA3RM AB, March 9th 2016

Nyberg, Henrik, CEO, Ceres i Skåne AB, March 23rd 2016

Personal interview

Skjöldebrand, Christina, Project manager "meeting place" project, April 5th 2016

Appendix 1. Logbook for data collection

Logbook for data collection from interviews

2016-02-16 – Vinnova is contacted in order to get access to material regarding the “meeting place” project, but redirects us to project leader Skjöldebrand, who is then contacted by phone.

2016-02-17 – Findus’ telephone exchange is contacted which redirect to customer support email. Email response redirects to telephone exchange, why another email is sent which is followed up by Findus’ executive assistant who books an interview with CEO Henrik Hjalmarsson.

2016-02-20 – Phone interview guide is prepared and recording equipment is tested.

2016-02-23 – Phone interview guide is tested on well-versed relative.

2016-02-24 – Phone interview with Hjalmarsson, followed by transcribing.

2016-02-25 – Fellbe is contacted by phone with a request to participate in an interview.

Interview with Fellbe is booked.

2016-03-01 – Phone interview with Fellbe, followed by transcribing.

2016-03-03 – Air Liquide, WA3RM and Vegafish (Olstorpe) are contacted by email with a request to participate in interviews.

2016-03-04 – Kloosterboer is contacted by email and respond the same day that they will give definite decision later.

2016-03-07 – Response from Indebetou, interview is booked. Phone interview with Tornerhjelm, followed by transcribing. Phone interview with Olstorpe.

2016-03-09 – Transcribing of interview with Olstorpe. Phone interview with Indebetou, followed by transcribing.

2016-03-14 – Nyberg is contacted with a request to participate in an interview. Kloosterboer respond that they will not be able to participate in the study due to lack of time.

2016-03-16 – Response from Nyberg, interview is booked.

2016-03-23 – Phone interview with Nyberg, followed by transcribing.

2016-03-24 – Interview is booked with Skjöldebrand.

2016-03-31 – **Findus announces that it will shut down production in Bjuv.**

2016-04-05 – Personal interview with Skjöldebrand at a café in Stockholm, followed by careful reading and processing of notes.

2016-04-06 – Received presentation from Findus’ participation in Heja Skåne.

2016-04-12 – Indebetou and Olstorpe are contacted for follow-up questions.

2016-04-19 – Phone conversation booked with Olstorpe to take place next day.

2016-04-20 – Phone conversation with Olstorpe to clarify some details regarding the recycling-based production system.

Appendix 2. Interview guide

Background

- What does FVoB mean to you? How do you perceive this initiative?
- How did you get involved in this initiative? When?
- How do you perceive your role in FVoB?
- Which actors do you consider to be part of FVoB?
- Which stakeholders do you perceive as most important for this initiative?
- What do you perceive to be the driving forces behind this initiative?

Teamwork/collaboration/communication

- How do you perceive the cooperation between the actors on the site?
- How do you perceive the contact between actors?
- Do you feel that the activities in FVoB generate any new ideas?

Opportunities and challenges

- How do you perceive that your organization benefits from being part of this cluster?
- What do you perceive are the main opportunities of being part of FVoB?
- What do you perceive are the main challenges of initiating/being part of FVoB?

Potential for improvement

- Do you feel that there is anything that could be improved FVoB? What?
- How do you perceive the future prospects of this initiative?
- Do you feel that you have any possibility to influence the development of FVoB?
- What lessons have you learned from being part of FVoB?