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The case of Bornholm

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**Territorial Knowledge
Dynamics and
alternative food:
The case of Bornholm**

Jesper Manniche

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**Territorial Knowledge Dynamics
and alternative food:
The case of Bornholm**

PhD Thesis

**Submitted to University of Aalborg,
Department of Culture and Global Studies,
The PhD-program SPIRIT**

Jesper Manniche

28-05-2013

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Content

Introduction to the thesis	5
Topics and questions addressed	5
The structure of this manuscript.....	9
How to read the submitted works.....	10
Chapter 2. An introduction to Bornholm.....	11
Chapter 3. The TKD approach and the case studies of Bornholm food.....	17
The theoretical framework.....	17
The notion of Territorial Knowledge Dynamics	19
The Differentiated Knowledge Bases typology	23
The Exploration-Exploitation Knowledge Chain	28
Institutional contexts for knowledge creation	30
Methodology	31
The knowledge biography methodology	31
The research methods of the Bornholm case studies.....	34
The empirical findings.....	39
Territorial scales.....	39
Epistemological approaches.....	42
Institutional contexts.....	45
Conclusions and further discussions	46
Chapter 4. Knowledge and food.....	49
Food and rural areas as the scenes for innovation and knowledge creation	50
Research conceptualizations of market restructuring	52
Paradigm change in the food sector.....	52
Conventions of quality and the World of Production model	53
Rural cultural economies.....	55
The Experience Economy.....	57
Knowledge in the agro-food research.....	59
Knowledge bases and Worlds of Production (Publication 5).....	63
Knowledge in the staging of food experiences (Publication 6)	65

Conclusions	66
Chapter 5. Conclusions and policy implications.....	68
Overall findings and conclusions.....	68
Empirical results and perspectives.....	68
Theoretical findings and perspectives.....	72
Regional innovation, knowledge and learning.....	72
Market restructuring and new producer-consumer relations	74
Methodological reflections	76
Policy implications for Bornholm and rural areas.....	78
Policies for Bornholm food.....	78
Development of tangible and intangible product components.....	79
Supporting research-based knowledge and institutions.....	81
TKD - A new perspective for rural development policies?	83
Summary of PhD thesis.....	88
In English	88
Opsummering af phd-afhandlingen på dansk.....	91
References.....	95
Annex I: List of publications submitted as part of the thesis.....	104

Introduction to the thesis

Topics and questions addressed

The emergence of markets for varying sorts of 'alternative' food such as organic, local and fair-trade witnessed by most Western countries in recent decades, have provided many rural areas new business opportunities for food entrepreneurship and activities with a higher value-added as well as new and more direct linkages to urban areas and consumers. The creation of small-scale productions, business networks, marketing and governance systems for regional culinary food on the Danish island of Bornholm since the beginning of the 1990-ies exemplifies this general observation and constitutes the empirical case for the analyses of this thesis.

In a Danish food context of lacking traditions and consumer markets for culinary heritage, this regional innovation process has been pioneering. The established businesses differ regarding products, technologies and business models, but a common characteristic is the use of the Bornholm origin of production as a factor causing or adding to the quality of the food and drinks products. The innovation did not draw on new scientific or technological advances but relied on entrepreneurial, technical activities of developing artisanal and industrial production methods and new distribution and sales systems, on identifying geographical and cultural narratives about the Bornholm origin of production to embed into the products, and on the marketing of these on a national scale, i.e. activities quite different from those science and technology-driven innovations and knowledge dynamics that usually are considered in research. One of the main changes of the Bornholm food economy is the new and more direct ways of connecting to the markets and consumers, compared to the conventional types of standardized food production that exclusively were represented on Bornholm before.

The core empirical focus of the thesis regards the *knowledge dynamics* of developing Bornholm food. The knowledge development processes of firms, networks, policy actors and others that enabled the emergence of alternative food productions on Bornholm were subject for in-depth empirical case studies of regional and firm-level innovations conducted within the EU research project, EURODITE¹, which involved case studies of innovations in seven different economic sectors (including food) and different types of regions throughout Europe.

The knowledge dynamics of developing Bornholm food are approached from the theoretical perspectives of two major research fields: 1) Regions, knowledge and

¹ The EURODITE project, *REGIONAL TRAJECTORIES TO THE KNOWLEDGE ECONOMY: A DYNAMIC MODEL*, was supported by the EU Sixth Framework Program, Priority 7: Citizens and Governance in a Knowledge Based Society, Proposal/Contract no.: 006187, Integrated Project, 2005-2010.

learning in the global knowledge economy, and 2) Alternative food and restructuring of markets and producer-consumer relations.

In the former economic geographical perspective, a recent research debate concerns the notion of 'Territorial Knowledge Dynamics' (TKD). The TKD is an update to the varying 'Territorial Innovation Models' (TIM) (Moulaert and Sekia 2003) applied within economic geography such as 'industrial districts', 'clusters', 'regional innovation systems' and 'learning regions'. The TKD notion questions three aspects of TIMs: 1) the emphasis on intra-regional knowledge interactions which does not take into account the growing mobility of knowledge and the role of extra-regional interactions for regional competitiveness, 2) the focus on technological, production-oriented innovations which overlooks the role of socio-cultural innovations connected with the growing importance of services and cultural aspects of products, and 3) the lacking conceptualizing of the growing role of end-consumers and new types of producer-consumer interaction for product development and value-creation. Accordingly, the TKD notion is an attempt to conceptualize a general shift in the still more globalized and services-based economies from regional, cumulative knowledge dynamics along specific sectoral production and technology trajectories, emphasized by the diverse TIMs, towards multi-scalar and combinational knowledge dynamics involving multiple territorial scales, different types of knowledge (not only scientific and technological but also socio-cultural) as well as interaction across the production-consumption divide.

The notion of TKD outlines a new approach for the research and policies on regional innovation and knowledge. In the TKD approach, geographical proximity and the administrative region still play a significant role for innovation and innovation policy. Nevertheless, it suggests that the abilities of regional actors of linking to diverse sorts of external knowledge systems and of combining extra- and intra-regional interactions are at the core of regional competitiveness in today's globalized economies.

The TKD perspective and its three dimensions of 'combinatorial' knowledge dynamics, territorial scales, different types of knowledge and learning, and production-consumption interaction, were applied in the empirical case studies of the EURODITE project, including the case studies of Bornholm food. A core methodological tool for the TKD approach is a 'knowledge biography methodology' designed to trace and map the important knowledge interactions in the life-span processes of innovations.

Although the EURODITE project provided the basic theoretical and methodological structures for the studying of knowledge, the complex and multi-dimensional analytical frameworks (see e.g. EURODITE 2005; Crevoisier et al. 2008; Butzin et al. 2010a) were not ready-made at the starting point but were subject for an iterative process of refinement and elaboration during the project period. Hence, it is an aim of the thesis to theoretically clarify the definition and interconnectedness of the three conceptual components of the multi-scalar and combinational TKD approach:

knowledge interaction at multiple territorial scales including regional, national and international levels, combination of different types of knowledge and learning including scientific, technological and socio-cultural, and knowledge development in varying institutional contexts including the spheres of production and consumption.

Moreover, it is an aim of the thesis to explore the empirical usefulness of the TKD approach for describing and understanding the complex knowledge dynamics underlying the innovation of Bornholm food. This empirical investigation mainly regards the usefulness of the TKD approach for innovation studies in rural development contexts. The TKD perspective seems to offer a useful lens for studies in rural development contexts where the agglomeration dynamics, specialized institutions, labour markets and science systems in focus of TIMs are lacking.

Special efforts are devoted to clarify the theoretical content and empirical implications of the epistemologically defined Differentiated Knowledge Bases typology (Asheim 2007) which is included in the TKD approach in order to distinguish between three different types of knowledge and learning: analytical-scientific, synthetic-instrumental and symbolic-cultural knowledge. The inclusion of symbolic knowledge alongside the analytical-scientific and synthetic-instrumental knowledge types, usually considered in innovation research, provides a conceptual novelty compared to mainstream research which seems useful for studying of socio-cultural types of innovation such as development of culinary food. The thesis discusses the theoretical implications of the typology and empirically explores the significance and interaction of the three differentiated knowledge types in the processes of developing Bornholm food.

The second theoretical perspective with which the case of Bornholm food is approached regards restructuring of markets and producer-consumer relations in the food sector. As said before, the case of high-quality, regional food of Bornholm exemplifies a more general trend in modern market economies of a growing role of cultural values and narrative elements embedded in or attached to consumer goods (Lash and Urry 1994) and of new types of producer-consumer interaction for innovation (Grabher et al. 2008). A core question addressed by the thesis concerns possible analytical frameworks regarding such overall changes in economies with which to understand and explain the innovation and knowledge processes identified in the Bornholm case studies, especially the significance of socio-cultural, symbolic knowledge. Two specific conceptualizations of restructuring of markets and producer-consumer relations are suggested and applied as analytical frameworks for re-interpreting the empirical case study data about the knowledge dynamics of Bornholm food: the Worlds of Production model of Storper and Salais (1997) and the experience economy notion of Territorial Staging Systems (Jeannerat and Crevoisier, 2010).

The emergence of markets and productions of alternative food constitutes a huge and multi-disciplinary field of research. However, the discourses on the knowledge-based economy and regional innovation, knowledge and learning prevailing within economic

geography, is not to the same degree addressed in agro-food research literatures where discourses about economic, social and environmental sustainability are more central. The knowledge aspects of alternative food are therefore relatively un-explored in the literatures. The thesis discusses how and in which ways the Bornholm food case and the applied TKD conceptualizations of knowledge possibly contribute to the research on alternative food.

Six complementary publications, made within varying research contexts, are submitted as part of the thesis (see Annex I). This manuscript presents and discusses the theoretical and methodological frameworks, the findings and the further implications of these publications. All of them theoretically concern and conceptualize innovation knowledge dynamics and empirically relate to the investigation of the case of Bornholm food, however, their focus and research designs differ. The publications 1-3 are made as part of the EURODITE project but have – at least partly - different analytical frameworks and purposes. Publication 1 introduces the food sector as the specific empirical scene for studying innovation and knowledge while publication 2 and 3 contain the EURODITE case studies on Bornholm food, applying the TKD approach. The publications 4-6 are articles published or accepted for publication in three different international scientific journals. They re-use selected parts of the theoretical knowledge concepts and empirical data of the Bornholm case studies but address varying research fields and questions and two of them add further conceptualizations regarding restructuring of food markets.

Thus, it is difficult to organize the thesis within a coherent, monographic analytical agenda structured around one set of common research questions, theoretical frameworks and methodological approaches. On the other hand, the six publications can be divided into two groups. One consists of the publication 2, 3 and 4, addressing mainly economic geographical research debates and exploring the TKD theoretical framework on the regional innovation case of developing Bornholm food. The second group consists of publication 1, 5, and 6, which explicitly address and conceptualize the topic of restructuring of markets and producer-consumer relations in the food sector in order to improve the analytical framework for understanding the observed knowledge dynamics of innovating Bornholm food.

Accordingly, the presentation and discussion of the findings of the thesis in this manuscript is divided in two main parts structured by differing – though related – theoretical research questions.

The theoretical questions addressed in the first group of publications connecting into regional research debates on innovation and knowledge, are:

In which specific terms should we conceptualize and methodologically study the complex, 'combinatorial' knowledge dynamics underlying the realization of innovations and in particular socio-cultural innovations such as the development of regional

culinary food? Is the notion of 'Territorial Knowledge Dynamics' useful, and if so, in which ways?

The theoretical research questions in the second group of analyses connecting into research on alternative food and restructuring of markets and producer-consumer relations, are:

How can we conceptualize the ongoing changes of markets and producer-consumer relations in the food sector in order to explain the innovation efforts and knowledge processes observed in the Bornholm case studies of alternative food?

How may the applied knowledge concepts contribute to the research on alternative food?

In the final concluding chapter, a third and policy-oriented perspective is addressed by a discussion of the implications of the presented findings for Bornholm specifically and rural areas more generally in terms of possible policies to support rural economic development.

The structure of this manuscript

Due to the centrality of Bornholm as the geographical context for empirical studies, a brief and general introduction to Bornholm is needed. This is done in the next chapter two.

In chapter 3, the TKD approach and the empirical case studies on Bornholm food are in focus. I present and discuss the theoretical and methodological frameworks, the research methods, and the empirical findings of the three publications 2, 3, and 4 regarding the knowledge dynamics of Bornholm food.

Chapter 4 more explicitly explores and defines the food sector as the specific empirical scene for innovation and knowledge creation. I introduce the three publications 1, 5 and 6 and the varying research debates regarding restructuring of markets and producer-consumer relations that they address. I present two specific conceptualizations of market restructuring, the Worlds of Production model (Storper and Salais 1997) and the experience economy notion of Territorial Staging Systems (Jeannerat and Crevoisier, 2010), and discuss their usefulness as tools for understanding how and why scientific, technological and in particular socio-economic types of knowledge, are developed. I also in chapter 4 introduce the conceptualizations of knowledge that prevail in the agro-food research and discuss in which way the Bornholm case studies and the applied TKD knowledge perspective may contribute to the agro-food research.

In the final chapter 5, I first summarize the overall empirical, theoretical and methodological results and secondly elaborate on the policy implications for Bornholm and rural areas. This latter discussion has two main sections: I initially discuss the priorities of future policies to support the further development of Bornholm food and present a few proposals for future policy initiatives, and in the final section I discuss broader perspectives of rural socio-economic development and try to answer the question whether and in which ways the notion of TKD may outline a new perspective for policies to support innovation and economic development in rural areas.

A brief summary of the thesis in English as well as in Danish is found at the end of this manuscript.

How to read the submitted works

Since the thesis consists in this manuscript and six other publications some directions are needed regarding in which row the different works are best read. I suggest this 6-step sequence of reading:

1. Chapter 2
2. Chapter 3
3. Publication 2, 3 and 4
4. Chapter 4
5. Publication 1, 5 and 6
6. Chapter 5

Chapter 2. An introduction to Bornholm

Before presenting the submitted works an introduction to Bornholm as the specific geographical context for the studies is needed. The Bornholm context – and in particular the public policy and governance context which has played an important role in the studied development process - is described and included as an element in the analyses of the food development process in the region. However, these contextual descriptions have not aimed at identifying how Bornholm possibly is distinguished from other rural, peripheral areas and without this knowledge, it is difficult to discuss the possible implications of the studies for the research and for policy making.

It should be stressed that the introduction below does not intent to be structured on the basis of scientific research on rural areas and development and is not a general and all-inclusive description but only has the ambition of providing the reader of the submitted works a basic idea of the contextual research setting.

The following contextual factors of Bornholm are shortly described:

- Geography and peripherality
- Nature and cultural heritage
- Tourism and the national place-brand
- The historical Danish market context
- Rural economy and crisis
- Demographic development
- Public administration

Geography and peripherality

Located far from the rest of Denmark, south of Sweden in the middle of the Baltic Sea, with a traditional economic structure and a total population of around 41.000 people (2013), Bornholm defines a peripheral, rural area.

Travelling to the island by flight² is possible from Copenhagen airport in 30 minutes but otherwise visitors and Bornholm residents need ferry transport³ either from Køge, located ca. 40 km south of Copenhagen, Ystad in Sweden located ca. 100 km from Copenhagen or Sassnitz in Germany. The fastest and thus most frequently used transportation link is the Ystad-ferry which combined with land transportation in car, bus or train allows a total travelling time of ca. 3 hours to/from Copenhagen. Due to the prices of the ferry and the fee to cross the Öresund bridge connecting Copenhagen and Malmö/Sweden, this travel is much more expensive than travelling to other

² <http://www.bornholms-lufthavn.dk/>

³ <http://www.faergen.dk/>

distant parts of Denmark. The time and price of travelling means that the number of out- and in-commuters is low and thus that the local labour market truly is insular and closed.

On the other hand, unlike other peripheral parts of Denmark the transport and communication infrastructures historically have connected the island directly to the capital of Denmark and thus, for the vast majority of Bornholm inhabitants Copenhagen is not a distant place only visited at rare occasions as day tourists to see the national culture symbols but a place to go to visit relatives and friends or simply to transit in order to reach other destinations.

Nature and cultural heritage

Geologically, Bornholm differs from the rest of Denmark having plenty of landscapes and coastal areas characterized by visible bedrock. Bornholm also has attractive beaches with especially fine-grained and light sand. The climate is tempered but by average is a bit sunnier than in the rest of Denmark and allows certain sub-tropical trees such as fig to grow in open air.

The cultural heritage of Bornholm is rich and includes, for instance, a number of round churches the type of which is only seen here and picturesque small fishing villages with smokehouses serving the only genuine, Bornholm culinary heritage dish of smoked herring. In the first half of the 20th century, Bornholm was centre for a group of trend setting Danish art painters the works of who today are exhibited at the recently built Bornholm's Art Museum⁴, every year attracting thousands of guests. There are also longstanding craft traditions within ceramics and glass production. The industrial manufacturing part of these traditions has been closed down for decades but the range of exercised crafts on the island has been expanded in the last couple of decades, mainly due to newcomers who have moved to the island. Today there are about 100 arts & crafts workshops within glass, ceramics, textile, wood, metal etc. as well as a national Design School for Glass and Ceramics⁵ teaching in craftsman production and industrial design and attracting students from the rest of Denmark as well as from abroad.

Tourism and the national place-brand

The varied and (in a Danish context) special nature and the rich cultural heritage without doubt are among the main reasons for the longstanding traditions for tourism on the island, starting already in the first half of the 20th century, i.e. decades before

⁴ <http://www.bornholms-kunstmuseum.dk/>

⁵ <http://www.dkds.dk/Bornholm>

modern mass tourism reached other peripheral parts of Denmark. In the period after World War 2, Bornholm witnessed an expansion in mass tourism based on summer holiday stays of families. Moreover, a nation-wide tradition of primary schools of bringing entire classes to Bornholm for a week's stay in special cottages made for this purpose was started.

Accordingly, the majority of Danes have visited Bornholm at least once and has some sort of first-hand experience of and knowledge about the island, though maybe of a rather stereotypical kind provided through visiting the most popular natural and cultural attractions, eating smoked herrings at traditional smokehouses and shopping the standard souvenirs of ceramic round churches. Compared to most other rural, peripheral parts of Denmark, Bornholm has a strong and multi-faceted place-brand. The very existence of a pre-understanding of Bornholm among Danes obviously has been an invaluable resource at the consumer-side for the recent years' development of new types of small-scale quality-food productions.

As documented by the Bornholm food case studies, concerted and successful efforts of the regional tourism industry⁶, network organizations for Bornholm food⁷ and for Arts and Crafts businesses⁸, and, not least, rural policy actors⁹ have been made in recent years to re-invent the traditional, rather quaint and rural-idyllic place-brand into a more modern, entrepreneurial, gastronomic and vivid place-brand, more appealing to urban consumers of today. This is a further indication of the Bornholm food sector's symbiotic relation to the island.

The historical Danish food context

The Bornholm food development took off in the 1990-ies within a Danish historical context characterized by almost hegemonic dominance of standardized, industrially grown, processed and retailed food commodities and a few steadily growing multinational players in the processing and retailing links controlling ever larger parts of the supply chains. Except for an (internationally) high profile within a few organic product categories such as milk, the supply on consumer markets of products, not competing on price but on more specialized and dedicated qualities, largely consisted in imported luxury brands.

Although Danish consumers generally are highly price-focused when it comes to shopping of food, new trends in society and culture of connecting personal identity

⁶ <http://www.destinationen.dk/>

⁷ There are two food producer network organizations: Regional Culinary Heritage Network (Danish name is 'Regional Madkultur' (<http://www.culinary-heritage.com/region.asp?sprakid=2®ionid=6#.UZy3uqTU96o>)) and Gourmet Bornholm (<http://www.gourmetbornholm.com/>).

⁸ <http://www.craftsbornholm.dk/>

⁹ <http://www.lag-bornholm.dk/>

formation to consumption of goods such as foods and drinks (CIIA 2006; EMCC 2006; Gehlhar and Regmi 2005; Miele 2006) also in Denmark have led to new consumer demands for high-profile products and, in turn, have pushed even conventional producers to diversify their product portfolio. However, since Danish consumers 10-15 years ago had few reference points for comparing and evaluating the physical-technical product features but, nonetheless, were curious for trying 'alternatives' to mainstream commodities, the requirements to producers for entering markets and satisfying consumers were generally low.

The Bornholm producers were among the first-movers in the national emergence of new types of small-scale, artisanal food productions, who were advantaged by the lacking competition on markets for specialized, alternative food, especially regarding products emphasizing geographical origin. Historically, these market conditions provided excellent opportunities for the market entry of 'Bornholm food'.

Rural economy and crisis

Besides the above described longstanding traditions for tourism, arts and crafts the economy of Bornholm is typically rural. This means that traditional activities such as fishery, agriculture, mining, forestry and food processing industries play a significant role. However, this economic structure also means that Bornholm during the last decades has experienced a radical decline in employment in the agro-food sector due to increased global competition, continuous technological rationalization, closure or relocation of companies, new regulation schemes etc. Furthermore, by the end of the 1980'ies the Baltic population of stock fish, on which the big Bornholm fishery and fishing processing industries heavily relied, collapsed. This resulted in severe problems of bankruptcy and losses of job and income that still have not been totally regained.

This crisis formed the economic and social background on which the emergence of new types of food productions, studied in the thesis, took off during the 1990'ies. This renewal of the regional economy was conditioned by a multiple of factors not least at the demand-side of consumers but also by classical rural virtues of self-dependency, local patriotism, entrepreneurship and skills orientated towards production of tangible goods while the more knowledge-intensive, research-based types of activities that in the same period experienced high growth rates in most urban areas did not have advantageous conditions for being developed. There are other cases of recent successful business development on Bornholm than the emergence of a new sector for culinary foods which includes certain strongholds within the metallic manufacturing industries producing unique industrial laundry handling equipment for global markets¹⁰ but alternative food definitely is the prime example of economic renewal on the island.

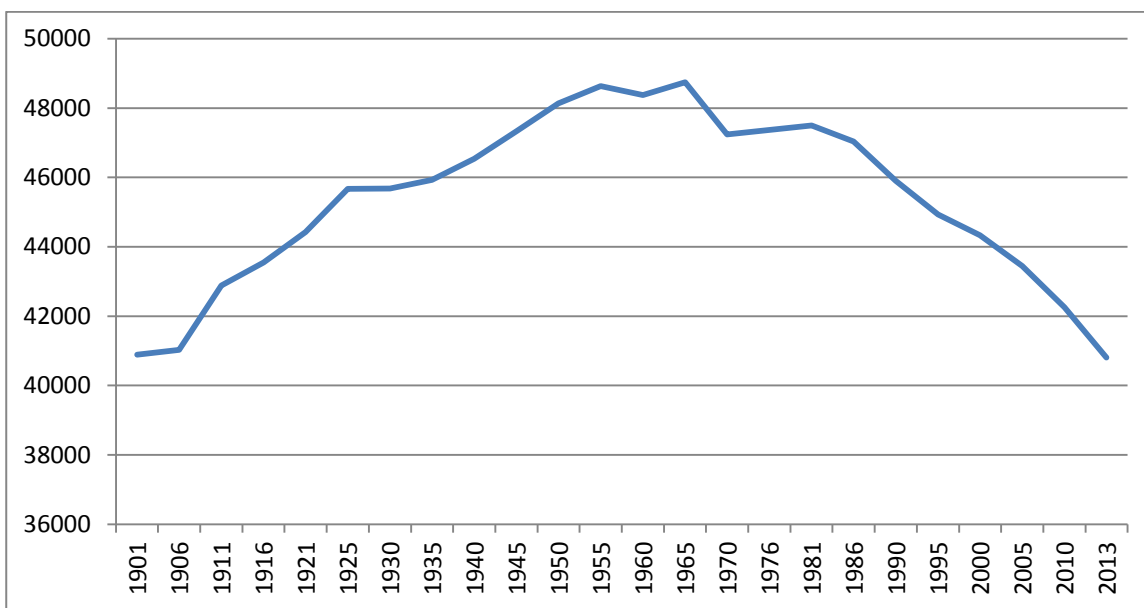
¹⁰ <http://www.jensen-group.com/>

Demographic development

The demographic development on Bornholm (see Figure 1) mirrors the serious effects in rural areas of the overall structural change in modern economies. The high growth within natural resource-based manufacturing industries peaking in the 1960-ies has been replaced by continuous down-scaling and closures. Although public sector activities have been heavily expanded in all parts of Denmark in the post-war period this has not prevented a steady depopulation of many rural areas, including Bornholm. In the period 1960-2013, the total Danish population has increased by 23% from 4.566 to 5.603 million people while the Bornholm population has decreased by 16%.

This indicates the crucial importance of creation of new firms and jobs in rural areas which however, is easier said than done also considering the relatively low educational level compared to urbanized areas as well as the lacking institutional conditions for research, education, and innovation that generally characterize Bornholm and other rural areas.

Figure 1. Development of the population on Bornholm 1901-2013



Source: Danish Statistics.

Public administration

The public policy and governance structures are described in the Bornholm case studies as a part of the factors influencing the regional innovation and knowledge processes. However, a few introductory remarks should be mentioned here.

Until 2007, Bornholm was one of 13 counties in the Danish public administrative structure, mainly responsible for hospitals and regional educational, industrial and innovation policies which included administration of the EU structural funds for social and regional cohesion. Due to a reform of the Danish administrative structure in 2007, the 13 counties were eradicated and replaced by five larger regions and in this structure Bornholm became part of the Capital region of Copenhagen.

As an element of this national reform, so-called regional Growth Forums were established in the five regions that are responsible for coordinating and implementing regional economic, innovation, educational, and labor market policies including administration of EU structural funds. Such a Growth Forum already was established on Bornholm¹¹ as part of an amalgamation in 2001 of the five Bornholm municipalities into one administrative unit, the Regional Municipality of Bornholm¹². The new national administrative reform through which Bornholm became part of the Capital Region, provided Bornholm certain dispensations in terms of maintaining its Growth Forum and status as a region eligible for EU structural funding and support from rural policy schemes such as the LEADER program. Thus, historically Bornholm has had an administrative status allowing for region-specific policies and support schemes.

In sum, Bornholm is a peripherally located island, struggling with classical periphery problems of structural economic change, increased international competition, depopulation, relatively low levels of income and education, etc. On the positive side, Bornholm is advantaged by a strong place-brand due to longstanding traditions for tourism as well as by a varied nature and rich cultural heritage which constitute a good point of departure for culinary development strategies.

¹¹ <http://www.brk.dk/Bornholms-Vaekstforum/Sider/Forside.aspx>

¹² <http://www.brk.dk/Sider/Forside.aspx>

Chapter 3. The TKD approach and the case studies of Bornholm food

This chapter has the purpose of presenting and discussing the findings regarding the empirical case in focus of the thesis: the knowledge dynamics that enabled the development of 'alternative' food productions and related business networks, marketing and governance systems on the Danish island of Bornholm. Theoretically, the main question addressed relates to the fields of economic geography and regional studies and concerns how such complex knowledge dynamics should be conceptualized and whether the notion of Territorial Knowledge Dynamics is useful for understanding the Bornholm case.

In more practical terms, the chapter aims at introducing the analytical frameworks and empirical findings of the submitted publications 2, 3 and 4. The core part of the empirical data used throughout all the six submitted publications was collected through in-depth empirical case studies about the knowledge dynamics involved in the innovation of Bornholm food reported about in publication 2 and 3. Nonetheless, the publications only describe the applied theories, concepts and methodologies in a fragmented way and not always in detail. The purpose in the first of four sections in the chapter is to present in a more comprehensive manner the theoretical frameworks within which the case studies are made. This includes an introduction to the theoretical reflections in the submitted Publication 4 about the Differentiated Knowledge Bases typology that were made subsequently on the basis of findings from the case studies of Bornholm and other EUODITE case study regions. In the second section, I describe the applied research methodologies, and in the third I summarize and discuss the empirical findings regarding the innovation of Bornholm food. In the fourth and final section, I conclude the presented analyses.

The theoretical framework

Conducted within the EU FP6 project, EUODITE, the case studies are part of larger research activities aiming at empirically investigating the complexity and diversity of knowledge dynamics of firms and regions in the global knowledge economy. The EUODITE project was a large-scale Integrated Project with participation of close to 30 research partners from all over Europe who all contributed with empirical firm-level and regional case studies. The case studies were not deductively approached and not designed in order to confirm or reject certain theories or hypotheses regarding the relationship between territory, knowledge and economic development but was inductive and explorative in terms of identifying the variety of "regional trajectories to the knowledge economy" in Europe:

"The overall goal of the EURODITE project is to understand the role of knowledge in the economies of European regions in order to inform policies in these regions towards a knowledge-based economy with enhanced social cohesion. The intention is to probe beneath the popular notion of the 'Knowledge Economy' by describing the diversity of learning processes, knowledge dynamics and knowledge trajectories across Europe. It is also intended to examine the assumption that regions and other spatial arrangements (such as 'clusters' or 'milieu') represent coherent units of explanation and intervention in the knowledge field." (EURODITE 2005, p. 3)

Nevertheless, the notion of Territorial Knowledge Dynamics (TKD), developed by EURODITE partners Crevoisier and Jeannerat (2009) and emphasizing the increasing multi-scalar and combinatorial nature of knowledge dynamics connected with the transition from industrial to service economies, in many ways is a programmatic banner for the approach to studying innovation and knowledge creation undertaken in the case studies.

The EURODITE analytical framework was multi-dimensional and contained components from diverse fields of research such as economic geography, epistemology of knowledge and organizational management that not before had been put together in a comprehensive research design and the theoretical basis of which not always was described in detail in the framework papers presented *ex ante* for the research teams (see e.g. EURODITE 2005; Crevoisier et al. 2008). Thus, the basic research approach was a rather explorative one of using and testing the applicability of multiple suggested concepts in different sectoral and regional contexts and allowing individual research teams room for inclusion of relevant additional perspectives. Accordingly, although conducted within the overall framework and guidelines for empirical studies, the EURODITE case studies differ according to the varying approaches chosen by the individual research teams.

Hence, the below presentation of the EURODITE theoretical framework should be considered my *ex post* elaborated description and discussion of the analytical components that have been important for the structuring of the Bornholm case studies. Together the components provide a comprehensive TKD approach, suggested useful for the studying of combinatorial knowledge dynamics. The following conceptual elements have been particularly important and are introduced below:

- The notion of Territorial Knowledge Dynamics;
- The Differentiated Knowledge Bases typology;
- The Exploration-Exploitation Knowledge Chain;
- Varying institutional contexts for knowledge development.

A fifth methodological element of 'knowledge biographies' might be added to a comprehensive 'EURODITE TKD approach'. This element is presented subsequently.

The notion of Territorial Knowledge Dynamics

Numerous conceptual models such as 'clusters' (Porter 1998), 'regional innovation systems' (Cooke, 1992), and 'learning regions' (Morgan, 1997) have been elaborated within economic geography and regional studies in order to describe how knowledge, learning and innovation are embedded in and supported by regional or otherwise localized, path dependent economic, institutional and social systems. Moulaert and Sekia (2003) have commonly phrased such models as 'Territorial Innovation Models' (TIM). The TIM paradigm has had an enormous impact on regional and innovation policy formulation at both EU, national and regional levels throughout Europe.

Despite the varying focus of the different TIMs they rest on two basic assumptions: 1) Knowledge has two main forms, codified and tacit, and innovations rely on the interaction of these two forms of knowledge. Codified knowledge is explicit and communicable in texts and other forms of graphical representation and thus can be transferred over longer geographical distances while tacit knowledge is context-specific, difficult to communicate without face-to-face interaction and accordingly less easily transferable in space; and 2) Geographical proximity between actors not only give cause to advantages related to external economics and agglomeration dynamics (e.g. specialized suppliers, labour, services and educational institutions) but also facilitates the formation of trust, shared cultures, norms and values among actors which in turn facilitates creation of common tacit knowledge, difficult to transfer out of the specific geographical, social context.

In recent years, critical voices increasingly have been raised about the TIM paradigm. Critics regards, for instance, the strong emphasis on the region as the frame for knowledge development causing blindness for the role of interactions at national or international levels (Bunnell and Coe 2001; Bathelt et al. 2004); the fuzziness of concepts and the anecdotic and single case evidence (Markusen 1996); the focus on sectoral, path dependent trajectories when identifying sources for regional competitiveness and the lacking awareness of potentials connected with cross-sector platforms and 'related variety' (Asheim et al., 2011); the bias to the sphere of production and the lacking conceptualization of the role of consumers (Grabher et al. 2008; Malmberg and Power 2005).

The notion of Territorial Knowledge Dynamics (TKD) was developed by EURODITE partners Crevoisier and Jeannerat (2009) in the course of preparing the analytical frameworks for the EURODITE empirical case studies and was introduced as an explicit attempt to take into account the growing critique of the 'proximity paradigm'

of the TIM literature¹³. The aim of Crevoisier and Jeannerat, however, is not to abandon the insights of TIMs literatures and the relevance of regions as analytical objects not least in relation with innovation policy:

"We nevertheless consider that today it is necessary to bring these conceptions up to date in order to take into account the changes that have taken place at two levels. First, at a theoretical and conceptual level, there has been a rapid development of new theories on the knowledge economy and a radical expansion of the conceptions of innovation to include socio-cultural dynamics and the economy of services, which makes it necessary to move beyond the concept of innovation that was inherited from the industrial economy. Secondly, at a more general level of the development of society and the economy, it is necessary to take into account the extraordinary growth we are witnessing regarding the mobility of information, knowledge, individuals and capital. The traditional paradigm covered (..) under the generic designation of TIMs is in fact essentially based on the thesis of the immobility or low mobility of production factors, at least at an international level." (Crevoisier and Jeannerat, 2009, p. 1224).

Hence, Crevoisier and Jeannerat emphasize the growing importance of 'socio-cultural dynamics', caused by the overall shift in economies from industrial production to services, and the increasing mobility of knowledge in the globalized economies and digitalized societies of today and call for new models conceptualizing the impact of these changes. They also emphasize the growing importance for value-creation the growing role of end-consumers as co-producers and the need for integrative production-consumption conceptual models. In sum, Crevoisier and Jeannerat underline the need for a shift in innovation and regional research from the *proximity* paradigm focusing on regional, cumulative knowledge dynamics along specific production and technology trajectories towards a *multi-location* paradigm in which innovations and regional competitiveness are sourced through combinatorial knowledge dynamics involving multiple territorial scales, interaction of different types of knowledge such as scientific, technological and socio-cultural knowledge as well as interaction across the traditional divide of production and consumption.

The TKD mirrors a more general shift in the field of regional studies from a focus on socio-institutional perspectives towards cognitive perspectives (Lagendijk, 2006) such as the 'Buzz and pipelines' perspective suggested by Bathelt et al. (2004) which questions the paramount role of geographical proximity (buzz) for knowledge creation and points as well to the role of shared practices and distant knowledge interaction through relational-organizational proximity (pipelines).

¹³ For discussions of the varying implications of the TIM and the contrasting TKD paradigms, see the two articles authored by EURODITE partners Lise Smed Olsen (2012) and Laura James (2012).

As said before, the underlying goal of the proposed TKD notion is not a total break with the TIM literature but to provide a territorially more open perspective for the studying of how connections between extra- and intraregional knowledge dynamics and policies to support such connections¹⁴ can contribute to the 'anchoring' of mobile knowledge in regional economies:

"The question that arises is thus that of the new roles of the local environment but also of the other scales on which the economy, society and politics are organized. We are therefore advancing the thesis that the places that succeed today are those that mobilize the "elsewhere" and those that interact and move together with it. Cumulative, local knowledge dynamics can represent a major, solid basis for the competitiveness of regions, but the issue that is now at stake is to know how to create a composition of sorts that brings in the multiple forms of knowledge that are present elsewhere. Local specification is the result of multi-location milieus that achieve specificity together, within the context of globalization. Moreover, this capacity to participate in forms of mobility at medium and long distance can be explored using the concepts and tools developed by territorial economy." (Crevoisier and Jeannerat 2009, p. 1239).

The point in departure in specific places and regions as the nodes for studying of knowledge and innovation and the simultaneous awareness of the role of interaction at other scales were highly influential elements in the methodologies for collecting and analysing of data in the EURODITE case studies, both those about innovations at collective region-level which in fact was named using the abbreviation of 'TKD case studies', and those about firm-level innovations, named 'FKD case studies'.

The notion of TKD was applied as an overall analytical perspective rather than a complete, specified conceptual device. However, in order to provide it with operational components for empirical analysis three typologies of the possible *territorial* dimensions of knowledge dynamics were elaborated in the guidelines for the EURODITE TKD studies (Crevoisier et al. 2008, p.11) which together with a more generic opposition of combinatorial vs. cumulative knowledge dynamics were used as analytical conceptualisations:

- Generation vs. Use of Knowledge in a region;
- Proximity vs. Distance knowledge interactions;
- Mobility vs. Anchoring of knowledge.

Each of these three typologies defines four types of knowledge dynamics that possibly can prevail in a region by combining the opposed knowledge concepts in a two axes

¹⁴ Dahlström and James (2012) provide an interesting conceptual and empirical analysis, drawing on findings of EURODITE case studies, about the role and instruments of regional policy actors to support 'anchoring' of knowledge, i.e. the in-sourcing of knowledge of firms and other organizations through external linkages and the subsequent re-circulation and adoption (anchoring) of this knowledge more broadly within the region.

matrix. For example, a region can be characterized by strong or weak degree of knowledge generation and - in principle independently from this - by strong or weak degrees of use of knowledge. Similarly, a region can be characterized by strong or weak internal (proximity) interaction as well as by strong or weak external (distance) interaction. Finally, the knowledge dynamics in a region can be conceptualized in terms of strong or weak transfers of mobile knowledge from outside and in terms of strong respectively weak dynamics of anchoring knowledge in the region. The publication 2 (chapter 3.1) and publication 3 (chapter 3.2) contain parts dedicated the summing up and discussing of the empirical findings regarding these knowledge conceptualizations.

However, as described before, a territorially more open perspective than offered by the TIMs is only one of three core attributes of the TKD approach. Crevoisier and Jeannerat (2009) also emphasize the significance of two other dimensions potentially contributing to the increasingly composite and combinatorial nature of knowledge dynamics: the *epistemological* dimension of interaction between different types of knowledge and learning (such as scientific, technological and socio-cultural), and the *contextual/institutional* dimension of knowledge interaction across the spheres of production and consumption.

While these two additional dimensions of knowledge are not specified in detail by Crevoisier and Jeannerat (2009) they in fact are conceptualized in the EURODITE analytical framework in terms of, respectively, the Differentiated Knowledge Bases typology and five institutionally varying contexts for knowledge development (cf. below).

The notion of TKD, especially when combined with the below presented knowledge biography methodology targeted mapping of knowledge dynamics related to the historical, life-span process of realizing innovations, provides a quite different (but also methodologically demanding) perspective on innovation and learning than the one offered by TIM models. By paying attention to varying territorial, epistemological and contextual sources for knowledge creation instead of highlighting the centrality of specialized economic clustering and agglomeration dynamics, regional institutions and support systems, and scientific and high-technological types of knowledge, the TKD perspective opens the researchers' eyes for the complexity and compositeness of knowledge and innovation processes. At the end of this chapter I have a few comments regarding the applicability of the TKD perspective as a lens for studying of innovation and knowledge in rural development contexts and will also discuss the rural implications of the TKD approach up in the final chapter about policy implications.

The Differentiated Knowledge Bases typology

The Differentiated Knowledge Bases typology (in the following DKB¹⁵) was a core theoretical construct in the EURODITE project and is the perhaps single most important construct in the submitted works. Although given a central position in the theoretical and methodological framework papers for the EURODITE project regarding which different types of knowledge to consider in empirical analyses (Crevoisier et al. 2008; Butzin et al. 2010a), a comprehensive definition and critical discussion of the typology and its categories was not provided. One obvious reason for this was that the typology was still not fully defined and described by research publications. For instance, only very few of the research studies applying the typology contain definitions and discussions of all three knowledge bases but apply only one or maybe two of them (see e.g. Asheim and Coenen 2005 and 2006; Moodysson et al. 2008) and specifically, only very few research publications include and investigate the empirical implications of the symbolic knowledge category (but see e.g. Asheim et al. 2007; Asheim et al. 2011; Martin and Moodysson 2011; and the publications 4-6 submitted as part of the thesis).

Hence, the following introduction to the DKB typology is a post-script elaborated by me rather than a pre-script provided by the EURODITE framework papers. In the main lines, the introduction draw on the reflections in the submitted Publication 4 aiming at clarifying the theoretical content of the typology and in this sense should be considered a result, not a point of departure for the thesis. A summary of the main features of the three differentiated knowledge bases is given in Table 1 in Publication 4.

The Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE) at Lund University/Sweden, led by Professor Bjørn Asheim and with strong profiles within economic geography, regional studies and industrial innovation, has been the core node in the definition and use of the Differentiated Knowledge Bases typology up till now. However, although its elaboration is due to economic geographers and its application until now mainly relates to studies of regional innovation activities the typology fundamentally draws on the quite differing research fields of epistemology of knowledge and cognitive science.

The central characteristic of the typology, making this particular typology relevant in a dynamical perspective of investigating knowledge dynamics of innovations, is its epistemological nature, i.e. the categories of knowledge are defined not by any substantial, topical grounds but by differences regarding the principles of reasoning

¹⁵ It should be stressed that in some of the submitted publications I use the abbreviation of SAS instead of DKB, referring to the naming of the three specific knowledge types: Synthetic, Analytical, and Symbolic. However, I here prefer referring to the designation of the Differentiated Knowledge Bases typology, used in the research literature (see e.g. Asheim 2007).

and the ways of acquiring, evaluating and using knowledge. The DKB typology outlines three different ideal-typical cognitive approaches to generation and use of knowledge which in different ways can contribute to innovation and economic development and which I therefore propose understood as 'innovation knowledge strategies': analytical knowledge, summarized as 'theoretically understanding', synthetic knowledge summarized as 'instrumentally solving problems', and symbolic knowledge summarized as 'defining and communicating cultural meanings'.

This epistemological definition of the typology, however, is not always paid full attention in the research publications using the typology. The three categories sometimes are confused with a sort of organizational knowledge domains where analytical knowledge is restricted to universities and research departments, synthetic knowledge to production engineering departments and symbolic knowledge to marketing and sales activities. In the same line, the naming of the three categories as knowledge 'bases' may be misleading by provoking associations to varying substantial grounds, domains or stocks of knowledge as opposed to different ways of generating, adapting, and using economically relevant knowledge.

Without being explicated by the economic geographers using the DKB typology it seems to integrate two different dimensions of knowledge, on the one hand 'knowledge' about a specific object, and on the other hand a corresponding way of 'knowing' and learning. In other words, the typology seems to be in accordance with Cook and Brown's (1999) idea about "the generative dance between knowledge and knowing" where knowledge is defined as something people possess and based on an "epistemology of possession" and "knowing", defined as action and relying on an "epistemology of practice" (Cook and Brown, 1999, pp.381).

Cook and Brown, scholars within the organizational learning literature emphasizing the social, practice-related foundation of knowledge, conceptualize this 'generative dance' in terms of a continuous interaction between codified and tacit knowledge which are considered complementary and mutually interdependent rather than dichotomist knowledge forms. Also the DKB typology is intended to transcend the traditional tacit/codified dichotomy (see e.g. Asheim 2007). But while the organizational learning literature seems to suggest that there exist an in principle infinite number of possible 'knowledge dances' - or 'epistemic practices' (Knorr-Cetina 1999 and 2001; Nerland and Jensen 2012) defined by the varying social and epistemic specificities of distinct professions (such as software programmers, researchers, and hospital nurses), the DKB typology suggests that there basically are three ideal-typical epistemological dances, relevant for innovation.

An aspect of the typology, important when applied in economic geographical approaches is the different territorial implications of the categories. The knowledge resulting from analytical knowledge processing is to a large extent codified, mobile and transferable across space although a certain element of tacit knowledge is needed

as well to interpret, understand and work with codified knowledge and shared beliefs and values (Knorr-Cetina 1999). Synthetic knowledge is to a large extent tacit and practice-related but usually also has a codified element that allows for mobility across geographical space and sector borders. Compared to the two other knowledge bases, cross-fertilization across professional and sector borders, informal interaction with end-consumers and buzzing in non-commercial, civic, daily-life contextual settings (street cultures, public events, etc.) play a bigger role in symbolic knowledge dynamics (Asheim et al., 2007). Accordingly, symbolic knowledge is mainly (but not exclusively) tacit, closely linked to specific socio-cultural contexts and difficult to transfer directly in geographical space.

Compared to other typologies and concepts for categorizing and analyzing knowledge one of the major theoretical advantages of the DKB typology, especially in a TKD perspective, is its inclusiveness regarding the types of knowledge, learning actors, and social contexts that are suggested important for innovations and accordingly are conceptualized. The inclusion of symbolic knowledge as an in principle equally important knowledge category alongside the analytical/scientific and synthetic/instrumental types of knowledge that traditionally are considered in knowledge and innovation studies, opens opportunities for studying socio-cultural types of innovations and the interaction of knowledge across the traditionally separated spheres of production and consumption.

Without explicitly using the terminology of the DKB model, Allen (2002) has a comparable interpretation of the role of 'symbolic' knowledge in the economy:

"There is a symbolic form to the kinds of economic knowledge to be found in the finance and information-based services such as banking, insurance, accountancy and law, as much as there is in those industries which wear 'culture' on their sector label. Equally, in the much vaunted technologically innovative sectors of telecommunications, engineering and computing, economic knowledge rests upon a combination of symbolic functions and uses which share much with the symbolic schemas that routinely shapes the practices of the recognized 'cultural' industries. The point, quite simply, is that different economic activities play across a variety of symbolic registers – abstract, expressive, affective and aesthetic – and combine them in ways that render sectors distinctive. As such, any simple binary understanding of economic knowledge between, say, the cognitive and the aesthetic, or between the material and the symbolic, fails to apprehend the richness of knowledge in each and every area of the economy. There is no one symbolic sector to the contemporary economy, only economies which display a dexterity of symbolic knowledges in a variety of combinations, with certain sectors distinguished by one particular combination rather than another." (Allen, 2002, p. 49-50)

While Allen seems to purport that all economic knowledge basically is grounded on or at least holds certain 'symbolic' functions – a claim that radically blurs the boundaries between different types of knowledge and complicates the analytical categorization and study of such - the DKB typology is advantaged by indeed including socio-culturally defined symbolic knowledge but without deleting analytical-theoretical and synthetic-instrumental knowledge as categories in their own right and sustained by varying social and institutional conditions. Thus, the typology as a whole offers a perspective for studying how symbolic-cultural knowledge, analytical-theoretical knowledge and synthetic-instrumental knowledge interact and combine.

A main motivation for the publication 4 was the appeal of the DKB typology in terms of describing these three ideal-typical approaches to knowledge creation and innovation, exceeding the tacit-codified dichotomy and the high/low-tech sectoral classifications that often are applied in innovation studies. The publication 4 is an article of a special issue on *Knowledge Dynamics, Regions and Public Policy* of the journal *European Spatial Planning*, edited by a group of former EURODITE research partners including myself that was established as a direct spin-off of policy-orientated research tasks in the final phases of the EURODITE project and coordinated by Professor Henrik Halkier, University of Aalborg.

The Bornholm case studies (publication 2 and 3) had documented the importance of all three knowledge types and that analytical, synthetic and symbolic knowledge dynamics often were combined in the course of realizing innovations (I will describe these findings in more detail below). On the other hand, discussions with EURODITE colleagues, for instance in the editing group for the EPS special issue, demonstrated that precisely how to understand and use the typology in research was not always obvious and clear. Furthermore, and contributing to the lack of clarity, the existing research contributions applying the typology often do it differently than in the EURODITE case studies. My confusion was not that these published works (see e.g. Asheim and Coenen 2005 and 2006; Coenen et al. 2006) theoretically defined the knowledge categories differently but that they empirically often used only one or two of the knowledge categories in studies of the complex knowledge activities of entire regional innovation systems and localised sector-specific clusters and thereby tended to ascribe the principles of the knowledge categories to such macro-level social units.

Although this way of using the knowledge typology certainly is relevant for the purpose discussed by the mentioned research contributions of being able to distinguish between, for instance, science-driven (analytical) and engineering/technology-driven (synthetic) innovation systems when formulating regional innovation policies, it seems less applicable for unfolding the full potentials of the typology as a tool for studying the combinatorial knowledge dynamics of innovation processes, like it was attempted in the EURODITE case studies.

Thus, the aim of article was to clarify the theoretical, empirical, methodological and policy implications of the typology. For this purpose, two empirical data sets were used. One was the overall quantitative data collected from the more than 30 EURODITE research teams and describing the conducted firm-level knowledge biographies (the Timeline database¹⁶) that at this time was made available for further analysis across the many case studies. The other was data from one of the Bornholm firm case studies (the FKD3).

As shown in the three tables on pages 51-52 in Publication 3 summing up the three FKDs, the firm case studies documented, on the one hand, that the individual knowledge interactions, i.e. the smaller sub-sequences of knowledge development that together form an innovation, usually can be described by the principles of one of the three DKB knowledge approaches, and, on the other hand, that the realization of the innovation as a whole relied on interaction and combinations of different knowledge types. This picture is confirmed by the overall Timeline dataset provided by the EURODITE project (Larsson 2010) including data from all the firm case studies made from different regions all over Europe by EURODITE partners.

The tables also show how different types of knowledge dynamics are combined and interconnected in firm innovations. Using the FKD3 case about the innovation of Bornholm pork meat as illustration of a typical characteristic of the three firm-level cases, the focus of knowledge creation changed several times in the course of the studied innovations. The firm accomplished its innovation by organizing and coordinating the activities in differing intra- or inter-organizational professional contexts of relevance for the required task (e.g. search for product or technology knowledge, discussion of branding values, elaboration of production manuals, etc.) These knowledge interactions got inputs from previous knowledge interactions and provided outputs causing succeeding knowledge interactions, and very often these succeeding steps in the organizational innovation process entailed jumps not only between the DKB knowledge bases but also up- and downstream the chain of knowledge exploration, examination and exploitation (cf. below). Thus, the innovation processes certainly were not linear.

My analysis concludes that the three DKB knowledge bases are applicable for describing the knowledge approaches and learning modes of micro-level actors, networks and professional communities involved in the realization of firm innovations but that firms and multi-actor social systems such as sectors, clusters and regional innovation systems rarely rely on interactions within one single knowledge base but rather coordinate their actions in several interrelated learning modes, communities and contexts.

¹⁶ See Larsson, A. (2010) EURODITE WP6 Timeline data. University of Gothenburg. Available at <https://dl.dropbox.com/u/7725404/readme.txt>.

These conclusions have methodological consequences for how the typology should be applied. As the DKB knowledge bases refer to micro-level (organizational and inter-organizational) social systems, they should not be translated directly into distinct macro-level organizations and institutions such as regional innovation systems and clusters. The analytical potentials of the typology seem best exploited when the categories are applied altogether as a comprehensive conceptual tool for identifying the roles and interconnectedness of differing scientific/theoretical, engineering/instrumental and artistic/cultural types of knowledge and modes of learning.

Also in relation to policies for regional innovation and economic development, the DKB typology mainly holds potentials as a comprehensive analytical tool and overall perspective for identifying and evaluating the knowledge attributes and infrastructures of particular economic systems. In this perspective the goal should be to secure not only efficient environments for generation of scientific, engineering, and socio-cultural knowledge but also to establish efficient mechanisms for transfer and interaction of knowledge across the epistemological borders defining such types of knowledge. Such an integrative and inclusive perspective on the variety of knowledge and modes of learning that potentially can contribute to innovation, might provide new and promising policy opportunities for encouraging the development, diffusion and use of knowledge in ways that truly break with one-size-fits-all policies and that exceed the sectoral approaches and production bias characterizing a great deal of current innovation and economic development policy (Asheim 2007; Asheim et al. 2007).

However, it also should be stressed that the DKB typology basically is a descriptive and not an analytical concept¹⁷. It outlines three different types of knowledge approaches that can be used to describe and categorize observed knowledge interactions but it does not present further explanation as to why and under which circumstances these different approaches may be chosen and followed. Thus, the typology in itself gives few indications regarding how to organize research but requires assisting theoretical/conceptual tools and frameworks in which to be applied. In fact, exploring such possible assisting frameworks for applying the typology is an aim of more of the submitted publications.

The Exploration-Exploitation Knowledge Chain

Another conceptualization regarding the epistemology of knowledge which often is applied in innovation research is the distinction between exploration and exploitation of knowledge, originating from the organizational management literature (March 1991; Tushman and O'Reilly 1996). In line with the basic economic geographical focus of the EUROTITE project, the case studies primarily aimed at identifying how the

¹⁷ I owe Professor Bente Elkjær Århus University the credit of pointing out this fact.

cognitive outcome of learning processes facilitates innovation and regional economic development and not at a detailed analysis of the social, practice-based learning processes of the activated actors and communities which, on the other hand, are in focus of interest within the organizational learning literature.

The analytical focus on how knowledge contribute to innovation rather than on the socially constituted learning processes as such accentuates the need of conceptualizing the management and coordination dimension of securing an organizational progression of the development of knowledge from generation/search of knowledge towards commercial utilization and a flow and interaction of knowledge between the involved actors. This management and coordination dimension is conceptualized by the distinction between 'exploration' and 'exploitation' of knowledge and was included in the EURODITE theoretical framework. The origin of the distinction in the organizational management literature was not specified in the EURODITE theoretical framework papers but the basic definitions of exploration and exploitation as varying interconnected knowledge strategies or functions rather than temporally divided phases of knowledge development that mechanistically follow each other was in line with the definitions in the literature (see e.g. Lavie et al. 2010; Gupta et al. 2006).

In the EURODITE project, the original exploration-exploitation distinction was added an intermediate step of 'examination'. As discussed in the Publication 2 (e.g. Chapter 1.2.3) and Publication 3 (e.g. the Chapters 2.5 and 3.2.1), this distinction served useful for directing attention for the crucial role in innovations of not only generation of new knowledge but also of functions such as testing, trialling, scoping, diffusion, adaptation and contextualisation of existing knowledge to specific geographical and cultural settings.

A conceptualization of the organizational processing of knowledge in innovation studies may prevent the risk of overemphasizing the role of knowledge exploration and overlooking the importance of knowledge examination and exploitation. In other words, the organizational need for not only generating new knowledge but also for pushing and processing this knowledge towards commercial utilization adds an extra dimension to the combinatorial nature of knowledge dynamics, emphasized in the TKD perspective.

As appears from the tables at pages 51-52 in Publication 3, the observed knowledge interactions of the EURODITE FGD case studies (cf. the below section about the methodology) were set into a rather strict and schematic matrix with a horizontal dimension of the three DKB knowledge bases and a vertical dimension of the three generic knowledge phases. To some extent this matrix violates the basic DKB idea of certain *qualitative* differences regarding the ways the three knowledge bases develop. However, it worked as an overall framework for understanding the complexity of innovation knowledge dynamics and for identifying feed-back loops and jumps up-

and downstream the chain of knowledge exploration-examination-exploitation as well as between different knowledge epistemologies.

Institutional contexts for knowledge creation

In the analytical frameworks for the EURODITE case studies (see EURODITE 2005; Crevoisier et al. 2008; Butzin et al. 2010c), varying institutional settings for knowledge development were conceptualized in terms of the five different contexts of *Firm, Markets/Networks, Policy/Governance, Science/Education, and Society/Culture*. The relevance of these particular contexts were not theoretically argued but were suggested as descriptive categories for empirical analysis. However, the attention to varying societal, institutional contexts for knowledge development mirrors the EURODITE project's economic geographical attention to the larger contextual setting of economic activities and formed, as said before, an important conceptual element for empirically identifying and documenting the combinatorial nature of knowledge dynamics.

The firm context refers to the activities of individual firms for developing knowledge through internal processes; the market and network context refers to traded or non-traded knowledge interactions between economic actors or networks of actors; the public policy context refers to the specific role of public sector actors and initiatives to influencing knowledge dynamics in the economy (the production and/or consumption sphere) in distinct directions; the science and education context refers to the role of universities and research centres for developing economically useful knowledge, while the context of society and culture relates to pecuniary as well as non-pecuniary activities at an overall societal and cultural level affecting the conditions for economic activities. This could be public cultural events, national discursive campaigns regarding health, climate change or other societal challenges, or activities in diverse sorts of consumer forums.

The four contexts of firm, market/network, science/education, and policy/governance together form what might be called production-side contexts. While these production contexts are often included in economic geographical innovation studies, the context of society/culture, easily translatable into the sphere of consumption, is rarely considered. The above described emphasis of Crevoisier and Jeannerat (2009) of new forms of production-consumption interaction might be seen as a simple and more clear-cut version of the five contexts included in the EURODITE framework.

Since in-depth analysis of the complex knowledge interactions in the sphere of consumption exceeded the aim of the EURODITE project, basically focussed on production side knowledge dynamics, the society/culture (consumption) context had limited practical implications for the data collection but served mainly as one of five 'multiple choice categories' for classifying the institutional setting of the knowledge

interactions observed in the case studies. Notwithstanding this, the data collected in the case studies regarding the role of the varying contexts for the innovation of Bornholm food is re-interpreted in an integrated production-consumption theoretical perspective in the Publication 5, introduced in the next chapter.

Another aspect of the conceptual inclusion of contexts with bigger practical implications for the empirical case studies relates to the way the policy/governance context was approached. The policy/governance context were investigated not only as a context producing initiatives affecting the knowledge dynamics of forms, networks etc. like usually done in innovation studies but also in terms of a setting in which knowledge actually is developed and used in innovations, for instance through the organization of branding activities.

Although the DKB knowledge bases, as described above, were not thought of as directly related to specific institutional settings, certain connections between the knowledge types and the contexts were hypothesized and used for the analyses and categorization of observed knowledge dynamics. Analytical knowledge dynamics were suggested to primarily involve actors representing the context of science and education such as universities and research centres or firms with organized research activities; synthetic knowledge dynamics were suggested to mainly be firm-internal processes or occurring in the market/network context involving actors such as customers, suppliers and distributors, while symbolic knowledge dynamics were supposed to often involve external actors representing the society/culture context such as consumers, media, and citizen/cultural organisations but also often firm-internal processes related to identification of branding values, elaboration of marketing strategies, etc. The empirical case studies reported about in the publications 2 and 3 confirmed this indicative description of different institutional contexts for the three knowledge bases but also drew a more complex and varied picture of a high degree of interaction between different contexts and actors.

While the above described concepts formed the core theoretical framework for the empirical case studies, the knowledge biography methodology formed a main and matching methodological element. This methodology is introduced in the below section which also describe the more practical methodological challenges and decisions in relation to the making of the Bornholm case studies.

Methodology

The knowledge biography methodology

As said before, the EURODITE case studies aimed at identifying and mapping the ways the cognitive outcomes of learning processes facilitate innovation and regional economic development and not at a detailed analysis of the social, practice-based

knowledge systems and processes of the activated learning actors in focus of interest for social theories of learning. In other words: the above described theoretical framework is equipped for mapping the territorial, epistemological-cognitive, and institutional-contextual aspects of knowledge dynamics contributing to innovation but have a lacking vocabulary for mapping the social characteristics of the involved learning communities and knowledge dynamics.

From a methodological point of view observing, categorizing and analyzing the truly intrinsic human phenomenon of knowledge creation poses a challenge. For the studying and mapping of how micro-level knowledge dynamics contribute to innovations, a specific knowledge biographical methodology was elaborated by EURODITE partners. The methodology can be introduced with the following quotations from the EURODITE Final Working Package 6 report (Butzin et al. 2010a):

“The method of knowledge biographies has been developed in order to grasp the entire set of events, actors and knowledge components that contribute to knowledge dynamics in firms that are engaged in innovative activities. Knowledge dynamics are the basis for a change in products, processes or the organisation of a firm. Innovations are easily observable results of knowledge dynamics. This means that a change process (or innovation) can be the ‘red thread’ to be followed in order to uncover the knowledge dynamics necessary for such a change to happen.” (Butzin et al. 2010b, p. 2)

Further:

“By starting on the firm-level, knowledge biographies study the evolvement of knowledge dynamics in innovation processes over time and space. They allow capturing of relationships and contextual settings within and between firms and scales and thereby make possible to follow knowledge dynamics over time. The basic principle is to examine the procedural and interactive nature of knowledge applied during the entire life-span of an innovation process.” (Budzin et al. 2010a, p. 6).

And finally:

“The following three dimensions of an innovation process are regarded as methodologically important:

- the time-space dimension,
- the concrete development process, e.g. the kind of knowledge applied and its modes of generation, use and sharing,
- the network of partners who interact in this process and the broader environment of the innovation.” (Butzin et al. 2010a, pp.11)

To sum up, the basic idea is to use innovation processes of firms as the concrete social activities observable in time and space around which knowledge is generated, diffused and used by varying types of actors and inter- and intra-organizational networks.

In order to define the analytical units through which the data describing the involved micro-level knowledge dynamics is provided, the entire innovation process is broken down into distinct sub-sequences or 'knowledge interactions', i.e. temporally, spatially and/or organizationally separate but interrelated steps (but not necessarily linear) of knowledge evolution. Among the indicators with which to describe such knowledge interactions were a number of variables with multiple choice categories, thus providing quantitative data sets. The variables regarded, for instance, type of knowledge, phase/strategy of knowledge development, institutional context, knowledge domain, the importance of the interaction for the realization of the innovation, besides diverse time-space bibliographic information.

As a part of the methodology for analysis and reporting, these knowledge interaction data were entered into a quantitative 'Timeline' database, encompassing data of all 55 biographies accomplished in the EURODITE project (Larsson 2010). However, more importantly than providing data for overall quantitative analyses of the EURODITE case studies¹⁸ the break-down procedure of the methodology was meant as a tool enabling a historical description and qualitative analysis of the development and flows of knowledge in the entire life-span of the studied innovations.

The knowledge biographical methodology was used only in the firm-level case studies, reported about in publication 3. However, the regional-level case studies (publication 2) applied a comparable historical and holistically orientated methodology of breaking down the life-span of the studied innovation into a number of main phases or sub-elements of knowledge interactions. As outlined in the conceptual and methodological framework for the studies (Crevoisier et al. 2008) these knowledge interactions were studied and described in terms of 'what' (the topic in focus of knowledge creation), the 'who' (the involved actors and institutional contexts), the 'how' (the types of knowledge and learning), and the 'where' (the geographical location(s) of the actors involved).

The knowledge biography methodology constitutes a component of the EURODITE analytical framework with major advantages for the study of innovation knowledge dynamics. By considering the entire life-span of innovation processes from the first ideas and preparations and till the final phases of commercialization and implementation rather than merely the parts of the innovation that ex ante are assessed as crucial (for instance, the science activities behind a new technology), the biography methodology allows for tracing and mapping the complex and wide-ranging

¹⁸ In this phd-thesis, these quantitative Timeline-data has only been used in Publication 4.

processes through which firms (and other actors) acquire and develop knowledge in the course of accomplishing innovations.

For instance, the request to cover the entire life-span of innovations directs attention also to the initial, preparatory interactions before the actual endeavours of realising a specific innovation that define the needs of change and direct the subsequent innovation knowledge dynamics. Furthermore, applied in combination with the above described territorially, epistemologically and institutionally/contextually open TKD perspective rather than with the more restricted 'proximity paradigm' of the varying TIMs, focussed on the role of regional interactions and institutions, the biography methodology helps in drawing a richer picture of the diverse intra- and extra-organizational sources for knowledge creation that are activated by innovating firms.

However, the biography methodology also has certain disadvantages. The request for data about historical, often long-lasting processes often is difficult to satisfy for the persons interviewed simply due to lacking memory, and also the topic in focus of data collection, the evolvement of knowledge, can hold tacit and subtle elements that are difficult to verbalize by interview persons. I will further comments the challenges of applying the knowledge biography methodology in the below section which describes the specific research methodologies and the methodological choices applied in the making of the publications 2 and 3.

The research methods of the Bornholm case studies

It was a central element in the EURODITE analytical framework to study the knowledge dynamics at region- and firm-levels in an integrative way. Although differing methodologies were applied in the region level study (publication 2) and the firm level studies (publication 3), the theoretical frameworks and the collection and analysis of data for the two tasks were closely integrated. Accordingly, also this introduction to the two publications including their empirical findings is made in an integrative way.

Selection of cases for TKD and FGD studies

The choice of selecting the development of production, marketing, network and governance systems for 'regional food' of Bornholm as the specific case for region- and firm-level empirical studies results from the location on Bornholm of my employing organization, CRT, but also other factors impacted the choice. First, as the emergence of diverse types of 'alternative' food products and productions is a main ongoing international trend, a case study about Bornholm culinary food could have international and not only marginal, local interest.

Secondly, in-house knowledge of CRT about the new food productions on Bornholm stemming from previous analyses (see e.g. Hedetoft 2004 and 2006) as well as news stories in local medias indicated that the new Bornholm food productions generally represented an entrepreneurial, socio-cultural type of innovation relying on geographical, cultural and experiential assets of the place of production, new types of direct sales and interaction with consumers, storytelling and branding aspects rather than more tangible or technological qualities such as health or environmental aspects of products. Hence, selecting Bornholm food as case supposedly could provide new insight regarding socio-cultural types of innovations and the role of symbolic knowledge in the economy.

Thirdly, a case about alternative food innovations on a peripheral island rather than technologically advanced and scientific innovations of larger urban food clusters (although these perhaps would be more important in economic terms), was supposed to provide a rural perspective on knowledge dynamics that could counter-weight the overall bias in innovation research towards urban regions.

As described in Publication 3, the three firms used for FKD case studies were selected to secure an analysis of knowledge activities covering larger parts of the spectrum of different business models within the Bornholm food sector. Based on the above mentioned in-house knowledge of CRT as well as preparatory desk research made as part of the food sector study¹⁹ (publication 1), three different business models were identified among the producers of 'Bornholm food': a. niche producers distributing their specialty products on national consumer markets outside the island; b. producers based on creation of diverse consumer experiences and direct sales to visiting customers; and c. large-scale industrial producers who exploit the Bornholm brand through specialized product innovations as part of a diversification strategy of their standardized product portfolio.

One firm from each of these three groups was selected for the FKD case studies. Also this selection to a large extent was made on the basis of the CRT in-house knowledge about individual Bornholm food firms and their special development conditions and entrepreneurial stories. The FKD1 represents the first group and is about the development of rapeseed cooking oil, and FKD2 represents the second group and is about the creation of a vineyard. The FKD3 case study represents the quite different third model of 'Bornholm food', not like the two others small-scale and artisanal in nature and not driven by Bornholm entrepreneurs. It concerns the innovation of specialized Bornholm pork meat as part of the highly standardized product portfolio of a multinational company with relatively weak links to Bornholm.

¹⁹ The three business models have similarities with the three modes of rural business development identified by Ploeg and Renting (2004, pp.236) and designated, respectively, "deepening", "broadening" and "regrounding". In Manniche and Kjeldsen (2009) the three Bornholm firm cases are analysed within the framework of these concepts.

Data collection

As said before the region- and firm-level case studies were conducted in an integrative way. Although a different methodology and perspective were applied in the TKD and in the three FKD case studies, the collection and analysis of data for the two tasks were closely integrated.

The 26 interview persons listed at the end of publications 2 and 3 of which some have been interviewed more than once provided information that was used for the coordinated analyses of both reports. The 26 interviewees have all been involved in larger or smaller parts or phases of the region- and/or firm-level innovation processes, either as owners or employees of food producing firms or as representatives of supply chain partners (customers, distributors, retailers, business consultancy services, etc.), public authorities or related industries such as tourism. CRT colleagues assisted in the making of the interviews which took in average about 1½ hour. The interviews were almost exclusively made via face-to-face meetings but in a few cases via telephone, and were tape-recorded and subsequently transcribed. In line with the EURODITE guidelines the interviews were either genuinely open or semi-structured in order to allow the interviewees to tell their stories in their own words and following their own logic. This obviously was a resource demanding methodology.

Each FKD study started with a 'narrative interview' (Butzin et al. 2010a, pp. 12-13) of a key person involved in the studied innovation and able to draw a (more or less) full picture of its main phases, actors, challenges, results, etc. In the FKD1 and FKD2, presented in Publication 3, this key person was the owner of the studied small local firm while in the FKD3 about a large company it was a manager responsible for the realization of the innovation. Subsequently new interviewees (inside or outside the studied firm) who was identified as important for specific knowledge interactions or phases of the innovation, were selected, contacted and interviewed, and step by step information required for the mapping of the evolvement of knowledge in relation to the studied firm and region-level innovations was provided.

Second hand information about the involved persons, organizations, topics, etc. was frequently searched for and acquired from websites and other sources of written materials in order to prepare the interviews, to generally improve the amount of information about the study subjects, to cross-check provided interview information and to secure that all relevant perspectives and views were considered.

The knowledge biography methodology unquestionable was a time-demanding research method, and defining when a sufficient number of informants are interviewed and a sufficient amount of empirical data is collected was a challenge. In the Bornholm case studies this conclusion was reached by a trade-off between on the one hand, investment of restricted time resources and, on the other hand, the possible value-added in terms of providing truly new information or perspectives through more

interviews. At a certain point in time, interviewees no longer provided additional and new information but rather confirmed already collected information.

Nonetheless, it should be said openly that restricted research resources prohibited me and CRT colleagues in thoroughly following and mapping the Bornholm food knowledge biographies in all their many directions, especially when involving distantly located (often abroad) interviewees who also might be difficult to interview due to language reasons. This potential language barrier in fact constitutes a serious problem related to the practical use of the methodology, especially when applied as part of the multi-scalar TKD perspective.

Analyzing data

The collected set of qualitative interview data was analyzed by heuristically confronting the findings regarding knowledge dynamics with the complex theoretical and conceptual frameworks set up for the EURODITE case studies including the DKB model of different types of knowledge, the distinction between different institutional contexts of knowledge development as well as the four oppositions of knowledge dynamics, underlined in the TKD perspective: combinatorial vs. cumulative knowledge; generation vs. use of knowledge; proximity vs. distance in knowledge interactions; and mobility vs. anchoring of knowledge. Both Publication 2 and 3 contain sections dedicated analyses of the empirical findings in relation to these overall theoretical constructs.

As mentioned and discussed at several occasions in the publications 2 and 3, this data interpretation was not always straightforward. For instance, the temporal break-down procedure of the knowledge biography methodology was a big challenge. Breaking down innovations in sub-parts, even in retrospective, is certainly not straightforward since the observed knowledge dynamics often are intertwined, overlapping, and non-linear if not circular. This challenge is extraordinarily demanding when applied in multiple research team organizations like the EURODITE project where common understandings of concepts and methods are crucial for producing validated and comparable set of empirical data. Furthermore, the number of knowledge interactions that relevantly can be defined as contributing to the innovation, easily reaches a level where it prohibits the holistic, historical storytelling that also is important in the biography methodology.

Accordingly, the analyses and reporting of the knowledge biographies in Publication 3 do not always follow the sequences of the identified 'knowledge interactions' but is structured around a smaller number of often topically and temporally defined headings of the accomplished development activities. Nevertheless, as said before, the knowledge biography methodology served useful for identifying and mapping the multiple types of knowledge, learning forms, actors and territorial scales that are

involved in firm innovations and should be considered a central methodological device in TKD approaches.

Another main problem of categorizing observed knowledge dynamics centred on the use of the DKB typology the categories of which entail a high degree of qualitative definition. Indeed, the categories give immediate sense as three ideal-typical basic epistemological approaches to knowledge creation and use that certainly are identifiable in real world innovations. However, the individual knowledge interactions through which the studied innovations were realized rarely were directly comparable to the ideal-typical descriptions of the knowledge bases in diverse EURODITE framework papers and research articles but more varied and mixed up. Thus, the categorization of observed knowledge interactions (see e.g. the three tables on pages 51-52 of the publication 3, summing up the three FKDs) sometimes held an element of subjectivity and simple choice.

However, by investigating and identifying the precise task of an interaction and the criteria for evaluating when this task was accomplished, most knowledge interactions could meaningfully be classified as one of three: 1) cognitively understanding, forecasting or planning something by asking "is this true/valid?", 2) instrumentally solving a specific practical problem by asking "does this work in practice?" or 3) defining, communicating or providing a material/sensuous expression of personal or organizational meanings, values and preferences by asking "does this make sense?". This procedure demands qualitative, in-depth and time-demanding research methodologies and data collection through interviews of the persons directly involved in the studied knowledge processes.

Reporting

The case study reports are kept in strict compliance with the detailed and sometimes repetitive reporting templates prepared for the TKD and FKD studies (Crevoisier and Vale 2008; Collinge et al. 2008), including parts presenting the empirical findings and parts with interpretation and discussions of the findings in the light of the varied conceptual frameworks.

The text presenting the empirical findings is kept in a subsuming, historical style that emphasizes the overall flow and evolvment of knowledge characterizing the studied innovations but also put weight on evaluating and reflecting upon the practical content and applicability of the applied concepts. Unfortunately, this presentation style to some extent prohibits a specification of the precise sources of findings.

The empirical findings

Publication 2 and 3 present the results of the empirical case studies that were made as part of the working packages 5 and 6 in the EURODITE project and that provided the core empirical input to the thesis. The two publications have a different but complementary perspective. In Publication 2 about 'Territorial Knowledge Dynamics' (TKD), the focus of analysis is the collective, regional level of developing and conceptualizing more general aspects of the Bornholm food productions related to, for instance, experience elements and branding values, as well as of establishing the business networks and public policy systems.

In Publication 3 about 'Firm Knowledge Dynamics' (FKD), the focus is on three individual firms and their processes of innovating products, technologies and distribution and marketing systems. As said before, these firm level case studies applied the novel 'knowledge biography methodology' which provided unique, in-depth empirical data about firms' complex, wide-ranging processes of developing knowledge in order to realize innovation, involving intra- and inter-organizational interactions at different territorial scales, different types of knowledge and ways of learning, etc. The three resulting 'knowledge biographies' constitute a core empirical contribution of the thesis to the research.

The below summary of the findings of the two reports is structured by the three dimensions of knowledge compositeness which are emphasized in the TKD approach and which were central objects for the empirical analyses in both the region-level TKD case study and the three firm-level FKD case studies: territorial multi-scalarity, epistemological diversity, and varying institutional contexts.

Territorial scales

The region- and firm-level case studies confirmed the relevance of paying attention to multiple territorial scales of knowledge. The new Bornholm sector for culinary foods and drinks consists of 40-50 firms and employs approximately 400 workers. Among the firms are approximately 10 smoke house restaurants (of which some have existed for generations) that offer the traditional regional smoked herring dishes, as well as a number of recently established gourmet restaurants. Two business models have emerged: one of classical niche producers relying on distribution via retailers outside the island, and the other of producers relying on direct, face-to-face sales and experience-based offerings to visiting customers/tourists. The food producers have close cooperation relations with other regional 'related variety' sectors (Asheim et al. 2011) such as tourism, restaurants, and arts & crafts who commonly market and brand their products with a regional identity.

Two regional producer associations have been formed. One is the European Network of Regional Culinary Heritage²⁰, an association formed in 1995 due to inter-regional policy network cooperation between Bornholm and Scania/Sweden and today recruiting member regions mainly from Poland, Sweden and Denmark. The Bornholm affiliation has around 45 members. The other is Gourmet Bornholm, established in 2005 and organizing exclusive the retail-oriented Bornholm producers focused on non-local markets in order to start more formalized cooperation on marketing and distribution.

Furthermore, the Bornholm culinary sector has been provided certain policy support structures, mainly manifested in the so-called LAG (Local Action Group), established as part of the administration of EU Common Agricultural Policy (CAP) schemes for rural development and responsible for defining the goals and priorities in a 'local development plan'²¹. The LAG coordinates the use of the EU funding (€1.7 mil. annually), assists in the provision of co-financing via diverse public authorities on Bornholm and has prioritized support to network activities of local food producers and arts and craft businesses.

Thus, the established production, distribution, marketing and support systems for Bornholm food have certain characteristics of a localized 'cluster', if not in the Porterian sense then as a rural micro version of such, characterized by intense interaction and cooperation and certain support structures. Crucial parts of the learning processes enabling the innovations of culinary products and productions occurred within the framework of this localized business sector. For instance, the two producer associations have played important roles as platforms for knowledge exchange regarding topics such as start-up of small-scale manufacturing firms, establishing distribution and logistical systems and implementation of distinct food regulatory requirements. The importance of intra-regional knowledge dynamics also relates to symbolic knowledge dynamics of conceptualizing and branding the cultural qualities and experience elements of 'Bornholm food' and to entrepreneurial processes of identifying and understanding the implications of value-based business models relying on branding values, storytelling, and experience offerings.

On the other hand, the intraregional knowledge interaction has sourced heavily from interaction at other territorial scales. In the lack of a rich, authentic regional food culture to tap into by Bornholm food producers (besides smoked herrings), the tangible products generally cannot be described as regional culinary heritage in a traditional sense. Rather they are specialty versions of already known product categories (meat, cheeses, beer, pasta, wine, cooking oil, liquorice, ice cream, chocolate, etc.) emphasizing geographical, cultural and experiential assets of Bornholm rather than, for instance, health, environmental or other functional product assets. In this strategy, producers draw on the place-brand of Bornholm which has

²⁰ <http://www.culinary-heritage.com/>

²¹ <http://www.lag-bornholm.dk/>

been built through longstanding tourism traditions. Nonetheless, in a Danish context products emphasizing such product qualities are rare and thus, the studied development definitely should be considered innovative and pioneering.

Important inspirational sources for the producers have been the culinary styles and business models of other countries (e.g. Southern European) as well as the concept of "New Nordic Food", a gastronomic style recently launched and promoted by the Nordic Council of Ministers (<http://www.norden.org/>), focusing on the naturalness and freshness of Nordic food raw materials and on developing new products and recipes by using and combining traditional raw materials in new ways (Meyer 2007).

In particular the firm-level case studies document that relational and cognitive/professional proximity rather than geographical proximity have been important for appropriation of product and technology knowledge. The entrepreneurs achieved codified knowledge (in the case of the wine producer of FKD2, even tacit elements) about specialized products and technologies through sources such as the internet, contacts and personal visits to suppliers, industry organizations and other professionals not only at a national scale but also internationally, and subsequently developed more tacit knowledge components through learning-by-doing. The interviewed entrepreneurs generally described their ways of getting access to national and international professional expertise as uncomplicated, non-rivalry and not restricted by strong gatekeeper functions. This might reflect that the contacted professionals usually were not competitors and operating on the exact same market as the Bornholm producers. The rivalry experienced by the entrepreneur in FKD2 when contacting a competing wine grower in another part of Denmark for advice could be an indication of this. Furthermore, as said before, the mobile and codified product/technology knowledge provided from external sources was not directly operational and competitive but needed a supplementary tacit and contextual dimension developed through a proceeding phase of learning-by-doing (examination).

Also the above mentioned entrepreneurial (symbolic) knowledge dynamics of conceptualizing, commercializing and branding the qualities of 'Bornholm food' drew on external sources and inter-regional cooperation. For instance, the Bornholm LAG and the Bornholm affiliation of the association European Network of Regional Culinary Heritage have organized study tours for the producers to rural areas in Sweden and Italy in order to transfer knowledge about culinary traditions, operation of artisanal business models, marketing and sale of premium-priced products from countries with longer experiences for such activities. The European Network of Regional Culinary Heritage has been a platform for inter-regional cooperation with other rural areas in Europe regarding marketing and food tourism as well as for intra-regional interactions and discussions about, for example, how to define the special branding qualities of Bornholm food.

These activities exemplify not only the significance of multiple territorial scales for knowledge creation but also the deliberate creation of both 'pipelines' to extra-regional knowledge sources (such as study tours to other countries) and diverse 'local buzz' arrangements to re-circulate and anchor external knowledge (such as organization of cultural events).

An excellent example of such global pipeline/local buzz type of arrangements is the crucial role of regional private consultancy firms for transferring, contextualizing, re-circulating and anchoring of external knowledge about branding and experience-based business models that were supported financially via a regionally organized business consultancy support scheme. As clearly illustrated by the quotation from the interview with one of these private consultants, Hans Christian Holmstrand, in Publication 2 (p. 15), the abstract concept of the 'experience economy', invented and developed by international consultants and researchers to describe new business forms profiting from growing consumer demands for experiences and products with a face and story, was transferred and contextualized through the services of the business consultants who recently had moved to Bornholm from the Copenhagen area. Through the intermediating roles of these business consultants and through interaction with other related experience-based sectors in the region, the practical implications of the experience economy concept for diverse business functions has anchored among regional firms and governance actors.

Thus, external, mobile knowledge about topics such as commercialization of culinary traditions and the significance for producers of premium-priced products of consumer preferences, branding, cultural event making, and value-based communication have been transferred to Bornholm via diverse channels, contextualized and adapted to the conditions of Bornholm and Danish consumers and tourism markets, and have been re-circulated and anchored among businesses in the food and other sectors through diverse network activities. These cross-sector processes of transfer, contextualization and anchoring of knowledge constitutes a main result of the long process of developing Bornholm food, giving the development its distinct region-specific character, difficult to replicate by other regions.

Epistemological approaches

The analytical tools in the thesis regarding epistemology of knowledge are the Differentiated Knowledge Bases typology, outlining three different, ideal-typical 'knowledge approaches' (analytical, synthetic and symbolic) and the distinction of knowledge exploration, examination and exploitation.

Despite the challenges of using the rather fuzzy, ideal-typical categories for categorization of real-world knowledge interactions (cf. above), the empirical data and analyses have proved the value of the DKB typology for innovation studies. A good

example of the real world applicability of the typology is given in the FKD3²² about the innovation of Bornholm pork meat by the multinational company, Danish Crown, utilizing and combining in-house research-based knowledge, agricultural technological knowledge and (for this company) new types of knowledge about consumers and how to define distinct cultural qualities to embed in the product.

Another exemplary illustration is the three main phases of university research, technical engineering, and branding consultancy that were identified in the FKD1 study of the life-span innovation of a cooking oil product and following varying epistemological principles (see publication 3, p. 25-26). Compared to the above mentioned example from the FKD3, the three knowledge approaches in this example were clearly separated and confined not only in time and space but also, at least to some extent, regarding institutional context. Due to this institutional separation of the involved actors, the commercial activities of the Bornholm producer were only realized coincidentally. According to an evaluation report made at the end of the initial chemical and engineering research activities, actually aiming at developing *non-food* use of farm crops such as rapeseeds (see publication 3, p.15-16), the research efforts had "demonstrated added values of more than 100% over traditional refining for oilseed rape" which nonetheless was considered insufficient to allow for a commercial breakthrough of the invented technologies. However, by the assist of a consultancy firm in identifying specific branding values and narrative elements to embed in the rapeseed oil, developed through the research activities, the entrepreneur studied in FKD1 succeeded in commercializing the product on consumer markets. This clearly indicates the significance of symbolic knowledge for economic value creation. More generally, the example may illustrate the importance of storytelling and symbolic knowledge of Bornholm food producers, public actors and other local stakeholders for the legitimization of the premium-prices of products compared to conventional product categories.

Also the FKD2 study about the wine producer documents illustrates the significance of different epistemological approaches in the course of realizing the innovation. The producers' initial synthetic knowledge dynamics of developing wine in a Danish geographical and climatic context were for a period, due to interaction with a private communication consultant, replaced by symbolic knowledge dynamics of defining the cultural and entrepreneurial values of the business model which provided crucial inputs to the final phase of designing and building the physical facilities for the visiting customers.

Not surprisingly, the case studies have documented that the three DKB knowledge types have played different roles. There has been an almost total absence of *analytical* knowledge processes, i.e. science-driven, research-based exploration of

²² This example is also used in the Publication 4 for the theoretical purpose of illustrating the interaction of the three DKB knowledge approaches and the epistemologically 'combinatorial' nature of innovation knowledge dynamics.

new knowledge and technologies. This reflects the rural context with few research institutions as well as the food sector context characterized by non-technological, socio-cultural approaches to innovation and change. As documented in the FKD1 case study, the cooking oil technology put in commercial use by the Bornholm firm relied on previous phases of basic and applied research activities primarily occurring in the science/education context, and as documented in the FKD3 case study the innovation of a specialized pork product drew heavily on exploitation of existing in-house agricultural research knowledge (firm context). However, in both of these examples, which are atypical regarding the involvement of analytical research-based activities, the research were conducted by actors, representing organizations or institutions external to Bornholm and did not lead to further explorative or testing research activities on the island.

While research based activities played a limited role (except for the two above examples) *synthetic* knowledge dynamics have been crucial for the innovation of the tangible food and drinks products and production and distribution system. As already described, the entrepreneurs searched for existing artisanal product and technology knowledge often via interaction with suppliers of technology, ingredients, packaging etc. or with other producers located in other parts of Denmark or abroad, and then adapted and contextualized this knowledge to the specific geographical, market and social conditions of Bornholm via learning-by-doing (examination and exploitation). Other synthetic knowledge dynamics regarded entrepreneurial business development aspects of such as start-up of small-scale, alternative manufacturing firms, establishing distribution and logistical systems, and implementation of distinct food regulatory requirements.

Crucially important *symbolic* knowledge dynamics have concerned the identification and conceptualization of the distinct branding values of 'Bornholm food' and of individual firms, and the development of intangible experience elements of products (which are focussed on in more detail in the Publication 6). These processes involved interaction among the food producers, interaction between the food sector and other sectors in the region such as tourism, catering, and arts & crafts as well as regional rural policy initiatives of supporting the entrance of Bornholm food on Danish consumer markets, for instance through organizing cultural events in and outside Bornholm but also was sourced and inspired from external actors.

As documented in all the three firm case studies, symbolic knowledge dynamics were not only important in terms of isolated inputs to the final marketing and implementation phases of product or technology innovations but for the construction of cultural meanings and value systems that (sometimes) affect subsequent analytical and synthetic knowledge development dynamics.

The empirical findings generally confirm the above characterisation of the DKB categories' different territorial dimension (see e.g. Table 1 in Publication 4).

Institutional contexts

The third and last dimension of knowledge dynamics considered in the theoretical framework concerns the role of the varying institutional contexts of firms, market/network, science/education, policy/governance and society/culture for the realization of innovations. As said before, the former four might be considered production-side contexts which often are included in innovation and regional studies, while the context of society/culture, translatable into the sphere of consumption, rarely is considered. Also the collection and analyses of case study data have focused on the production-side contexts (but see Publication 6), but nevertheless have provided evidence regarding the role of activities also in the context of society/culture such as organization of public cultural events.

Like is the case regarding the epistemological approaches and territorial scales of knowledge, the empirical case studies draw a picture of highly combinatorial knowledge interactions across varying institutional contexts. Firm internal processes, market and network based interactions, public policy initiatives, social and cultural discourses at a regional or national level have contributed to the studied innovation processes while scientific research activities have had less significance except in the cases of a few individual producers.

In particular, the case of Bornholm food has documented the role of intra- and extra-regional network interaction and the importance of the region as locus for policy making. A central coordinating role in the entire life-span process of conceptualizing and developing the specific qualities of Bornholm food as well as for the actual branding and marketing activities targeted national consumer markets, was undertaken by public policy actors mainly related to the above mentioned Bornholm LAG.

The relatively limited financial resources of the Bornholm LAG were focussed on support to building of network cooperation between the Bornholm food producers, between food businesses and other Bornholm sectors, mainly arts and crafts and tourism as well as to actors in other rural areas in Denmark and abroad. This has built up trust and mutual understandings among Bornholm actors, which has been manifested, as already described, in the establishment of two formal food producer network organizations, and has led to diverse collective network-based activities such as study tours abroad and cross-sector product development projects. Many collective initiatives have had a marketing and branding purpose such as the organization of cross-sector marketing events for food producers, arts and crafts businesses and tourism. The LAG also for a period employed a so-called Food Ambassador who among other things organized a series of concerted, media covered place-branding events for

Bornholm food often including the tourism and arts and craft sectors. A final initiative to emphasize

Hence, in line with the multi-scalar TKD approach to regional policies, Bornholm rural policy actors have encouraged extra-regional knowledge interactions as well as intra-regional re-circulating and anchoring of mobile knowledge on Bornholm through network events, project related cooperation etc. In the final chapter of discussing the policy implications of the findings, I shall return to this aspect of the Bornholm case.

Conclusions and further discussions

A main purpose of this chapter is to present and discuss the findings regarding the overall empirical case in focus of the thesis: the knowledge dynamics that enabled the development of 'alternative' food productions and related business networks, marketing and governance systems on the Danish island of Bornholm. Theoretically, the main question has been how to conceptualize such complex knowledge dynamics.

I have discussed the definition and possible interconnectedness of multiple knowledge conceptualizations from economic geography, epistemology, and organizational management that were included but not fully defined and grounded in the analytical frameworks for the empirical studies, provided by the EURODITE project in which they were part. Specifically, the notion of Territorial Knowledge Dynamics (TKD) and its three dimensions of 'combinatorial' knowledge dynamics, territorial multi-scalarity, differentiated epistemological approaches, and varying institutional contexts, have been discussed and further elaborated as a possible theoretical and conceptual perspective for studying regional innovation and knowledge creation.

The TKD perspective and its conceptual components were applied in the Bornholm case studies together with a novel methodology of 'knowledge biographies', tracing and mapping the historical life-span and wide-ranging processes of realizing innovations. This has allowed for empirically documenting the significance of complex knowledge dynamics that involve clear elements of intra-regional and extra-regional knowledge sourcing, combinations of mainly synthetic-instrumental and cultural-symbolic types of knowledge and ways of learning, as well as interactions in varying institutional contexts including firm internal processes, market and network based interactions, public policy initiatives as well as societal, cultural discourses. In contrast, analytical-scientific, research based knowledge only have played a role for a few producers and have not in general contributed to the studied development on Bornholm. I will return to this in the final chapter of discussing the policy implications of the findings. Hence, the case studies have empirically explored and validated the

TKD approach and its three territorial, epistemological and institutional/contextual components.

Considering the fact that the Bornholm case concerns the emergence of a localized production and governance systems that explicitly emphasizes the geographical origin of products, the extrovert sourcing and the multi-scalar international, national and regional character of the observed knowledge dynamics are surprising. This maybe would not to the same extent and with the same degree of evidence have been revealed in the territorially more restricted analytical perspectives of varying territorial innovation models (TIM) such as cluster or regional innovation systems, more attuned to study the role for innovation and knowledge of sectors, institutions, labour markets, economic and social dynamics etc. inside the borders of localized path-dependent systems.

In rural research contexts, the shift of focus from localized institutions to knowledge development processes connected with replacing the TIM analytical perspective by the TKD approach is highly enriching and inspiring. By not focussing on the a priori centrality of localized institutions for innovation but instead tracing the lines and sources of local actors' development of varying types of knowledge, the TKD approach (at least when applied together with the knowledge biography methodology) seems better suited for studying innovation and knowledge dynamics in rural areas than TIMs.

Central parts of the definition of rural areas and a fundamental condition for business development in such areas is the geographical location outside the urban centres with specialized economies and strongly institutionalized knowledge and innovation systems producing the vast majority of globally new scientific and technological knowledge. Learning via local as well as global interaction, searching useful knowledge from non-local sources and adapting it to the specific geographical context through in-house as well as network activities are basic business conditions in rural areas. However, according to recent discussions within regional studies (Bunnell and Coe 2001; Bathelt et al. 2004; Lagendijk 2006) this might not only characterize rural areas but may be a general characteristics in the global knowledge economy.

Of particular interest for the research on the growing role of socio-cultural innovations and a 'cultural turn' in economies (Power and Scott 2004), the case studies furthermore have documented the crucial role of symbolic knowledge in the traditional economic sector of food related to, for instance, the identification of cultural meanings to embed in products, communication, marketing and branding, and the creation of consumer experience offerings and services. Hence, symbolic knowledge should not be confined to the so-called 'creative industries' such as fashion and media but seems to play significant roles in broader parts of the economy.

Special efforts have been devoted to clarify the theoretical content and empirical implications of the epistemologically defined Differentiated Knowledge Bases typology.

According to my analyses, drawing also on the findings of other EURODITE case studies, the three ideal-typical categories of analytical, synthetic and symbolic knowledge may be applicable for describing the varying knowledge approaches and learning modes of micro-level actors, networks and professional communities that actually are involved in the realization of innovations. However, firms and multi-actor social systems such as sectors, clusters and regional innovation systems rarely rely on interactions within only one knowledge approach but rather coordinate their actions in several interrelated intra- and inter-organizational learning modes, communities and contexts.

Chapter 4. Knowledge and food

The case studies about the creation of new types of production, marketing and governance systems for alternative, regional food of Bornholm were theoretically and conceptually designed to primarily inform research debates within economic geography and regional studies rather than research debates about restructuring in the food sector and in economies in general. However, having made the Bornholm case studies it was apparent that the unique and detailed set of data about the knowledge dynamics of Bornholm food held further opportunities for contributing to the food research. As noted by Morgan and Murdoch (2000), food is rarely the study case for investigating innovation and knowledge:

"Discussions of economic knowledge have often bypassed agriculture and food production, giving the impression that little innovation and knowledge application is going on in this sphere. Limits to the application of knowledge in the food sector are generally seen as deriving from the "laws of nature" which play such a prominent role in this particular production process (..) Thus the major innovations in production, processing and retailing that have so changed the food sector almost beyond recognition in the post war period have largely been ignored by those concerned with the knowledge-based economy. Even when aspects of the transformation of food are recognized it is still often assumed that agriculture lies outside the contemporary application of knowledge in the food production process." (Morgan and Murdoch 2000, p. 162)

The three articles resulting from my work of exploiting the data of the Bornholm case studies for further studies all reuse parts of the analytical framework and empirical findings of the Bornholm case studies. One of the articles was the above described publication 4 which further reflects on the epistemological dimensions of the case studies but still only considers knowledge conceptualizations of the EURODITE framework as well as general research debates on knowledge and innovation, and accordingly this article was introduced as part of the previous chapter.

The two other articles, the publications 5 and 6, as well as the initial publication 1, more explicitly concern and try to conceptualize the ongoing processes of restructuring in the food sector though they still retain an overall focus on knowledge dynamics. The purpose of this chapter is to introduce these three publications and to discuss their possible contribution to the research.

The remaining part of the chapter comes in four sections. First, I introduce publication 1 outlining the specificities of the food sector and rural areas as the scenes for innovation and knowledge creation. This introduction concerns the food sector as a whole and not only the relatively small segment of 'alternative' food. Secondly, I briefly introduce a number of conceptualizations of changes and restructuring of food markets of which some also are referred to in publication 1. In particular, the two specific conceptual constructs that are applied in publication 5 and 6, are presented: the Worlds of Production model of Storper and Salais (1997) and the experience

economy notion of Territorial Staging Systems (Jeannerat and Crevoisier, 2010). Although the knowledge aspects of alternative food are relatively unexplored in the literature, a few contributions on the matter exist. These are introduced in the third section as part of discussing the possible contribution of the empirical findings of the Bornholm case studies to the research on alternative food. Fourth and finally, I introduce the two articles, publications 5 and 6, in which the Differentiated Knowledge Bases typology are combined with the two mentioned conceptualizations of restructuring of markets and producer-consumer relations, the Worlds of Production model and the notion of Territorial Staging Systems. These conceptualizations play the role as analytical frameworks for understanding how and why different types of knowledge – and in particular symbolic knowledge, so important in the Bornholm case - are developed.

Food and rural areas as the scenes for innovation and knowledge creation

CRT's role as partner in the EURODITE project included a responsibility for certain overall project-relevant studies of the food and drinks sector which was one of seven sectors selected for empirical case studies (Automobile, Biotech, Food and Drinks, ICT, Knowledge Intensive Business Services (KIBS), New Medias, and Tourism). One working task was a study, coordinated with similar studies of the other six selected sectors, carried out as part of the Working Package 3. These sector studies aimed at providing an introductory, descriptive overview of the "main contemporary trends and drivers of change, the corresponding typical firm responses, and the types of knowledge and knowledge dynamics prevailing" in the selected sectors. The studies were supposed to assist the 27 EURODITE partners in their preparations for empirical case studies of territorial and firm level innovations in the subsequent working packages 5 and 6, for instance related to selection of relevant cases. The publication 1 is an edited (mainly shortened) version of my WP3 food sector study (Manniche 2007) which together with the other EURODITE sector studies formed an anthology published by Edward Elgar²³.

The analytical frameworks for elaborating publication 1 were set by general guidelines of the EURODITE project. Among the conceptual elements to use for the introductory investigation of prevailing sector knowledge dynamics were the distinctions between the three types of analytical, synthetic and symbolic knowledge, the distinction between three phases or functions of knowledge development, exploration, examination and exploitation, and the five knowledge development contexts of firms,

²³ The anthology was a direct spin-off of the work in the EURODITE WP3 sector studies. The main editor of the anthology was Professor Philip Cooke, Cardiff University, who also was overall coordinator of EURODITE WP3 activities and all contributing researchers were involved in the EURODITE project.

markets/networks, science/education, governance, society/culture. However, compared to the region- and firm-level case studies the analytical frameworks for the sector studies were less restrictive and open for inclusion of varying sectoral contexts and theorisations. Thus, publication 1 was made on the basis of desktop research and collection of statistics and written materials on websites of, for instance, international food producer organizations, individual food companies, the EU, national regulatory authorities, universities and research centres, and others, as well as on a review of diverse research literatures on food fields such as agro-economics, rural sociology, human geography, and political science.

One of the main characteristics of the food sector as a platform for innovation and knowledge creation is the cultural embeddedness of food markets. Consumption of food and drinks is a central element of cultures and everyday life of people all over the world. Eating and drinking plays a decisive role in the daily and festive social and cultural rituals, traditions and communication patterns within families, ethnic, territorial and religious communities and other social groups. Thus, foods and drinks can be considered cultural artifacts and food production and gastronomy 'cultural' industries (Messine Petruzzelli and Savino 2012).

Another special feature of foods and drinks is that their attraction to customers are often tied to tradition rather than novelty and change, which allows producers, contrary to producers in most other sectors, to market products by use of catch phrases such as 'A product from the old factory' and 'Like grandma made it'. The target for innovation of foods and drinks is often, widely recognized by the food and drink industry (see e.g. CIAA 2006), connected with fuzzy product qualities like 'pleasure', 'taste', and 'convenience', i.e. qualities that are evaluated according to socially and culturally embedded traditions and norms. These characteristics indicate the significance of tacit, culturally embedded, symbolic knowledge in the sector, even in the big segment of industrialized, standardized production.

In the EURODITE sector study, the food sector was defined as the food and beverages manufacturing industries at 2-digit level of the NACE-Rev. 1, i.e. DA15, which constitutes the largest manufacturing sector in EU, accounting (2005) for 14% of total turn-over, 12% of total value-added, and 13% of total employment in manufacturing (CIAA 2006).

The research literatures and other information collected for the sector study indicated that the food manufacturing industries today are challenged by strong drivers of change due to a number of factors. The most central of these are summarized and described in publication 1 in terms of 1) new consumer demands, 2) supply chain restructuring including the growing power of retailers, 3) technological developments, and 4) introduction of new regulation and policies for safety, environmental effects etc. The innovation of Bornholm food seems to exemplify a response to mainly the former aspect of new consumer demands, although these in the Danish consumer

context in the 1990-ies when the Bornholm development process took off maybe not were expressed in very explicit quality terms but mainly regarded a general aspiration for specialized 'alternatives' to mainstream, standardized products.

Diversity characterizes all seven sectors selected for EURODITE studies but seems to be especially the case of markets for food and drinks where the entire systems of agricultural and fishery activities, manufacturing processing, research, advisory and supplier systems, distribution, catering, retailing, and consumption are under restructuring and diversification. In publication 1, three main food production-consumption models, often considered in agro-food research literatures, were identified:

- The '*industrial*' or conventional food model, characterised by competition and conventions of qualities related to price, volume, efficiency and industrial standards, and in which synthetic knowledge is hypothesized as crucial.
- The '*alternative*' food model, an emergent model characterized by the abandonment or a reduced use of production inputs stemming from the industrial model of farming and food processing, reliance on traditional, small-scale, often artisanal technologies, conventions of qualities connected with geographical origin, gastronomic experiences, environmental effects, social justice and other value-laden aspects, and in which symbolic knowledge is suggested to play a pivotal role.
- The '*functional*' food model, another emerging model representing an opposite science-driven strategy of taking advantage of new biotechnologies and other advanced technologies in designing and producing food and drinks products on the basis of quality conventions related to documented health, diet and nutritional benefits for consumers, in which the core knowledge types is analytical.

Publication 1 describes the varying market, technological and regulatory conditions and the knowledge implications of these three food models. The results are summarized in Table 3.1 (p. 70-71) and Table 3.2 (p.77).

Research conceptualizations of market restructuring

Paradigm change in the food sector

The majority of the huge and varied research on food production has its disciplinary basis within agro-economics, rural sociology, human geography, and political science. Central debates within these extensive fields centre on a radical critique of the capitalist, productivist food production, distribution and consumption model that has achieved a dominant position on food markets since World War II, supported by regulatory schemes of national welfare states and international trade organizations

such as WTO (Goodman 1987; Flynn et al. 2003; Murdoch 2006; Marsden 2006; Morgan and Murdoch 2000). Critics concerns issues such as the increasingly globalised commodity flows, concentration of power in the supply chains in the links of (multinational) processing industries and retailers, industrial farming methods with severe environmental effects, mistrust of consumers due to safety and transparency problems, obesity and health problems, continuous standardization, up-scaling and technological rationalization causing employment decline, and erosion of rural culinary cultures and local production methods.

These critical debates gained further momentum by the counter-trend to the increasing globalization and up-scaling of conventional food systems that during the last decades has materialized in most Western countries through the emergence of new types – or a revival of pre-industrial types – of small-scale production and distribution systems for specialized, 'alternative' food. Invoked by this counter-trend a more recent debate centres around the question whether the emerging alternative food economy entails a paradigmatic change towards 'post-productivism' (Evans et al. 2002; Goodman 2004; Murdoch 2000) and a 're-territorialisation' of the food economy (Watts et al. 2005; Ploeg and Renting 2004; Winter 2003).

More recent trends of convergence in the food sector, for instance of increasing sales of organic products through the conventional distribution channel of supermarkets, have led to an increasing consensus among scholars to exceed the alternative/conventional dichotomy and instead look at varying food production-consumption networks as complementary and forming a continuum between two extremes (see e.g. Holloway et al. 2007; Sonnino and Marsden 2006).

I generally support this growing conception regarding convergence of 'alternative' and 'conventional' food systems which is confirmed by, for instance, the FKD3 case study about the innovation of specialized Bornholm pork meat by a multinational company generally focussing on standardized productions. However, I use the designation of 'alternative' food in the thesis mainly of emblematic reasons but also to stress the differences regarding knowledge bases of alternative producers with premium-priced 'quality' products and of volume-based, price-competing conventional producers.

Conventions of quality and the World of Production model

A specific heading of debate in the agro-food research regarding possible paradigm change is the 'quality turn' of markets for food (Goodman 2003; Harvey et al 2004), i.e. the shift of the specific quality factors that are demanded by consumers and targeted by producers in their innovation efforts, from factors related to price and standardization towards a variety of specialized, socio-culturally defined dimensions of products such as 'gourmet experiences', 'organic', 'local identity', 'fair-trade', etc.

In order to explain and describe such processes of diversification on food markets several agro-food scholars (e.g. Murdoch & Miele 1999 and 2004; Murdoch et al. 2000; Morgan et al. 2006; Ilbery & Kneafsey 2000; Amilien et al 2007; Lindkvist & Sánchez 2008; Stræte 2008) have applied convention theory, i.e. models to explain the social construction of the 'conventions of quality' that define the functioning of markets for goods and services. The French convention school and industrial sociologists such as Laurent Thévenot, Luc Boltanski and Robert Salais have been important for the elaboration of convention theory (Aspers 2004).

Convention theory emphasizes that the functioning and governing principles of any market (whether for standardized or specialised products) are defined by a set of conventions constructed and justified through broader social and cultural discourses and practices. Some of these conventions regard the specific product qualities that producers supply and customers demand and that are perceived as important for the transaction. In a convention theoretical perspective, production-consumption systems and their actors and stakeholders of processors, suppliers, retailers, consumers, public authorities, R&D organizations etc., are understood in terms of "network configurations, formed through processes of negotiation between differing entities and discursive formations" (Murdoch & Miele 2004) on the basis of differing "repertoires of justification" (Thevenot et al. 2000).

Especially the convention theoretical construct *Worlds of Production* (WOP) (Salais and Storper 1992; Storper and Salais 1997) has been influential within agro-food studies. In short, the WOP model outlines four Worlds of Production (WOP) – or action frameworks for businesses – deriving from the combination of two principal dimensions in a two-axis matrix. In one dimension (the technology and production dimension), products are either "standardized" or "specialized" and in the other dimension (the market dimension), products are either "generic" or "dedicated".

The model seems useful as a scheme for classifying the main contemporary directions of innovation in the food sector, specialization and dedication, both involving a shift from the economics of scale and standardization principles that prevail within the conventional industrialized food model (the 'Industrial World' of standardized-generic products).

The option of specialization entails using restricted forms of know-how and technologies, applied in the realization of certain tangible product qualities that differentiate them from prevailing industrial standards. This could be special 'organic' methods in the production of milk or introducing technologies for specialty beers. While the specialization strategy does not necessarily entail major changes of customer relations and distribution channels, this in essence is the strategy of 'dedication', i.e. shifting from 'generic' to 'dedicated' products. Generic products target a multitude of (similar) demands and not the specific demands of individual customers. The qualities of generic products are widely recognized by customers, for

instance via information on packaging or other means of marketing, which allows for sale on mass markets without direct interaction of the producer and the consumer. By contrast, dedicated products target the demands of specific (groups of) customers. The qualities of dedicated products are often defined through interpersonal dialogue based on face-to-face contacts or mediated by communication technologies between producer (or a trusted representative such as agent or distributor) and customer. This facilitates knowledge exchange, trust building and establishment of common expectations. Hence, dedicated products are not suitable for sale via anonymous distribution channels but need an element of interpersonal producer-consumer interaction.

In most cases, Bornholm food producers represent combinations of the two strategies. Nevertheless, the WOP model is useful for understanding the varying innovation strategies of the three studied firms: the niche producer distributing a special cooking oil on national consumers markets (the specialized-generic WOP), the business relying on experience offerings and sales to dedicated visiting consumers but relying on standard production technologies (the standardized-dedicated WOP) as well as the 'diversification' strategy of developing a specialized pork product of the multinational company representing the conventional, industrial food model, moving the firm from the standardized-generic WOP towards the specialized-generic WOP. In addition, the model also is suitable for describing the price, scale and efficiency orientated innovation strategies prevailing in the conventional food sector.

The WOP model was applied in publication 1 as a scheme with which to understand the different innovation efforts and knowledge characteristics of the three identified production-consumption models of industrial, alternative and functional food and was as an overall theoretical stepping stone in the anthology of EUROTITE sector studies from which publication 1 stems (Cooke et al. 2010). I further applied and reflected upon the model in my publication 5 (see below), and also apply it in the final chapter 5 as a scheme with which to discuss policy initiatives.

Rural cultural economies

Another debate from the food research, highly relevant for the Bornholm case, concerns the ways rural areas in developed market economies increasingly respond to globalization by creating economic activities on the basis of locally embedded resources, skills and knowledge and how alternative food increasingly becomes part of 'rural cultural economies'. This debate has gained important contributions from Christopher Ray (1998; 1999a; 1999b) who defines the 'rural culture economy' as an attempt to "(re)valorize place" and "localize economic control" through the exploitation and commodification of resources such as traditional foods, regional crafts, folklore, landscapes, buildings etc. He uses 'culture' to refer to "a set of place-

specific forms that can be used to animate and define 'development'" (Ray 1999a, p. 263) and suggests that a local area can turn 'back' to the indigenous culture of the territory or choose new development paths.

Many scholars have applied similar perspectives in studies of the territorial embeddedness of alternative food systems (Winter 2003; Watts et al. 2005; Hein et al. 2006) and the commercial exploitation and commodification of cultural, semiotic, experiential dimensions of food (Perkins 2006; Bessier 1998; Miele and Murdoch 2002). As part of summarizing the content of 'neo-endogenous rural development', Ray (2006) outlines an emerging 'territorial mode of production':

"The new mode of production appears to require both individual and collective reflexive action to build a pool of territorial common resources. The various actors of a territory pursue their separate goals but also engage in voluntary, cooperative activity, directly and indirectly, to accumulate the forms of capital at the territorial level. Thus, the type of social relations that guide the operation of the new mode would seem to be a mixture of market exchange and voluntary reciprocity. A territorial mode of production, therefore, would be based on the discovery, or creation, of place-specific resources and a strategic process of capital accumulation. Indeed, it is the logic of accumulation that dictates the nature of production and provides the rationale for voluntary collective activity. Moreover, capital — social, cultural/symbolic and educational — is primarily embodied in people as individuals and so it is the dynamic relationship between individuals, social groups and territories that is of crucial interest in the mode of production. The accumulation of forms of capital may occur within and between all realms: private business, domestic, educational, public administration and voluntary associations. A territorial mode of production also distinguishes itself by investing the relationship between producer and consumer with an element of symbolic exchange (..) Consumption and production become imbued with the culture of the producing territory: territories of people with a politico-cultural identity. Thus, culture becomes commoditized but in the form of territorial (common) intellectual property. Yet this is a particular type of commoditization which serves as one of the mechanisms in the accumulation of each of the territorial forms of capital." (Ray 2006)

This 'territorial mode of production' in many ways provides a framework applicable for understanding the Bornholm case, drawing from diverse social, cultural and financial capitals. However, while Ray and other agro-food scholars within the field are very helpful in identifying and conceptualizing the social, cultural and economic resources and dynamics at production-side of rural cultural economies the role of consumers, consumption dynamics and co-producing intermediaries for the creation of economic value and the functioning of markets is not explicitly conceptualized. This, on the other hand, is at the core of the notion of the 'experience economy', introduced below.

The Experience Economy

The notion of the 'experience economy' was originally suggested by Pine and Gilmore, private consultants within strategic business management, in their 1999-book *The Experience Economy: Work is Theatre and Every Business a Stage* and relates to broader processes of cultural change whereby consumers increasingly demand memorable, authentic experiences. According to Pine and Gilmore (1999, 2007) the 'experience turn' does not refer to high growth rates within certain statistically definable 'experience industries' (such as entertainment, tourism - or food for that matter) but to the success of a particular business model based on value-creation through 'staging' of memorable experience offerings and the ability to interact with and engage consumers in a personal way for which a premium price can be asked.

The notion of experience economy also relates to Lash and Urry's (1994) often cited ideas of a general shift in competition from 'use-values' of tangible products to the 'sign-values' of intangible brands and of the growing role of 'reflexive aestheticism' in modern societies. According to Lash and Urry - but see also Miele and Murdoch (2002) and Murdoch (2006) for food related analyses on the topic - everyday practices such as eating, cooking, dressing, interacting, designing, entertaining, managing etc. increasingly are underpinned by aesthetic considerations.

One of the defining features of the experience economy is the significant role of end-consumers for value creation. Experience-based businesses commercially rely on closer relationships with consumers than those characterizing traditional manufacturing and distribution systems, in which the two spheres of production and consumption are disconnected in time and space (Grabher et al., 2008; Malmberg and Power, 2005). As experiences are intrinsic to the individual consumer, they are not 'produced' by producers but realized by consumers through engaging themselves in the act of consuming or using the commercial product (Therkildsen et al., 2009; Lorentzen, 2009). Hence, the experience economy - like the dedicated worlds of production in the above described WOP model - demarcates distinct business fields in which symbolic knowledge about consumption cultures and consumer preferences can be hypothesized as crucial.

As described in publication 2 and 3, the experience economy was not only an abstract business strategic concept but explicitly referred to as an inspirational source of business development and innovation by Bornholm food entrepreneurs, though to some extent due to the intermediating role of local consultancy firms.

In more general terms, the experience economy concept seems useful for understanding the new market economic conditions and mechanisms that - at least partly - drive the emergence of alternative food markets. As documented by numerous research contributions (Ilbery and Kneafsey 2000; Fonte 2008; Ploeg and Renting 2004; Bessier 1998) as well as by the Bornholm case studies, the

establishment of alternative food productions are often motivated by personal, entrepreneurial quality of life strategies and/or more ideological or local patriotic strategies of resistance to the growing powers of multinational players dominating the mainstream food production, distribution and retailing systems. Nevertheless, these entrepreneurial and/or ideologically motivated initiatives would not have been successful without the existence of consumers with purchasing power, actively looking for authentic experiences and symbolic, narrative dimensions of products.

With the aim of conceptualizing the integrative relations between the production and consumption sides of experience markets and to describe territorially and culturally embedded and yet multi-scalar systems for creation, commercialization, validation, and consumption of place-bound resources and experiences, Jeannerat and Crevoisier (2010) have tentatively introduced the concept of Territorial Staging Systems (TSS). The TSS model further elaborates on the distinction between Territories of Production, Territories of Co-production and Territories of Distribution/Consumption, developed by the authors through their EURODITE case studies of the Swiss watch industry (Jeannerat and Crevoisier 2008).

In short, the TSS model is centred on the 'stage', i.e. a producer-consumer interface, on which two fundamental dynamics meet and interact: 'stage setting' of producers and 'experiential engagement' of consumers. On the production-side of the system, resources such as the natural, historical and culinary assets of a specific location are mobilized, transformed into products and brought to the market through stage setting. On the consumption-side, resources such as knowledge, income and social capital are transformed into experiential engagement that can be commercially exploited by producers. Experiences are realized in the meeting of these processes on the stage.

The territories of production and consumption are connected by the bridging activities of stage setting and experiential engagement but do not necessarily overlap in physical, geographical space since the stage can be a physical place of co-presence of producers and consumers of 'attendance-based' experiences as well as a virtual place for distant, mediated interaction and transaction regarding 'distributed' experiences (Lorentzen, 2009).

Due to its systemic character, the model analytically integrates the activities of in principle all types of private and public actors and allows for analyses exceeding the micro-level of individual firms and their customers. Whilst the TSS model fundamentally is orientated along a vertical producer-consumer axis and centred in 'the stage' as the interface for producer-consumer interaction, it also holds a horizontal dimension where the valorisation and staging of products, rather than being isolated, autonomous experience economic activities, are integrated in the larger local economy, labour markets, governance systems, cultural discourses and broader 'relational place-making' processes (Pierce et al. 2010; Sheppard 2002). The

distinction of vertical (food supply chains) and horizontal (relations to non-food actors) dimensions is emphasized also in the research literatures on alternative food (see e.g. Murdoch 2000, and Kneafsey et al. 2001 for an interesting analysis of the rural cultural economy of Wales). This horizontal dimension of local sector-crossing networking and place-branding is evident in the Bornholm case, as documented by the case studies.

In sum, by adding an explicit conceptualization of the importance of consumers, consumption dynamics and co-producing intermediaries for the creation of economic value and the functioning of markets to the above described 'territorial mode of production' of Ray (2006) the TSS model is suggested to provide a richer and more integrative perspective for analyses of territorially embedded cultural economies such as regional culinary heritage.

The TSS model was applied in the Publication 6 on an analysis of the knowledge dynamics of innovating and staging the experience-based elements of Bornholm food. Before introducing the publications 5 and 6, I will introduce the conceptualizations of knowledge that prevail in the agro-food research as part of identifying and discussing the contribution of my analyses to this field of research.

Knowledge in the agro-food research

The knowledge aspects of what today is considered the 'conventional', industrial food model have been looked at in several studies. In short, the successful historical development of the model, peaking in the decades after World War 2, is described by scholars in terms of a productivist modernization project, led by national welfare states, multinational agro-food corporations, the EU and international trade organizations such as WTO, through which universal, rational, scientific principles and technological knowledge have eroded traditional, genuinely local food knowledge (Murdoch 2000; Marsden 2006; Goodman 1987; Green and Foster 2005; Morgan and Murdoch 2000). Morgan and Murdoch (2000) put it this way:

"As standardised innovations such as chemicals come into use, so agricultural practice is disconnected from local ecosystems and the knowledge required to manage these. And as these standardised packages are disseminated throughout farming, so a locally embedded, craft based activity becomes replaced by a set of uniform and spatially standardised procedures. Thus agricultural knowledge becomes a property of the large and powerful institutions which lie upstream (and downstream) of the farm." (Morgan and Murdoch 2000, pp.165)

This basic understanding of traditional local knowledge being replaced by scientific types of knowledge as a colonization effect of the victorious 'productivist paradigm' in fact constitutes one of the central elements in the critique of the conventional food

model that is manifested within much of the agro-food research. It also seems highly influential in the few existing approaches explicitly studying the knowledge characteristics of alternative food (see e.g. Morgan and Murdoch 2000; Bruckmeyer and Tovey 2008; Tovey and Mooney 2006; Fonte 2008). Generally, these contributions are not positioned in discourses about the knowledge-based economy but in discourses on sustainability.

Fonte (2008), presenting the analytical frameworks and findings of a large European research project (the EU 6FP project CORASON²⁴), is illustrative for the knowledge conceptualizations prevailing in agro-food research basically distinguishing between, on the one hand, codified, scientific/technological, global/mobile knowledge and, on the other hand, tacit, craft-based, specialized/local types of knowledge closely related to the geographical and cultural specificities of distinct places:

“Created through normal processes of socialisation, (tacit knowledge) is a form of knowledge transmitted pre-discursively in a community through its social norms and habits. It is important in rural development since it helps to strengthen informal social networks and social relations, promoting trust and social cohesion. Lay knowledge is instead about ‘objective reality’, practical causal connections or ‘how things work’ (..) It is a technical form of knowledge acquired through particular experiential circumstances and transmitted by specific ‘local experts’ in informal situations of learning. It differs from ‘scientific’ knowledge in that it is neither standardised nor formal. Its variability (linked to specific places and cultures) has earned it an inferior status in relation to ‘scientific’ knowledge. In the case of local food, lay knowledge refers to the technical knowledge utilized by farmers and producers to grow or to prepare food in the specific agri-ecological context in which they operate. It includes knowledge about production and preparation techniques, local natural environmental processes and the characteristics of the product. Local lay knowledge, often exchanged and circulated through informal social networks, is the dominant form of knowledge used.” (Fonte, 2008, pp. 210)

Both of these ‘scientific’ and ‘lay’ knowledge types seem to be mixes of the analytical and the synthetic knowledge categories of the DKB typology while none of them seem to include the symbolic knowledge type.

Using the distinction between ‘scientific’ and ‘lay’ knowledge, Fonte (2008) investigates the knowledge produced and used among two types of food re-localisation networks in Europe, following the varying strategies of ‘producer-consumer reconnection’ (in areas where distinct local food traditions have been lost or

²⁴ CORASON: A cognitive approach to rural sustainable development - the dynamics of expert and lay knowledges. SIXTH FRAMEWORK PROGRAMME, PRIORITY 7, Citizens and Governance in a Knowledge Based Society, Proposal no. 506049.

never existed) and 'valorisation of the origin of food' (in areas with strong and viable culinary traditions). As Bornholm is an example of the first type of areas with weak culinary traditions, her findings regarding local food networks following the strategy of 'producer-consumer reconnection' are of particular interest here:

"The knowledge that small artisan producers in these networks need is first of all about production techniques: learning how to grow food (..) Initiatives to re-localise food systems include both attempts to educate or self-educate food growers, and conscious attempts by growers to re-educate consumers about food and food consumption...These cases show that scientific knowledge is not sufficient in the effort to re-localise food and that there is a need to recreate a new local lay knowledge on how to produce and to prepare food. Local lay knowledge is rebuilt through experience and exchanges among equals, with local knowledge in other (national and international) regions. New social networks are created and activated and different sources and occasions are used in the process, both formal and informal. These include exchanges with other growers, farmers' markets and contacts with non-local experts." (Fonte 2008, pp. 212-13)

Thus, Fonte underlines the centrality in such food re-location strategies of technical product and production knowledge and stresses that this knowledge is not provided from scientific knowledge systems but mainly by producers' re-building of local lay knowledge. Confirming the empirical findings of the Bornholm case studies, Fonte further suggests that such lay knowledge is acquired not only through local sources but also through interaction among equals at national and international scale.

Nevertheless, central in Fonte's definition of re-location food strategies is the collective local efforts of re-creating lay knowledge about specialized production methods. In contrast, in the Bornholm case studies product and technology knowledge was acquired mainly through individually organized processes tapping into external sources while the local 'lay' element mainly was connected with processes of contextualizing and adapting externally sourced knowledge to the local production and market conditions.

Furthermore, the symbolic knowledge category and its role for commercially exploiting the material product and technology knowledge that was evident in the Bornholm case studies is not considered as part of the knowledge needed and created by the food producers in Fonte's studies, either because it is not conceptualized in the knowledge theoretical framework or because this knowledge type simply played no role.

Morgan and Murdoch (2000), in an analysis of knowledge, power and innovation in organic vs. conventional food chains, utilize a similar basic distinction between scientific-standardised-codified and local-specialized-tacit knowledge but are more inclusive when defining specific forms of 'local' knowledge of interest for producers:

“The local knowledge which producers require in decentralised food chains needs to be more than technical on-farm knowledge: it needs to include commercial knowledge about specialized local markets as well as know-who knowledge about the networks through which producers and distributors can liaise to service markets beyond the locality.” (Morgan and Murdoch 2000, pp.170)

The authors further specify that the required non-technological knowledge about markets concern social “people skills” (p.168) of brokering agents and producer-consumer intermediaries and knowledge among producers about new forms of distribution and marketing systems building on direct producer-consumer relations and trust (p.171). However, the authors do not further conceptualize and empirically analyze this type of knowledge which could have resemblances with the symbolic knowledge type of the DKB typology but focus instead on knowledge on product, technology and distribution systems.

In sum, the conceptualizations of knowledge in the agro-food research are characterized by the tacit-codified dichotomy that also prevails within mainstream research on knowledge and innovation. However, in the agro-food research the tacit-codified knowledge pair is provided additional normative and hierarchical connotations in terms of also distinguishing between on the one hand, local/lay/cultural aspects, and on the other, global/scientific/capitalist aspects of which the latter are proposed to be more powerful and to erode the former.

While such knowledge conceptualizations may be applicable for the studying of the continuous modernization and technological rationalization of conventional agriculture and food processing systems, it seems too simplistic for the studying of the emergence of alternative food. Although the creation of new productions of Bornholm food to some extent was motivated by entrepreneurial ambitions of realizing ‘alternatives’ to the conventional, hyper-industrialized and globalized food model that dominate today’s food markets, the resulting small-scale business models exploiting cultural values and qualities of food, are still fundamentally capitalist. It seems misplaced to generally term the knowledge on which they rely, including knowledge about engaging consumers in memorable, identity forming experiences, as ‘pre-capitalist’, ‘lay’ knowledge. By defining the type of knowledge that first and foremost is required as lay knowledge about traditional production methods, alternative food producers may overlook what modern consumers really demand and may be part of an explanation as to why so many struggle to entering consumer markets.

Moreover, in today’s world of globally expanded communication and transport infrastructures and consumption systems it would be a serious mistake to focus too strongly on the individual rural area engaged in alternative food strategies as the locus for sourcing and creating of the knowledge required to compete on consumer markets. The success of Bornholm producers certainly cannot be understood without considering the place-specific conditions but basically tells the optimistic story of an

alternative food development strategy heavily sourced from outside rather than relying on rich local culinary traditions.

Compared to the knowledge concepts used in the food research literatures, the DKB typology offers a quite different, non-hierarchical tool for studying knowledge dynamics. By including the symbolic knowledge type as an in principle equally important knowledge type alongside the analytical-scientific and the synthetic-instrumental knowledge types, the typology provides a conceptual novelty compared to mainstream research. The DKB typology provides a tool for understanding within one single framework the entire knowledge systems and dynamics activated in innovation including sorts of symbolic knowledge that in other analytical approaches are overlooked or considered as purely belonging to social and cultural spheres with no or little economic implications and relevance. In such a non-hierarchical perspective, scientific, research-based, analytical knowledge is not incompatible with other types of knowledge, neither practical, technical, lay knowledge nor with socio-cultural types of knowledge.

In the final part of this chapter, I introduce the two publications 5 and 6 in which the Differentiated Knowledge Bases typology is combined with the two described conceptualizations of market restructuring, respectively the Worlds of Production model of Storper and Salais (1997) and the notion of Territorial Staging Systems (Jeannerat and Crevoisier, 2010).

Knowledge bases and Worlds of Production (Publication 5)

This article aims to provide a theoretical/conceptual as well as an empirical contribution to the literature on industrial innovation. For this research purpose, the publishing journal, *Industry and Innovation*, related to the internationally renowned DRUID research organization in Denmark, is a highly relevant channel.

On the theoretical and conceptual side, the article suggests a combination of the Differentiated Knowledge Bases typology (DKB) and the Worlds of Production construct (Storper and Salais 1997; Salais and Storper 1992). The WOP construct is applied as a framework for defining varying business innovation contexts and for investigating and interpreting knowledge dynamics inside such business contexts.

The conceptual proposal of combining the WOP model with the DKB knowledge typology was motivated by the idea that the DKB knowledge categories relate in differing ways and combinations to the two fundamental dimensions of business activity in the WOP (technology and market). The significance of symbolic knowledge for operating in 'dedicated' WOPs could be hypothesized immediately, and thus, exploring how the WOP and the DKB typology more generally related to each other was a legitimate research question.

Empirically, the article compares the market and technology conditions and the corresponding knowledge characteristics of two alternative food producers, representing two different WOPs. One of the cases was among the Bornholm firms in focus for the EURODITE FKD case studies (FKD2), representing the WOP of standardized-dedicated products, while the other is from Italy, representing the specialized-dedicated WOP. The empirical data from this second case was collected by Assistant Professor Stefania Testa, University of Genova, Italy, as part of an Italian research project about knowledge management. We considered her case studies comparable with the Bornholm firm case studies despite their different theoretical frameworks and the different Italian and Bornholm/Danish food context, and agreed on the idea of combining the DKB typology and the WOP construct in a comparison of the Bornholm and the Italian case.

A motivation for the empirical food-orientated parts of the article was that the findings of both the Bornholm and the Italian case studies (mainly findings about the role of symbolic knowledge) differed from other research studies applying the DKB typology on food innovations and concluding that the food sector relies on synthetic knowledge or a combination of synthetic and analytical knowledge (Asheim and Coenen 2005; Coenen et al. 2006). Thus, presenting the data was supposed to provide new empirical insight for the innovation research regarding the role of symbolic knowledge in traditional food manufacturing industries.

The comparison of the two producers mainly concerns the knowledge implications of their different positioning in the WOP model rather than their differing geographical, economic and cultural development contexts of Italy and Denmark. However, the different Italian and Danish development contexts including the varying local culinary traditions and cultures are outlined and presented as part of the reason of the two producers' differing positioning in the WOP model. Yet, the study documents that alternative food producers (even the distinct segment hereof that emphasizes local/regional qualities) do not form a homogenous group but in fact differ fundamentally regarding market conditions, product qualities, innovation activities, knowledge assets etc. This is an important finding, for instance in terms of identifying possible public support policies to support the development of alternative food including the knowledge processes. I will return to this in the final chapter.

An additional comment regarding the WOP model, not elaborated to a great detail in the article, is that it is a micro/local, business oriented construct with certain restrictions for major, comparative studies. At a cross-sector, macro-level of analysis, for instance considering all businesses in a region, it is difficult to define what is 'standard' as opposed to 'special' and what is 'generic' as opposed to 'dedicated'. Besides, although the model encapsulates general ongoing changes in economic organisation it seems better suited to describe traditional manufacturing activities rather than production of services and intangible product dimensions.

Knowledge in the staging of food experiences (Publication 6)

This article is included in a (forthcoming) special issue of the international journal, *European Urban and Regional Studies*. The special issue was an outcome of the meetings and activities of a research network under the Regional Studies Association, titled 'The experience turn in development and planning', coordinated by Professor Olivier Crevoisier, University of Neuchatel and partner in the EURODITE project, Professor Anne Lorentzen, University of Ålborg, and Professor Tone Haraldsen, Lillehammer University College, and in which I and CRT colleagues participated. The network activities started with a workshop in Neuchatel in December 2009 and went on through similar workshop meetings in Ålborg September 2010, Hamburg November 2011, and finally Bornholm October 2012, hosted and organized by CRT.

The article takes the empirical analyses of the innovation of the experience-based elements of Bornholm food, described in Publication 2 and 3, a step further and re-structures the collected empirical data about knowledge dynamics by use of the above introduced 'Territorial Staging Systems' model, elaborated by Hugues Jeannerat and Olivier Crevoisier and presented at the network meeting in Ålborg 2010. The main contribution to the research of the article relates to the explicit conceptualization and the empirical studying of the knowledge implications of the experience economy.

The fundamental production bias of the Bornholm case study data only allowed for an in-depth analysis of the production-side. Hence, the analysis describes the primarily symbolic knowledge dynamics, occurring in the three knowledge contexts of firms, market/network and policy/governance, of conceptualizing the culinary experience products of Bornholm food producers and of staging them on a broader national and international scale. Accordingly, the use of the experience economy concept in the article mainly functions as a conceptualization of new conditions and development strategies at production-side including the regional policy and governance systems. However, a brief description of important factors of the mainly urban Danish consumption system of Bornholm food is made on the basis of reviews of relevant literature regarding, for instance, the concept of New Nordic Food.

The Bornholm case seems to exemplify a first generation of the experience economy (Boswijk et al. 2007) where producer-consumer interaction is mainly indirect and not systematically organised and exploited by the producers. Nevertheless, the analysis shows that operating on markets for experience-based products has important implications for producers in terms of needs of linking onto consumption discourses and of organizing active and professional staging activities such as media covered cultural events.

From the perspective of rural development, the experience economy entails opportunities for new business forms and new types of urban-rural linkages connected

with the growing consumer demands for experience-based products such as food with a distinct regional identity. However, it also provides new types of barriers for rural economic development, for instance in terms of lacking pre-understandings of the area among consumers.

Moreover, and motivating the special issue in which the article is part (see the introduction to the issue, Lorenzen and Jeannerat (forthcoming)), the experience economy has crucial implications for regional policy and planning as the focus of intervention shifts from exclusively considering local production systems towards also considering consumption and intermediating systems. The professionally concerted, cross-sector place-branding activities of Bornholm food producers and, organizations, tourism actors, and public actors such as the so-called 'Food Ambassador' indicate that both private and public actors on Bornholm have recognized the importance in the increasingly 'culturized' market economies of staging territorial, cultural resources and products and of connecting onto broader, discursive identity formation processes among consumers.

Conclusions

Summing up this chapter I have introduced the submitted publications 1, 5 and 6 which deal with the ongoing processes of restructuring and the emergence of new business models and production-consumption configurations in the food sector. The topic, however, is approached by focussing on the knowledge dimensions. While the publication 1 mainly functions as an introduction to the food sector as the specific empirical scene for innovation and knowledge creation, the two articles of publications 5 and 6 have contributed conceptually as well as empirically to the research.

Conceptually, the articles apply two different conceptualizations of market restructuring, respectively the Worlds of Production construct (Storper and Salais 1997) and the experience economy concept of Territorial Staging Systems (Jeannerat and Crevoisier, 2010) as analytical frameworks for understanding how and why different types of knowledge – and in particular the symbolic knowledge type which was observed crucial in the Bornholm case studies - are developed. Both models emphasize the role of new types of interactive relationships between producers and consumers and the two articles relate the significance of symbolic knowledge, observed in the Bornholm case studies, to this aspect of market restructuring. However, both articles also stress that the growing role in the food sector of symbolic knowledge and of adding narrative, experiential elements to the tangible products does not eliminate the importance of synthetic and analytical knowledge about functional product features, manufacturing technologies, etc.

Empirically, the articles re-organize different parts of the data from the case studies about the varying knowledge dynamics of firms, networks, and policy actors that enabled the creation of productions and marketing and support systems for Bornholm culinary products but supplement these data with certain additional empirics regarding alternative food producers in Italy as well as important factors at the consumption side of Bornholm food.

As the knowledge and innovation aspects of alternative food are relatively unexplored in the literature, the empirical analyses provide a contribution to the research, not least due to the inclusion of the symbolic knowledge category in the conceptual framework. Like concluded in the previous chapter, the inclusion of the symbolic knowledge type alongside the analytical-scientific and the synthetic-instrumental knowledge types usually focussed on in the research on knowledge and innovation as well as in the research on alternative food, provides a conceptual novelty compared to mainstream research. The DKB knowledge typology offers a tool for understanding within one coherent framework the entire knowledge systems and dynamics activated in innovation of food including sorts of symbolic knowledge that in other analytical approaches are overlooked or considered as purely social and cultural with no or little economic implications and relevance.

Chapter 5. Conclusions and policy implications

Overall findings and conclusions

Empirically, this thesis has centred on investigating one specific study case: the knowledge dynamics that enabled the innovation of culinary productions, networks, marketing and governance systems on the Danish island of Bornholm. Theoretically, the innovation of Bornholm food has been approached and conceptualized from two different research perspectives: 1) regional innovation and knowledge in the global knowledge economy, and 2) restructuring of markets and producer-consumer relations. In the former perspective, the research question has been how to conceptualize the complex knowledge development processes that underlie the innovations of firms and regions and in particular socio-cultural, non-science and non-technology driven innovations such as the development of Bornholm food. In the latter theoretical perspective, the core question has concerned possible analytical frameworks regarding the ongoing changes of markets and producer-consumer relations with which to understand and explain the innovation and knowledge processes observed in the Bornholm case studies, especially the significance of symbolic knowledge.

Integrating the two research perspectives were supposed to be mutual beneficial. From the perspective of the regional and organizational innovation research, theorizations regarding culturization of markets and restructuring of producer-consumer relations in the food sector might improve the analytical framework for the studying of socio-cultural innovations and knowledge dynamics that are suggested to be of growing importance in the economy. And the other way around, the conceptualizations of knowledge from the regional innovation research and the empirical findings of applying these on the case of Bornholm food were supposed to provide new tools and insight to the research on alternative food.

The results of the empirical case studies and the theoretical reflections done within the two varying research perspectives are presented in six complementary publications as well as in the previous two chapters of this manuscript. In this concluding chapter, I shall first summarize the overall conclusions of the thesis, which comes in three sections focussing respectively on empirical, theoretical and methodological results and perspectives, and secondly, I shall discuss the further policy implications of the studies for Bornholm and other rural areas.

Empirical results and perspectives

The empirical study case has concerned the long-lasting processes of restructuring of Bornholm's food economy and governance systems which exemplifies a more general

trend in most Western countries, intensely studied by research. An important purpose of the below summary of the empirical findings is to identify in which ways the Bornholm case is typical and which ways it is special as compared to similar food restructuring processes in other rural areas described in research.

At the beginning of the 1990-ies where the development of new types of Bornholm food productions took off and the Bornholm case study takes its start, the regional food economy to a very high degree was dominated by the scale, standardization and price orientated methods of conventional agriculture and industrial processing. The Bornholm food economy largely consisted of processing of local fishery and agricultural supplies into standardized, semi-fabricated, price-competing commodities with no or little value-added connected to the geographical origin and which were distributed to processing industries elsewhere in the world, and thus, producers' linkages to end-consumers were weak or not existing. This type of standardized food commodity production have experienced a dramatic employment decline due to structural and technological changes, increased and continuous globalization, mergers and concentration, productivity initiatives, etc. Hence, in the period 1991-2007 overall employment in the Bornholm food industry diminished from more than 2000 jobs to about 900. Also agriculture and fishing are marked by steady employment decline and structural change towards fewer firms.

Hence, the development of Bornholm food took off in a historical Danish context characterized by almost hegemonic dominance of standardized, industrially grown, processed and retailed food commodities and by a limited supply on consumer markets of specialized, dedicated products, especially regarding products emphasizing geographical origin. The Bornholm producers were among the first-movers in the national emergence of new types of small-scale, artisanal food productions, who were advantaged by these historical conditions of lacking supplies and competition on consumer markets, providing excellent opportunities for the entry of 'Bornholm food'.

About 40 new firms, 200 full time jobs and a variety of specialty products within categories such as cooking oil, wine, lamb meat, beer, pasta, chocolate, and ice cream, have been created. Similar developments of small-scale quality food are identifiable in other locations in Denmark (Manniche 2008), but Bornholm food producers have been particular successful in entering national consumer markets, partly due to well orchestrated place-branding efforts, and Bornholm today is among the leading Danish regions for regional food.

The new firms are the results of bottom-up, creative, entrepreneurial processes of developing new business models, products, technologies, distribution and marketing systems, etc. The firms can be divided in two groups. One group relies on artisanal production methods, and direct sales and experience offerings for visiting customers, for instance by opening their production so that visitors can see how products are made. These firms depend heavily on the around 600.000 tourists that annually visit the island, most of them during the summer. The Bornholm affiliation of the

association European Network of Culinary Heritage mainly represents this group of Bornholm producers. The second group of firms consists of classical manufacturers who have followed in the footsteps of a few old Bornholm niche producers (e.g. a dairy with specialty cheeses and a producer of canned fish products), who use more conventional industrial production equipment and distribute their products on national consumer markets via wholesalers and supermarket chains. These firms have established the producer association Gourmet Bornholm mainly aiming at supporting the marketing and distribution on external markets. Since both groups of firms exploit the Bornholm origin of production as a factor causing or adding to the quality of the product, they rely on the strong place-brand of Bornholm, developed through the island's long traditions for tourism.

Many aspects of the Bornholm story are typical for the changes of food markets and production systems that have been ongoing in most Western countries during the last couple of decades. Scholars have studied these changes in terms of, for instance, a 'quality turn' (Goodman 2003; Harvey et al 2004), paradigmatic change towards 'post-productivism' (Evans et al. 2002; Goodman 2004; Murdoch 2000), 're-territorialisation' of the food economy (Watts et al. 2005; Ploeg and Renting 2004; Winter 2003), and 're-valorization of place in rural cultural economies' (Ray 1998; Kneafsey et al. 2001). These theoretical perspectives of 'turns' and paradigm change seem well suited for describing the changes of the Bornholm food economy including the decline of standardized productions and the emergence of new productions relying on specialized products for households and end-consumers, exploiting the geographical origin as a value-adding quality, building new distribution and marketing channels characterized by closer interaction with distributors and consumers, and engaging in new types of regional networking, marketing and branding activities, etc.

Yet, the empirical studies also have revealed some aspects of the Bornholm food case that differs from research findings from other cases of regional alternative food systems. A central finding of the empirical case studies and one of the decisive factors explaining the successful entering of Bornholm food on national consumer markets is the significance for the entrepreneurial business development of the support provided via diverse rural policy schemes, not least related to the (former) EU program for rural development and diversification, LEADER, and the Local Action Group administrating the funding via this program. The importance of the LEADER-inspired, bottom-up and territorial policy approaches to support rural development is often considered and emphasized in research contributions on alternative food (Ray 1998; Ploeg et al. 2000). However, the distinct strategy followed by Bornholm policy actors in one important way differs from the strategies revealed by research studies of other rural areas. While the development of tangible products and production methods is usually in focus of local food strategies and policy intervention, the Bornholm LAG deliberately has not spent the limited funding on individual producers' product and technology development but instead has prioritized support to topics such as network building, sector-crossing projects, experience elements, place-branding, marketing,

and culture event making. This policy strategy has contributed in turning producers' attention to the crucial role of developing not only the supply/production side but also the demand/market side and thus is one of the factors that may explain the significance of symbolic knowledge dynamics in the case of Bornholm food.

Another special aspect of the Bornholm food case regards the product development strategies chosen and the specific culinary qualities emphasized by the Bornholm food producers as compared to producers of 'regional food' in other European rural areas. A number of studies (Parrott et al. 2002; Marsden et al. 2000; Ilbery et al. 2005) have found big differences throughout Europe in firms' use of EU's protection schemes for products with distinct geographical origin (the PDO and PGI certificates). 75% of products granted a PDO or PGI certification in 2001, originate in peripheral, rural areas of the Southern and Mediterranean countries of France, Italy, Portugal, Greece, and Spain while only few firms in Northern Europe such as UK, Netherland and the Nordic countries had applied for and attained certification.

These findings have made agro-food scholars hypothesize the existence of two contrasting European food cultures: a 'southern' with a wealth of local and regional food specialties and a functional, commodity-driven 'northern'. Southern European food cultures are characterized by traditional and typical regional foods which are related to the meanings and values attached to the territory as a combination of culture, history, tradition, production process, terrain, climate and local knowledge systems and captured by the French concept 'terroir'. Thus, according to Parrott et al. (2002), the majority of regional food producers in 'South' have registered public collective brands (such a Parma ham or Champagne) that are 'owned' by local representative institutions and business organizations rather than the individual corporation. In contrast, northern European food cultures, again according to Parrots et al. (2002), has developed a legal system of protection and marketing centered on privately-owned brand trademarks and a functional approach to food governance in which quality of foodstuff is determined more by matters of public health and hygiene than by properties related to taste, smell and other sensorial aspects.

The *Danish* food context, at least in the 1990-ies with weak traditions for local/regional culinary foods at supply as well as demand side and an emphasis on functional food qualities such as health, safety and environmental effects rather than symbolic qualities connected with terroir, geographical origin and culinary heritage, seems to fit perfectly into these main cultural geographical lines. For instance, the popularity in Denmark of the 'organic' labelling scheme, emphasizing health and environmental effects, rather than the terroir-based labelling systems prevailing in Southern Europe, may be partly explained by such national food cultural differences.

On the other hand, the basic product and marketing strategy of Bornholm producers, generally emphasizing the geographical place of production, its culture and secure, entrepreneurial and trendy atmosphere seems badly described in terms of the above outlined 'functional' Northern food culture. Rather, the Bornholm case is in line with

the 'producer-consumer reconnection' strategy, identified and studied by Fonte (2008) and suggested to characterize areas mainly in Western and Northern Europe where distinct local food traditions have been lost or never existed, and contrasted with the strategy of 'valorisation of the origin of food' which is more relevant for areas with strong and viable culinary traditions. Central in 'producer-consumer re-connection strategies' are the efforts of local producers of re-creating the relations to consumers and re-inventing the local resource basis, including knowledge, for production and distribution of quality food.

In contrast to the development strategies of many Southern European rural areas but in line with the 'New Nordic Food' concept (Meyer 2007), the Bornholm strategy is not driven by nostalgia and 'archaeological' efforts of rediscovering an abandoned local culinary heritage but by curiosity to develop a new food culture on the basis of old ingredients and by engagement in re-interpretation of the identity of the place and its resources from a modern consumption perspective. Hence, the Bornholm case can be explained in terms of Ray's (1999a) 'place-specific rural culture economy paths' (cf. chapter 4) through which the island, influenced by longstanding traditions for tourism and a place-brand connected with relaxation, holiday and a laid-back atmosphere, has developed its own interpretation of the terroir concept. This fundamentally bottom-up process can be seen as part of broader societal discourses and development efforts in Denmark and Norden centred on the concept of 'New Nordic Food', which in many respects has been initiated and led 'top-down' by established chefs and gastronomic experts.

The empirical findings regarding the knowledge dynamics of innovating Bornholm food are already summarized in chapter 3 and thus will not be repeated here in detail. It suffices to say, that the above all significant finding was a picture of complex knowledge interactions across varying epistemological approaches, territorial scales, institutional contexts, and economic sectors. The empirical evidence of such combinatorial knowledge dynamics constitutes a core empirical result of the thesis.

Theoretical findings and perspectives

Regional innovation, knowledge and learning

Theorization on regional and organizational innovation and knowledge is mainly addressed in the publications 2, 3 and 4. The research question has been how we should conceptualize the complex knowledge dynamics that contribute to the realization of innovations of firms and regions and in particular socio-cultural, non-science and non-technology driven innovations such as the development of Bornholm food.

A recent debate in the international regional research interested in this question, concern the notion of 'Territorial Knowledge Dynamics' (TKD), suggested by Crevoisier and Jeannerat (2009) and applied in the EU research project EURODITE within which the Bornholm case studies are made. TKD outlines a new approach for studies and policies on regional innovation and knowledge by highlighting the multi-scalar, combinatorial nature of knowledge dynamics and three specific dimensions of knowledge compositeness: 1) interaction at *multiple territorial scales* (e.g. intra-regional, national, international), 2) interaction of *different types of knowledge* and learning (analytical-scientific, synthetic-instrumental and symbolic-cultural), and 3) interaction across the *varying institutional contexts* for knowledge creation of Firms, Market/Networks, Science/Education, Policy/Governance, and Society/Culture.

The thesis has clarified the definition and interconnectedness of these three knowledge dimensions and has explored their empirical relevance for the case of innovating Bornholm food by applying a knowledge biographical methodology able to trace and map the important knowledge interactions in the life-span processes of innovations. The empirical data validate the usefulness of the TKD approach by evidencing the significance of the three above mentioned dimensions of knowledge compositeness.

Regarding the *territorial* aspects of the knowledge dynamics involved in the innovation of Bornholm food, the case studies have documented the importance of interactions at intra-regional level, for instance connected with the conceptualization of the qualities of 'Bornholm food', as well as the significance of external interaction of which some has been collectively organized (e.g. common study tours abroad) and other parts have been organized by individual producers. Regarding the *knowledge types* involved, mainly synthetic and symbolic knowledge dynamics have been important and the case studies have shown how these two knowledge approaches have been combined in the entrepreneurial processes of developing businesses and products. In contrast, research-based analytical knowledge only has played a limited role. Finally, the development process involved a bundle of related knowledge dynamics crossing a *variety of institutional contexts* which includes firm internal processes, market and network based interactions, public policy initiatives, as well as activities at the overall level of society/culture.

A special interest has been devoted to clarify the theoretical content and empirical implications of the epistemologically defined Differentiated Knowledge Bases typology. According to my analyses, drawing also on the findings of other EURODITE case studies, the three ideal-typical categories of analytical, synthetic and symbolic knowledge should be understood as three differentiated 'knowledge epistemologies' that may be followed by the micro-level actors, networks and professional communities that are activated in the course of realizing innovations. However, firms and multi-actor social systems such as sectors, clusters and regional innovation systems rarely rely on interactions within only one of the three knowledge bases but

rather coordinate their actions in several interrelated intra- and inter-organizational learning modes, communities and contexts.

The main theoretical value-added of the typology, compared to other knowledge conceptualizations such as the tacit/codified dualism, is the inclusion of symbolic-cultural knowledge alongside the analytical-scientific and synthetic-instrumental knowledge types, usually considered in regional innovation research. The typology offers a tool for understanding within one coherent framework the entire knowledge systems, dynamics and actors activated in innovation of food including sorts of cultural and social knowledge, skills and environments that in other analytical approaches are overlooked or considered with no or little economic implications and relevance.

The thesis also has explored the relations between the DKB typology and other conceptualizations such as the World of Production model (cf. below) which indicates that the significance of the individual DKB knowledge types can be related to the varying conventions of quality that prevail on different markets and determine the goals and directions of firms' innovation.

Market restructuring and new producer-consumer relations

In the second theoretical perspective addressed in the thesis, mainly in the publications 1, 5 and 6, the core discussion has concerned possible analytical frameworks regarding the changes of markets and producer-consumer relations with which to understand and explain the innovation and knowledge processes observed in the Bornholm case studies, especially the significance of symbolic knowledge. Two specific conceptual constructs have been identified as useful for understanding the knowledge dynamics of Bornholm food and have been applied in publication 5 and 6 which empirically re-use the Bornholm case study data: the Worlds of Production (WOP) model of Storper and Salais (1997) and the experience economy notion of Territorial Staging Systems (TSS) (Jeannerat and Crevoisier, 2010).

Both models emphasize the role of new types of interactive relationships between producers and consumers and my analyses relate the significance of symbolic knowledge to this aspect of market restructuring. However, the analyses also stress that the growing role in the food sector of symbolic knowledge and of adding narrative, experiential elements to the tangible products does not eliminate the importance of synthetic and analytical knowledge about functional product features, manufacturing technologies, logistics, etc.

The WOP model has proven useful for identifying and explaining the two main business models and innovation strategies of Bornholm food producers, distinguishing them from standardized conventional producers: specialization and dedication. Most

Bornholm producers apply a combination of these strategies but the former is significant for the group of niche producers while the latter mainly is followed by the group relying on local markets of tourists. In the below section about policy implications I apply the WOP as a scheme with which to discuss relevant policy initiatives.

The notion of the 'experience economy' (Pine and Gilmore 1999) relates to broader processes of culturization of markets whereby consumers increasingly demand memorable, authentic experiences and to the growing role of consumers for value-creation and product development. The experience economy notion is rarely used as an explicit framework with which to understand and study the production aspects of alternative food but food is often the empirical study case in consumption orientated research about the growing role of narratives and 'sign values' (Lash and Urry 1994) of goods for modern consumers.

As documented by the empirical case studies, the experience economy was not only an abstract business strategic concept but explicitly referred to as an inspirational source of business development and innovation by Bornholm food entrepreneurs, though to some extent due to the intermediating role of local consultancy firms. Due to this finding, and due to the fact that Bornholm food actually have been part in concerted, cross-sector, and policy-supported place-branding efforts on a national scale, the notion of 'territorial staging system' has been applied in order to investigate the larger experience economic system in which Bornholm food is positioned.

The Bornholm case seems to exemplify a first generation of the experience economy where producer-consumer interaction is mainly indirect and not systematically organised and exploited by the producers (Boswijk et al. 2007). Nevertheless, despite the lacking empirical data especially regarding the consumption side, the analysis indicates that we actually can identify the contours of a larger staging system for Bornholm food (as well as for other types of 'high-quality', specialized food) centered on the urban population, gastronomic experts and trend setting life-style media actors in the Copenhagen area. The analysis also shows that operating on markets for experience-based products has important implications for producers in terms of needs of organizing active and professional staging activities such as media covered cultural events.

This certainly provides new perspectives for rural development in terms of opportunities for building closer linkages to urban areas and in terms of taking active part in broader societal discourses about consumption and how to organize the production and distribution systems of modern societies. However, the experience economy also entails new types of barriers for rural economic development. For instance, not all rural areas are advantaged by the same strong place-brand and traditions for experience-based activities such as tourism and arts and crafts that Bornholm has. Rural areas definitely have different conditions for success in the

'experience economy' and these varieties surely will add an extra dimension to the diverse and unequal development paths and integration in the global economy that already today divide rural areas in some with rather well-off economies and some with differing degrees of marginalization and degradation (Marsden 1998 and 2006; Murdoch 2000).

Another question has been whether and in which ways the Bornholm case studies and the applied knowledge framework of studying innovation and knowledge processes possible may enrich and give new insight to the research on alternative food. The knowledge based economy discourse that prevails within regional studies, is not to the same degree addressed in core agro-food research debates and literatures where discourses about economic, social and environmental sustainability prevail. The few conceptualizations of knowledge applied in the agro-food research are generally characterized by a hierarchical dichotomy between on the one hand, rational, codified, global, scientific knowledge, and on the other, local, culturally embedded, lay knowledge in which the former colonizes and eradicates the latter. This is not helpful for explaining the significance and interaction of varying epistemological approaches including symbolic knowledge observed in the Bornholm case studies. Thus, the thesis is suggested to have provided new conceptual tools and empirical insight to the research on alternative food.

Methodological reflections

Compared to tangible and statistically definable research objects such as sectors, regions, institutions, and firms, the topics of knowledge and knowledge dynamics are very challenging fields of research. Whether knowledge is conceived as intangible, person-born, intrinsic assets of individuals or as routines, skills and competences embedded in collective social systems such as firms, networks, and communities, studying it is difficult and quantifying its relevance and use almost impractical. In this sense, the recent shift in the field of regional studies from a focus on socio-institutional perspectives towards cognitive perspectives (Lagendijk, 2006), as exemplified by the TKD approach, accentuates a need of new research methods. Furthermore, the empirical findings of complex, combinatorial dynamics involving multiple territorial scales, differing types of knowledge and learning and varying institutional contexts, stresses the insufficiency of simple conceptualizations of knowledge such as the distinction of codified and tacit knowledge and underlines the need for also theoretically being equipped with a multi-facetted analytical framework.

The knowledge biography methodology elaborated for the EURODITE case studies and applied on the Bornholm firm level studies as part of a new TKD approach to regional innovation, should be seen as a response to such demands of new methodological and theoretical tools for studying economic knowledge processes. The knowledge

biography methodology unquestionable is time-demanding and faces the researcher with serious challenges, as described in chapter 3. However, as a novel instrument with which to tackle the growing interests in the cognitive aspects of economic development, the method definitely holds potentials for regional and organizational innovation studies. Further empirical studies that map the complex systems of interacting actors, learning forms and milieus, environments and contexts, activated by firms in their development, adaptation and application of knowledge, may provide inputs to the future development of theories and concepts for regional and innovation studies - as well as to the further refinement of knowledge biographical methods.

One of the specific advantages that might result from more targeted future efforts of making 'knowledge biographies' such as those conducted within the EURODITE project, is the identification of possible ways to measure and quantify knowledge processes, i.e. to develop indicators or proxies of the most important types of actors, contexts, moments, places of knowledge development and of the mechanisms and transactions through which knowledge is diffused and adapted to new contexts. This would improve the possibilities of measuring the qualities of distinct regional and organizational knowledge systems and of benchmarking across multiple knowledge systems. Translating knowledge into statistically identifiable indicators probably would violate the fundamental qualitative and embodied nature of knowledge, however it would address an urgent need in policy making of tools for 'taking the temperature' and evaluating the qualities of knowledge dynamics and local competence structures. This task however is too ambitious to be taken up here but will depend on future research.

Meanwhile, one attempt to quantify knowledge assets is touched upon in publication 4 and consists in translating the DKB knowledge categories into statistically identifiable *labor* representatives, i.e. distinct professional, occupational and educational groups of persons characterized by analytical, synthetic respectively symbolic approaches to creation and use of knowledge. This in fact is very close to what Florida (2002) did, when he defined the 'Creative Class' and its three sub-categories of 'The creative core', 'The creative professionals', and the 'Bohemians' on the basis of occupational and educational statistics. The precise translation of the DKB knowledge bases into specific groups of occupations obviously could be made in more or less restrictive manners resulting in larger or smaller labor groupings. Such ways of using the DKB typology may be useful for studying the place-specific significance of and correlation between differing competence structures, job categories, labour markets, and related research, innovation and educational systems.

The remaining part of this manuscript will be devoted a discussion of the policy implications for Bornholm and other rural areas of the presented analyses. The discussion has two main sections. In the first, I discuss the implications of the findings for the possibilities of supporting Bornholm food and present a few proposals for future policy initiatives. In the second, I address broader perspectives of rural socio-

economic development and discuss the question whether and in which ways the notion of TKD may outline a new perspective for policies to support innovation and economic development in rural areas.

Policy implications for Bornholm and rural areas

Policies for Bornholm food

As described before, the Bornholm producers were among the first-movers in the national emergence of new types of small-scale, artisanal food productions, who were historically advantaged by lacking supplies and competition on Danish consumer markets, providing excellent opportunities for the entry of 'Bornholm food'. Today however, the market conditions have changed. While the economic power structures and the supremacy of huge corporate interests in the Danish food sector maybe not have changed, the development surely has increased the supply on consumer markets of diverse specialized products including products from other Danish regions. Consumers have become more knowledgeable and selective, and competition has increased. This sets a new agenda for the future development of Bornholm culinary food, compared to the "happy old days" of pioneering and digging the immediately visible gold ores.

Businesses and policy actor on Bornholm indeed are aware of the increased competition and the need to constantly innovate and develop existing and new products as well as the brand of the sector as a whole in order to maintain Bornholm's lead in the race with other Danish rural areas. Like in the previous years, a main coordinator in this process continues to be the Bornholm Local Action Group (LAG). And like in the previous programming period, support to 'Regional quality food' is a special priority in the existing 'local development plan' for 2007-13 of the Bornholm LAG²⁵.

The strategic goals and priorities of the Bornholm LAG in the present and the previous financial program periods as well as the competent efforts of realizing these goals and priorities of a few employed consultants and voluntary community leaders have been emphasized throughout the thesis as main contributing factors for the success of Bornholm food. This praise is continued and further evidenced in the final section about broader policy perspectives of how to support rural development.

First, a few comments regarding the priorities of policies and strategies to support the *future* development of the Bornholm food sector should be stated. One group of comments regards possible ways of supporting the two basic innovation targets of Bornholm food producers: the tangible dimension of developing products and

²⁵ <http://www.lag-bornholm.dk/>

technologies, and the intangible dimension of developing the narrative, cultural and experience elements of products. A second heading of comments regards the lack of research-based knowledge that characterizes the Bornholm food sector.

Development of tangible and intangible product components

As described in chapter 3, the locally run businesses of Bornholm food relies on two different business models and innovation strategies. On the one hand 'classical' niche producers, distributing their specialty products on national consumer markets outside the island, and on the other hand, producers relying on local markets of visiting tourists, direct sales and diverse types of experiences offerings and services. The two groups of firms can be described as relying on two varying strategies to distinguish products from standard products, 'specialization' and 'dedication' (Storper and Salais 1997). Most of the businesses, however, in reality combine elements of both specialization and dedication, i.e. they use specialized techniques but also rely on new forms of 'dedicated' face-to-face or mediated interaction with consumers. It therefore seems apparent to discuss the varying implications of the two strategies in terms of possible policy initiatives to support the future development of Bornholm food.

Starting with the strategy of specialization, in particular relevant for the niche producers, the need for certain tangible competitive qualities embedded in the physical products is decisive. If not such qualities exist, it is difficult to distribute products to distant consumers via supermarkets or other retailing channels, at least if premium prices are expected. But also producers relying on direct sales to tourists have to constantly develop the tangible product qualities as consumers get more and more knowledgeable and selective and no longer are attracted only by means of a home-made sign put up at the road side.

However, due to the variety of products it would not be realistic to expect the firms – neither those relying on external consumer markets nor those relying on local tourist markets - to engage in close interaction regarding product-specific issues, such as development of new manufacturing technologies and processes which usually constitutes a core field of intervention for regional innovation policies. The variety of products also reduces the possibilities of creating regional institutional frameworks around specific product/technology fields (education and research institutions, technological suppliers, etc.) – an option more relevant for Southern European rural areas with traditions and many producers within one specific field of production (wine, cheese, ham, olive oil, etc.)

Establishment of new institutional structures for technical support to quality-based, artisanal, alternative food is not realistic at the administrative level of Bornholm and more appropriately should be considered a national responsibility. A national institutionalization process indeed is initiated and promoted for instance by the

organization 'The Taste of Denmark'²⁶ which presently organizes 10 Danish food networks including the Bornholm network, Regional Culinary Heritage, and certain relevant institutions are in place such as 'Videncenter for Fødevareudvikling' (Knowledge Centre Food Development)²⁷ that functions as a secretariat for the 'The Taste of Denmark' and coordinates its food development projects. However, a long way is still to go before a proper institutional structure (including supplies of relevant educations) is in place that can support the bottom-up entrepreneurial processes of developing competitive productions of high-quality, artisanal food in Denmark. The national institutionalization processes indeed could gain from the Bornholm experiences regarding how to secure in-flow of external knowledge and a regional re-circulation, contextualization and anchoring of this knowledge, for instance via support schemes for professional consultancy services.

Notwithstanding the importance of improving the national institutional support structures for alternative food, regional policy initiatives could be taken to support the development of tangible product and technology qualities in other ways. For instance, it could be a future priority to support the integration of Bornholm food producers into the new ambitious branding strategy "Bornholm - Green Bright Island 2014"²⁸, set up and launched in 2008 by the Bornholm Growth Forum, the regional authority coordinating economic policies on Bornholm including EU structural funding. The strategy defines an important platform for discussions of Bornholm's future development:

"Bright Green Island envisions Bornholm as an attractive green island based on 100% sustainable, renewable energy – an island community which is environmentally and ethically responsible in all its actions. By no later than 2014, Bornholm should have established a name for itself in the world as the Bright Green Island and be strongly positioned in the debate on climate change and energy sources....The strategy specifies a number of specific priority areas and actions, which convey Bornholm's message to the world at large and at the same time help to implement Bornholm's energy strategy goal of becoming a sustainable, carbon-neutral community."
(<http://www.bornholm.dk/cms/site.aspx?p=805>)

Support to the development of sustainable energy and resource reducing solutions for food production is not at the moment an explicit priority of the branding strategy but certainly should be considered an option. It not only could help providing critical mass to the realization of the Bright Green Island strategy but also could provide a practical (and maybe financial) framework for Bornholm food producers of collectively creating new technologies and processes within a field of profound interests of many consumers and the public as a whole.

²⁶ <http://www.smagenafdanmark.dk/>

²⁷ <http://www.vifu.net/>

²⁸ <http://www.bornholm.dk/cms/site.aspx?p=43>

The strategy of 'dedication' is particularly followed by producers relying on local tourists markets, face-to-face sales channels, and experience elements but certainly also has relevance and implications for the niche producers distributing via supermarkets. As described in the publication 6, staging of authentic experiences and cultural values and qualities of goods for instance through face-to-face sale situations and participation in cultural events, is a new imperative for producers with high-profile, premium-priced products. For more than a decade the Bornholm LAG has persistently coordinated a development strategy putting priority on marketing aspects of business development, cultural events and place-branding projects, cross-sector cooperation with tourism, restaurants and arts and crafts. Within this field, the work of the Bornholm LAG has been outstanding and shown the way to go for other LAGs in Denmark.

However, as indicated by the Bornholm case studies, only few producers have organized their consumer interaction in a systematic way, for instance through Facebook or other internet based fora where producers (not least during the long winters where no tourists are on the island) could observe, encourage and influence 'consumer buzz', get new ideas for product development, and distribute important information and storytelling about present and future activities in the firm. Most large conventional food processing companies such as Arla, Danish Crown and Carlsberg in fact have had such fora for consumer dialogue in operation for years.

Development of internet based, individually organized as well as collective solutions for the Bornholm food producers, as well as educational initiatives to provide the Bornholm producers the needed skills to use such solutions, seem obvious fields of regional policy intervention. Interventions very well could be organized as part of general business development support schemes not only targeted the food sector. Whether specifically targeted food producers or targeted larger parts of the regional economy, such an initiative could be very important in terms of place-branding of Bornholm. Engaging customers and end-consumers in discussions about the qualities, production and consumption of Bornholm products might affect not only the purchase of individual products but might also impact consumers' perception of Bornholm as a possible place to live.

Supporting research-based knowledge and institutions

A central finding regarding the knowledge dynamics observed in the Bornholm case studies is the limited role of scientific, research-based activities and institutions. This is not a specific characteristic of the Bornholm food sector but a general aspect of artisanal, small-scale productions of varying sorts. Nevertheless, as mentioned above, the alternative food sector as well as the research literatures studying it, is characterized by a dichotomy between global/scientific and local/lay knowledge. The Bornholm case studies clearly show that this dichotomy is not helpful, neither for

understanding the type of knowledge dynamics actually taking place nor for identifying new potentials for rural development. Creating links to food research systems and exploiting the results of research have not been explicit priorities of the Bornholm LAG. In order to identify and develop fields of food productions with larger, more strategic potentials for commercialization and job creation, closer links to research systems are necessary.

A small aqua research institution, AquaBaltic²⁹, who breed diverse fish species (mainly salmon) and release them in the Baltic Sea has existed on Bornholm since 1994 and presently is engaged in several projects including one about exploiting seaweed for human food supported by the Bornholm LAG. The 'Bioraf' research institution, previously located on Bornholm and established as part of large-scale EU research activities and described in the case study FGD1 (publication 3), resulted in a new rapeseed cooking oil product and production technology that were exploited commercially by a Bornholm farmer. However, this happened mainly due to coincidence and entrepreneurial opportunism than due to any formal, institutional mechanisms set up to secure commercialization of the research results. The research based knowledge disappeared from the island together with the Bioraf researchers and consultants when the institution, despite the efforts of regional politicians, was moved to another part of Denmark. This example shows the obstacles of running research institutions on a small peripheral island but it should be a future goal to improve the strategic links to relevant food research institutions in Denmark and internationally and to secure a better integration of research and commercialization efforts.

Rather than attracting food research institutions to permanently locate on Bornholm a goal could be to launch or to be part of larger specific research projects targeted development of new small- and large-scale production systems of relevance for Bornholm. Research projects may relate to the above proposal of integrating the Bornholm food sector into the energy and resource saving sustainability discourse of the Bright Green Island strategy. They also could relate to social science research and be directed towards investigation of consumers and new consumption and experience staging systems. In general, increased awareness of encouraging and connecting different types of knowledge and research milieus such as technological and marketing research, seems important.

A third topic for research projects could be development of the, for the time being, lacking resource basis on Bornholm of specialized agricultural produce to exploit by the processing industries and the catering and restaurant sectors. Integrating the still almost exclusively conventional agricultural sector on Bornholm in the strategies of specialization and/or dedication should be a core element in future policies for Bornholm food. This, however, is out of the hands of the policy actors responsible for

²⁹ <http://aquabaltic.dk/>

supporting Bornholm culinary food (mainly the LAG) and rather is an issue for higher-level regional policy and planning which is in the centre of the following section.

TKD - A new perspective for rural development policies?

What might be the lessons-learnt of the case of Bornholm food in terms of policies to support more general processes of economic and development on Bornholm and other rural areas? How and in which ways may the theoretical perspective of Territorial Knowledge Dynamics (Crevoisier and Jeannerat 2009) be useful for rural policies? Parts of my answer to these questions are already provided by the above presented analyses. However, in order to give the final part of the answer a few further remarks regarding the overall institutional structures set in place in Denmark to support regional and rural development are needed. They in particular concern the varying institutional structures for 'regional', 'rural' and 'agricultural' policies.

In a Danish policy context, regional and rural development mainly are supported through general welfare-oriented policies targeted health, education, social services, transport and communication infrastructures, etc. Nevertheless, certain national administrative structures and responsibilities are implemented and decentralized to Danish regions and municipalities to address and support specific regional and local agendas for development. This includes, for instance, the establishment of regional Growth Forums (cf. chapter 2), responsible for coordination of regional economic, education and labor market policies, and the devolvement to the municipality level the responsibility of making plans and policies for rural areas.

However, in terms of providing funding for the regional Growth Forums and the local municipalities with which to address the specific needs of the regions and rural areas, the EU rather the Danish state is the donor. The EU structural funds for social and regional development and cohesion are the main (external) sources available for the regional Growth Forum while the financially much smaller pillar III of the EU CAP, targeted rural economic development and diversification, forms a core financial framework for organization of rural policies. The Local Action Groups established in all parts of rural Denmark (and other EU countries) is a core administrative unit for coordinating this latter funding (on Bornholm €1.7 mil. annually in the existing programming period 2008-13).

In addition to these types of EU funding for regional and rural development, subventions is distributed to farmers, food processing industries and other agro-economic actors via the sectoral pillars I and II of the EU CAP. This funding basically is distributed directly from EU to the individual recipients according to general criteria and thus, is not part of regional or local decision and policy making. However, due to the huge amount of subvention flowing into rural areas through these policy

schemes³⁰, they constitute significant contributions to rural economies and have considerable effects on the use of land, natural resources and the physical environment.

In a rural setting such as Bornholm, the splitting up of regional, rural, and agricultural policies in varying administrative and regulative systems is not un-problematic and causes problems of coordinating the diverse sets of objectives, instruments and means. Solving these extremely complex problems which in fact would entail reforms of the entire EU regulation and funding systems (and the immense political problems of that should be well-known to everybody) is out of focus here. However, the case studies suggest that lessons could be learned by regional policy actors regarding the territorial, sector-crossing, network and bottom-up approach to develop rural areas inherited in the pillar III EU CAP, as contrasted to the sectoral cluster approaches prevailing within EU and national systems of regional and agricultural policies.

Among the many policies and programs that have affected the development of Bornholm food, the most influential undoubtedly has been the EU program LEADER for rural development and diversification. Since the initial launching in 1991 the LEADER program has represented a break with traditional sector support to conventional agriculture and agro-food systems and has launched new types of territorial approaches to diversification of rural economies as well as new principles for how to organize and implement policy initiatives through bottom-up and networking activities involving broader parts of local communities. The LEADER program is no longer operating as an independent program but in practice has been upgraded and, from the programming period 2007-13, adopted as a new third pillar in the EU CAP in order to supplement the strong sectoral approach in previous CAP program periods with new territorial approaches to rural development.

The first 1991 LEADER program was not implemented at the national level in Denmark, however on Bornholm LEADER funding supported the establishment of 'Landbrugets Udviklings- og Innovationscenter' (The Agricultural Development and Innovation Centre). Bornholm also was the first area in Denmark to establish a LAG in 1999, before other rural areas of Denmark in 2007 made similar groups as part of the national implementation of the third LEADER-string of the EU CAP.

Just like regional researchers and territorial innovation models such as clusters and regional innovation systems have had a strong impact on EU and national regional innovation policies during recent decades, so have EU policies for rural development in general and the LEADER program in particular been influenced by rural researchers and concepts such as the notion of 'neo-endogenous rural development'. The notion of 'neo-endogenous rural development' has gained its major theoretical inputs from

³⁰ According to <http://farmsubsidy.org/listx/denmark/>, Bornholm companies received close to € 1 billion via diverse EU CAP support schemes in the period of 2000-06.

Jonathan Murdoch (2000) and Christopher Ray (1998; 1999a; 1999b), who sums up the notion this way:

"The fundamental idea has been called neo-endogenous (rural) development (..) The endogenous part refers to the animation of development along a bottom-up trajectory: that is, when the search for development resources and mechanisms focuses onto the local territorial level. Generally, a synonym for endogenous would be participative. The 'neo' part, whilst not challenging the integrity of bottom-up dynamics, identifies the roles played by various manifestations of the extralocal. Actors in the politico-administrative system (through the national up to the European level) as well as in other localities are all seen as part of the extralocal environment of rural development and as potentially recruitable by localities in support of their regeneration strategies." (Ray, 2006)

According to Ray (1999a), the local/extra-local dialectic manifested in neo-endogenous development is specific to each place. The consciousness-raising needed to promote endogenous development should be seen as 'Janus-faced.' It looks outwards in order to 'sell' the area to the 'extra-local' (to consumers, policy making bodies etc.) and inwards in order to recruit territorial actors (local businesses, communities, voluntary organizations etc.) In this way, the approach mediates between exogenous and endogenous forces.

This perspective seems very close to the TKD approach's multi-scalar perspective and emphasis on the need for regional policy to pay attention to both internal and external sources and to regional networking in order to re-circulate and anchor mobile knowledge and its applicability on the Bornholm case seems obvious. Explicitly inspired by the territorial, bottom-up and network LEADER principles and working methods, the Bornholm LAG and board have strategically worked for involving local communities in the development of Bornholm, for creation of new public-private partnerships, for building of trust and cooperative network relations among local businesses within related sectors, to connect these networks to national and international networks, to secure a regional diffusion of relevant knowledge, and a multiplicity of cultural events, place-branding initiatives on and outside Bornholm have been launched.

Meanwhile, on Bornholm as well as in all other Danish regions the regional authorities and administrative systems including the Growth Forum and the Business Centre Bornholm³¹ have adopted the 'cluster' approach preached by overall EU and national authorities as a core element of proper regional economic and innovation policies. A number of 'clusters' have been identified such as a 'Green Technology Universe', a 'Food Universe', and an 'Experience Universe' and local business representatives have been selected to specify their goals and activities. The actual activities within the framework of this Bornholm cluster policy have not been studied. However, the

³¹ <http://www.clusterdevelopment.dk/mainpage/0/2>

naming of the clusters as 'universes' indicates the difficulties in identifying fields of business activity on Bornholm with critical mass, specialized suppliers, demanding customers, research and education institutions, governance structures, etc. which usually define clusters.

As described in chapter 3, the varying TIM models of clusters, regional innovation systems, industrial districts etc., lying behind much of today's regional policy, are characterized by understandings of innovation and knowledge as formed by localized interaction, by definitions of growth potentials related to specific sectors/products and by a focus on building of regional institutional frameworks for the firms. In contrast, the TKD perspective opens the attention to the variety and complementarities of local actors and how they from different positions possibly could contribute to the common goal of creating development in the region. The TKD perspective focuses on increasing the connections to relevant external knowledge milieus and (at least from the point of view of policy actors, as noted by Dahlström and James 2012) on securing a re-circulation, contextualization and anchoring of knowledge among actors in the region. Paying attention to the complex networks and relations through which rural businesses actually acquire and share their knowledge at multiple territorial scales, in varying knowledge systems, and across the production-consumption divide, brings in a new and more optimistic perspective for rural development, relying more on relational and organizational proximity than on geographical ditto.

I will argue that the cluster approach from a theoretical point of view is inappropriate in addressing *rural* development problems. The underlying theoretical model, which determines and directs the practical approaches of regional policy actors, is not particular useful in rural economies with low degree of specialization and market based interaction and missing institutional systems. This does not imply, however, that sector-based approaches are always inappropriate in rural contexts, as appears from my above proposals regarding relevant future food-based policies for Bornholm.

In an increasingly globalized and service-based world, it seems crucial for regional economic policy-makers, maybe even more in rural contexts than in urban, to understand and deal with the implications of combinatorial knowledge dynamics, i.e. that regional economic development increasingly is sourced from interactions at multiple territorial scales, from different types of knowledge including socio-cultural, and from new types of producer-consumer interaction. As said, the administrative structures for rural development policy on Bornholm (the LAG) have not much to learn from the TKD perspective in terms of priorities on sector- and region-crossing activities, intra- and extra-regional network building, inclusion of consumption perspectives and involvement of different types of knowledge and learning.

But these successful experiences and best-practices might give cause to reflexion in the more powerful governance and policy systems for regional economic development. State and regional level authorities should discuss whether the one-size-fits-all cluster policy formula is suitable in addressing the specific problems and resources of rural

areas without larger populations and business clustering or whether other models and approaches should be applied there. More empirical and theoretical research on varying types of regions is needed before a distinctive 'TKD approach' can present operational, ready-made models and tools for policy-making. But the TKD theoretical perspective and the LEADER-inspired policy approaches described in this thesis indeed offer inspiration for new models and approaches to rural development.

Summary of PhD thesis

In English

This manuscript presents and discusses the theoretical and methodological frameworks, the findings and the further implications of six complementary publications, made within varying research contexts and submitted as part of the thesis (see Annex I).

Empirically, the thesis centres on investigating one specific study case: the knowledge dynamics that enabled the innovation of culinary productions, networks, marketing and governance systems on the Danish island of Bornholm. In a Danish food context of lacking traditions and consumer markets for culinary heritage, this regional innovation process has been pioneering. The new businesses differ regarding products, technologies and business models, but a common characteristic is the use of the Bornholm origin of production as a factor causing or adding to the quality of the food and drinks products. The innovation processes did not draw on new scientific or technological advances but relied on entrepreneurial, technical activities of developing artisanal and industrial production methods and new distribution and sales systems, on identifying geographical and cultural narratives about the Bornholm origin of production to embed into the products, and on the marketing of these on a national scale, i.e. activities quite different from those science and technology-driven innovations and knowledge dynamics that usually are considered in research.

Theoretically, the innovation of Bornholm food is approached from the perspectives of two major research fields: 1) Regions, knowledge and learning in the global knowledge economy, and 2) Alternative food and restructuring of markets and producer-consumer relations.

In the former economic geographical perspective, a recent research debate concerns the notion of 'Territorial Knowledge Dynamics' (TKD) (Crevoisier and Jeannerat 2009). The TKD is an update to the varying 'Territorial Innovation Models' (TIM) applied within economic geography such as 'industrial districts', 'clusters', 'regional innovation systems' and 'learning regions'. The TKD notion is an attempt to conceptualize a general shift in the still more globalized and services-based economies from regional, cumulative knowledge dynamics along specific sectoral production and technology trajectories, emphasized by the diverse TIMs, towards multi-scalar and combinational knowledge dynamics involving multiple territorial scales such as regional, national and international, different types of knowledge (not only scientific and technological but also socio-cultural) as well as interaction across the production-consumption divide.

The TKD perspective and a special 'knowledge biography methodology', designed to trace and map the important knowledge interactions in the life-span processes of innovations, are applied in the empirical case studies of Bornholm food, conducted as

part of the EU 6FP project, EURODITE. The thesis explores the usefulness of the TKD approach for describing and understanding the complex knowledge dynamics underlying the development of the new Bornholm food sector. Moreover, the thesis aims at clarifying the theoretical definition and interconnectedness of the three conceptual components of the multi-scalar and combinatorial TKD approach: multiple territorial scales, differentiated types of knowledge and learning, and varying institutional contexts for knowledge development including the spheres of production and consumption. Special efforts are devoted to clarify the theoretical content and empirical implications of the epistemologically defined Differentiated Knowledge Bases typology (Asheim 2007) which is included in the TKD approach in order to distinguish between three different types of knowledge and learning: analytical-scientific, synthetic-instrumental and symbolic-cultural knowledge.

The Bornholm case studies validate the usefulness of the TKD approach by evidencing the significance of the three above mentioned dimensions of knowledge compositeness. Regarding the *territorial* aspects of the knowledge dynamics involved in the innovation of Bornholm food, the case studies document the importance of interactions at intra-regional level (for instance connected with the conceptualization of the qualities of 'Bornholm food') as well as of external interaction of which some has been collectively organized (e.g. common study tours abroad) while other parts have been organized by individual producers. Regarding the *knowledge types* involved, mainly synthetic and symbolic knowledge dynamics have been important and the case studies have shown how these two knowledge approaches have been combined in the entrepreneurial processes of developing businesses and products. In contrast, research-based analytical knowledge only has played a limited role. Finally, the development process involved a bundle of related knowledge dynamics crossing a variety of *institutional contexts* which includes firm internal processes, market and network based interactions, public policy initiatives, as well as activities at the overall level of society/culture.

The second theoretical perspective with which the case of Bornholm food is approached regards restructuring of markets and producer-consumer relations in the food sector. The core question addressed by the thesis concerns possible analytical frameworks regarding such overall changes in economies with which to understand and explain the innovation and knowledge processes identified in the Bornholm case studies, especially the significance of socio-cultural, symbolic knowledge. Two specific conceptualizations of restructuring of markets and producer-consumer relations are suggested and applied as analytical frameworks for re-interpreting the empirical case study data about the knowledge dynamics of Bornholm food: the Worlds of Production (WOP) model of Storper and Salais (1997) and the experience economy notion of Territorial Staging Systems (TSS) (Jeannerat and Crevoisier, 2010).

Both models emphasize the role of new types of interactive relationships between producers and consumers and the analyses relate the significance of symbolic

knowledge to this aspect of market restructuring. However, the analyses also stress that the growing role in the food sector of symbolic knowledge and of adding narrative, experiential elements to the tangible products does not eliminate the importance of synthetic and analytical knowledge about functional product features, manufacturing technologies, logistics, etc.

The WOP model has proven useful for identifying and explaining the two main business models and innovation strategies of Bornholm food producers, distinguishing them from standardized conventional producers: specialization and dedication. Most Bornholm producers apply a combination of these strategies but the former is significant for the group of niche producers distributing on national consumer markets while the latter mainly is followed by the group relying on local markets of tourists.

The notion of the 'experience economy' (Pine and Gilmore 1999) relates to broader processes of culturization of markets whereby consumers increasingly demand memorable, authentic experiences and to the growing role of consumers for value-creation and product development. The experience economy was not only an abstract business strategic concept but explicitly referred to as an inspirational source of business development and innovation by some Bornholm food entrepreneurs. Due to this finding, and due to the fact that Bornholm food actually has been part in concerted, cross-sector, and policy-supported place-branding efforts on a national scale, the notion of 'Territorial Staging System' is applied to investigate the larger experience economic system in which Bornholm food is positioned. Operating on markets for experience-based products has important implications for producers in terms of needs of organizing active and professional staging activities such as media covered cultural events. Rural areas definitely have different conditions for success in the experience economy (for instance, not all rural areas has a similar strong place-brand as Bornholm) and these varieties will add an extra dimension to the unequal development paths that divide rural areas in some with well-off economies and some with differing degrees of marginalization and degradation.

The emergence of markets and productions of alternative food constitutes a huge and multidisciplinary field of research. However, the knowledge aspects of alternative food are relatively un-explored in the literatures. The few conceptualizations of knowledge applied in the agro-food research are generally characterized by a hierarchical dichotomy between on the one hand, rational, codified, global, scientific knowledge, and on the other, local, culturally embedded, lay knowledge in which the former colonizes and eradicates the latter. This is not helpful for explaining the significance and interaction of varying epistemological approaches including symbolic knowledge observed in the Bornholm case studies. Thus, the Bornholm food case and the applied TKD conceptualizations of knowledge are suggested to provide new conceptual tools and empirical insight to the research on alternative food.

The thesis finally discusses the policy implications for Bornholm and other rural areas of the presented analyses. The discussion has two main sections. In the first, the priorities of policies to support the further development of Bornholm food are discussed and a few proposals for future policy initiatives are presented. In the second, broader perspectives of rural socio-economic development are addressed and the question whether and in which ways the notion of TKD may outline a new perspective for policies to support innovation and economic development in rural areas is discussed.

The TKD perspective seems to offer a useful lens for research studies as well as for policy making in rural development contexts where the agglomeration dynamics, specialized institutions, labour markets and science systems in focus of TIMs are lacking. The TKD perspective focuses on increasing the connections to relevant external knowledge milieus and on securing a re-circulation, contextualization and anchoring of knowledge among actors in the region. Paying attention to the complex networks and relations through which rural businesses actually acquire and share their knowledge at multiple territorial scales, in varying knowledge systems, and across the production-consumption divide, brings in a new and more optimistic perspective for rural development, relying more on relational and organizational proximity than on geographical ditto.

Opsummering af phd-afhandlingen på dansk

Dette manuskript præsenterer og diskuterer de teoretiske og metodologiske rammer, de empiriske resultater og de videre implikationer af seks komplementære publikationer, udarbejdet i forskellige forskningssammenhænge og indleveret som dele af phd-afhandlingen (se Annex I).

Empirisk fokuserer afhandlingen på én specifik undersøgelsescase: vidensdynamikkerne, som muliggjorde innovationen af produktioner, netværker, marketing- og støttesystemer for regionale kvalitetsfødevarer på den danske ø, Bornholm. I en dansk kontekst med svage traditioner og forbrugermarkeder for egnsspecialiteter og regionale fødevarer har denne regionale innovationsproces været banebrydende. De nye virksomheder er forskellige mht. forretningsmodeller, produkter og teknologier, men et fælles kendetegn er brugen af den bornholmske produktionsoprindelse som en faktor, der skaber eller øger kvaliteten af produkterne. Innovationerne byggede ikke på nye videnskabelige eller teknologiske nyskabelser, men på entreprenør-baserede aktiviteter rettet mod at udvikle håndværksmæssige og industrielle produktionsmetoder, nye distributions- og salgskanaler, identificering af geografiske og kulturelle narrativer om Bornholm mhp. at indlejre disse i de fysiske produkter, og på markedsføring og branding af produkterne på en national skala, dvs. aktiviteter som er ret forskellige fra de videnskabs- og teknologidrevne innovations- og vidensdynamikker som oftest er i fokus for forskningen.

Afhandlingen angriber casen om innovationen af bornholmske fødevarer fra to forskellige teoretiske perspektiver og forskningsfelter: 1) Regioner, viden og læring i den globale vidensøkonomi, og 2) Alternative fødevarer og omstrukturering af markeder og producent-konsument relationer.

En aktuell debat indenfor det førstnævnte økonomisk geografiske forskningsfelt drejer sig om begrebet 'Territorial Knowledge Dynamics' (TKD) (Crevoisier and Jeannerat 2009). TKD begrebet er opdatering af de mange forskellige 'Territorial Innovation Models' (TIM), som anvendes indenfor økonomisk geografi såsom 'industrial districts', 'clusters', 'regional innovation systems' og 'learning regions'. Begrebet er et forsøg på at konceptualisere et generelt skift i den stadigt mere globaliserede og servicebaserede økonomi fra regionale, kumulative vidensdynamikker langs sektor-specifikke produktions- og teknologispør, understreget af diverse TIM'er, og mod multi-skalare og kombinatoriske vidensdynamikker, som involverer flere territoriale niveauer (f.eks. regionale, nationale og internationale), forskellige typer af viden (ikke blot videnskabelig og teknologisk, men også socio-kulturel viden) og interaktion på tværs af den sædvanlige skillelinje mellem produktion og konsumtion.

TKD perspektivet og en særlig 'vidensbiografisk' metode, udviklet mhp. at opspore og kortlægge de vigtige vidensinteraktioner i det samlede forløb, hvorigennem innovationer gennemføres, er anvendt i de empiriske casestudier af bornholmske fødevarer som led i et stort EU-forskningsprojekt, EURODITE. Afhandlingen undersøger den empiriske anvendelighed af TKD tilgangen til at beskrive og forstå de komplekse vidensdynamikker bag udviklingen af den nye bornholmske fødevarerektor. Desuden sigter afhandlingen på, at klargøre de teoretiske definitioner af og sammenhænge mellem de tre konceptuelle komponenter i TKD tilgangen til beskrivelse af 'multi-skalare og kombinatoriske' vidensdynamikker: flere territoriale niveauer, forskellige typer af viden og læring, og varierende institutionelle kontekster for vidensudvikling såsom produktions- og konsumtionsfærene. Særlige bestræbelser er rettet mod præcisering af det teoretiske indhold og de empiriske implikationer af den epistemologisk definerede 'Differentiated Knowledge Bases' typologi (Asheim 2007), som er inkluderet i TKD tilgangen for at skelne mellem tre forskellige typer af viden og læring: analytisk-videnskabelig, syntetisk-instrumentel og symbolisk-kulturel viden.

De empiriske casestudier dokumenterer vigtigheden af alle tre ovennævnte dimensioner af kombinatorisk viden i innovationen af bornholmske fødevarer. Med hensyn til de *territorielle* aspekter viser casestudierne vigtigheden af både intra-regional interaktion (f.eks. forbundet med konceptualisering af de særlige brand-kvaliteter af bornholmske fødevarer) og af ekstra-regional interaktion, hvoraf en del har været kollektivt organiseret (f.eks. fælles studieture til udlandet), mens andre dele har været organiseret af individuelle producenter. Med hensyn til videnstyper har især syntetisk og symbolsk viden været vigtig og casestudierne har vist, hvordan disse to videnstyper er kombineret i de entreprenørielle processer med at udvikle

virksomheder og produkter. Modsat har forskningsbaseret analytisk viden kun spillet en begrænset rolle. Endelig har udviklingsprocessen involveret en række relaterede vidensdynamikker på tværs af forskellige *institutionelle kontekster* herunder firma-interne processer, markeds- og netværksbaserede interaktioner, offentlig støttepolitik, og aktiviteter på et overordnet samfunds- og kulturniveau.

Det andet teoretiske perspektiv, som bruges til at analysere den bornholmske fødevarer-case, drejer sig om omstrukturering af markeder og producent-konsumenterrelationer. Spørgsmålet, som stilles i afhandlingen indenfor dette teoretiske perspektiv, handler om mulige analytiske begreber om overordnet økonomiske omstrukturingsprocesser, der kan bruges til at forstå og forklare de innovations- og vidensudviklingsprocesser, som blev identificeret i de bornholmske casestudier, i særdeleshed vigtigheden af socio-kulturel, symbolsk viden. To specifikke teoretiske modeller om markeds-omstrukturering er foreslået og anvendt som analytiske rammer for nye analyser, der genbruger de bornholmske casestudiedata: Worlds of Production (WOP) modellen af Storper and Salais (1997) og den oplevelsesøkonomiske model Territorial Staging Systems (TSS) (Jeannerat and Crevoisier, 2010).

Begge modeller understreger betydningen af nye typer af interaktive relationer mellem producenter og forbrugere og analysen forbinder vigtigheden af symbolsk viden til dette aspekt af markeds-omstrukturering. Analyserne understreger dog også, at den stigende betydning i fødevarer-sektoren af symbolsk viden og af narrative oplevelses-elementer ikke eliminerer vigtigheden af syntetisk og analytisk viden om fysiske produktkvaliteter, fremstillingsteknologier, logistik, etc.

WOP modellen er yderst anvendelig til at identificere og forklare de to vigtigste innovationsstrategier anvendt af alternative fødevarerproducenter mhp. at adskille sig fra standardiserede, konventionelle producenter: specialisering og dedikation. De fleste bornholmske producenter anvender en kombination af de to strategier, men specialisering er især central for gruppen af nicheproducenter, som distribuerer på nationale konsumentmarkeder, mens dedikation især er vigtig for gruppen, der er baseret på lokale markeder af besøgende turister.

Begrebet 'oplevelsesøkonomi' (Pine and Gilmore 1999) relaterer til bredere social og kulturelle forandringsprocesser, hvorigennem forbrugere i stigende grad efterspørger mindeværdige, autentiske oplevelser, og til forbrugeres voksende betydning for værdiskabelse og produktudvikling. Oplevelsesøkonomi var ikke blot et abstrakt forretningsstrategisk begreb i udviklingen af bornholmske fødevarer, men blev eksplicit refereret som inspirationskilde til forretningsudvikling og innovation af entreprenører og policy-aktører. Begrebet 'Territorial Staging System' er derfor anvendt som forståelsesramme for at undersøge det større oplevelsesøkonomiske system i hvilket bornholmske fødevarer indgår og markedsføres. At operere på markeder for oplevelsesbaserede produkter har vigtige implikationer for producenter i

form af krav om organisering af aktiv og professionel 'staging' (iscenesættelse), f.eks. gennem mediedækkede kulturelle event. Landdistrikter har meget forskellige forudsætninger for succes i oplevelsesøkonomien (ikke alle områder har f.eks. et ligeså stærkt place-brand som Bornholm) og disse forskelligheder tilføjer en ekstra dimension til de ulige udviklingsspor, som allerede i dag opdeler landdistrikter i nogle med levedygtige økonomier og andre med forskellige grader af marginalisering og tilbagegang.

Fremvæksten af markeder for og produktioner af alternative fødevarer udgør et stort og multi-disciplinært forskningsfelt. Vidensaspekterne bag alternative fødevarer er imidlertid relativt uudforskede i litteraturen. De få konceptualiseringer af viden, anvendt i fødevarerforskningen, er generelt kendetegnet ved en hierarkisk dikotomi mellem på den ene side rationel, kodificeret, global, videnskabelig viden, og på den anden side, lokal, kulturelt indlejret, lægmandsviden, hvoraf den første koloniserer og eroderer den sidste. Det er ikke hensigtsmæssigt i fht. at forklare vigtigheden af og interaktionen mellem forskellige epistemologiske tilgange til vidensudvikling herunder symbolske vidensdynamikker, som blev observeret i de bornholmske casestudier. De bornholmske casestudier og de anvendte TKD vidensbegreber præsenterer derfor nye konceptuelle redskaber og empirisk indsigt til forskningen om alternative fødevarer.

Afhandlingen diskuterer endelig policy-implikationerne af de præsenterede analyser for Bornholm og andre landdistrikter. Diskussionen har to hoveddele. I den første diskuteres prioriteterne for politikker til at støtte den videre udvikling af bornholmske fødevarer og et par forslag til fremtidige policy-initiativer præsenteres. Den anden del handler om bredere perspektiver af socio-økonomisk udvikling i landdistrikter og diskuterer spørgsmålet, hvorvidt og på hvilke måder TKD tilgangen opridses nye perspektiver for politikker til at støtte innovation og økonomisk udvikling i landdistrikter. TKD tilgangen tilbyder et brugbart perspektiv for forskning såvel som for politik i landdistrikter, hvor de agglomerationdynamikker, specialiserede institutioner, arbejdsmarkeder og forsknings- og uddannelsessystemer, som er i fokus for diverse TIM (f.eks. klynge-begrebet) er ikke-eksisterende. TKD tilgangen fokuserer på at øge forbindelserne til relevante eksterne vidensmiljøer og på at sikre recirkulation, kontekstualisering og forankring af viden blandt aktører i regionen. Øget opmærksomhed på de komplekse netværker og relationer, gennem hvilke virksomheder i landdistrikter faktisk skaffer og deler deres viden via interaktion på flere territorielle niveauer, i varierende videnssystemer og på tværs af produktions- og konsumtionssfærerne, bibringer et nyt og mere optimistisk perspektiv for udvikling i landdistrikter, som snarere udnytter relationel og kognitiv/organisatorisk nærhed end geografisk ditto.

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Annex I: List of publications submitted as part of the thesis

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Platforms of Innovation

Dynamics of New Industrial Knowledge
Flows

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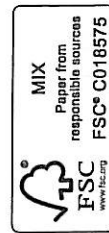
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Contents

List of contributors *Preface*

1	Trends and drivers of the knowledge economy <i>Philip Cooke and Carla De Laurentis</i>	1
1.1	Introduction	1
1.2	Some theoretical stepping stones	3
1.3	Markets, states and networks in the knowledge economy	6
1.4	The generalized theoretical framework: regions, sectors and firms in the knowledge economy	18
1.5	Conclusions	24
2	The rationale for Eurodite and an introduction to the sector studies <i>Stewart MacNeill and Chris Collinge</i>	27
2.1	Introduction and Eurodite objectives	27
2.2	Policy orientations	31
2.3	Relevance of Eurodite to EU objectives	32
2.4	The anticipated impact of Eurodite	36
2.5	Contribution to policy developments	37
2.6	Research, technological development and innovation activities	38
3	Production-consumption models and knowledge dynamics in the food and drinks sector <i>Jesper Manniche</i>	53
3.1	Introduction	53
3.2	Overall structure and trends of the sector	54
3.3	Business responses to drivers of change	60
3.4	Knowledge dynamics	73
3.5	Conclusions	76

project. The offer to work with Euroditie to pilot policy proposals was to be extended, as appropriate, to additional regional development agencies via the EURADA Management Board.

It was not possible to anticipate the exact nature of the pilot activities but they were thought likely to include:

- New targeted business development grants for small and medium-sized (SMEs) entering or developing the knowledge economy.
- SME development 'contracts' for innovation and knowledge processes.
- Regional actions to link universities and business.
- Gender specific actions for women in the workforce or women 'returners' to the labour force.
- Area regeneration initiatives to encompass the knowledge economy and reduce exclusion.

The pilot actions were to be managed by the agencies concerned and overseen by the coordinators supported by the Executive Group. Evaluation of the pilots would be overseen by the implementing agencies and the Euroditie Executive Group. Independent consultants were to be appointed by the agencies to undertake evaluation and to produce assessments.

3. Production—consumption models and knowledge dynamics in the food and drinks sector

Jesper Manniche

3.1 INTRODUCTION

Until the 1970s the development of the economic and social systems through which food and drinks were grown, processed, marketed and sold was an uncontested productivist modernization project based on growing mass markets for standardized products. Neo-Marxist researchers in the 1970s presented a criticism of capitalist 'food commodity systems' and 'agro-industrial complexes' using analytical concepts in line with the 'agrarian question' problematic of classical Marxism (Watts and Goodman, 1997). However, since the beginning of the 1990s the prevailing industrial agro-food model has been subject to a much broader criticism and public debate. Food-related issues like obesity, health, lifestyle-related diseases, food safety, environment protection, animal welfare, the effects of genetically modified organisms on nature and humans, the decline of rural economies, protection of regional culinary traditions, global imbalances in food supplies and principles of international trade policies are all subjects for intensive political and ethical debates.

Furthermore, in economical business terms the dominating industrial food model has recently been challenged by the emergence and growth of a variety of new food markets, supplied by new types of businesses models and networks, emphasizing other definitions of quality than price, efficiency and standardization. Despite their limited economic weight these new food markets and business models represent important directions for the future development of the food and drinks (F&D) sector.

Two emerging business models seem to be relevant alongside the mainstream, industrial food model: the 'alternative' and the 'functional' food models. 'Alternative' food covers different products with rather fuzzy, symbol-laden qualities such as organic, local, speciality, high-quality, slow and fair trade food. Alternative food producers emphasize the

abandonment or at least a reduced use of production inputs stemming from the industrial model of farming and food processing, and generally rely on traditional, often artisanal technologies. Functional food represents almost the opposite, a science-driven strategy of taking advantage of new biotechnologies and other advanced technologies in designing and producing food and drinks products with specific health, diet and nutritional benefits for consumers. Hence, the knowledge bases and knowledge dynamics of 'industrial', 'alternative' and 'functional' food networks seem to have significant differences.

The chapter is organized as follows. Section 3.2 describes the overall structures and change processes in the sector. Section 3.3 presents a theoretical framework for studying the emerging new food production-consumption models, depicts the main features of the three different food models, and outlines the typical innovation efforts and responses within the models. Section 3.4 looks at the specific knowledge categories and dynamics in the different models. Brief conclusions are provided in section 3.5.

3.2 OVERALL STRUCTURE AND TRENDS OF THE SECTOR

3.2.1 Structural Characteristics of the F&D Sector

The F&D sector is here defined as the food and drinks manufacturing industries at the two-digit level of the economic activity classification NACE-Rev. 1, that is, DA15. Sometimes a broader term, the 'agro-food sector/industry', is also used, including the whole food supply chain from agricultural and fishery activities to distribution and retailing.

The F&D sector is the largest manufacturing sector in the EU. In 2005 it accounted for 14 per cent of total turnover, 12 per cent of total value-added, and 13 per cent of total employment in manufacturing (CIAA, 2006). The activity of the F&D sector is less cyclical and more stable than manufacturing in general, due to the relatively static demand for food products. In general, however, employment in the industry is declining in Europe due to increased competition from low-income countries, technological development and restructuring initiatives of companies.

Four manufacturing industries dominate the sector: meat products accounts for 20 per cent, dairy products for 16 per cent, beverages for 15 per cent, and 'various food products' including bakery, chocolate and confectionary products, pasta and baby food for 26 per cent of total turnover

(CIAA, 2006). The industry of 'various food products' has experienced the highest growth rates since 1989 (CIAA, 2004). In terms of export figures, the beverages industry – including wine production – is the most important, in 2003 accounting for 31 per cent of all EU food and drink exports (CIAA, 2004).

The sector encompasses a diverse range of companies from multinationals such as Nestlé (the largest in Europe) with around 250 000 employees and a variety of product lines and production units, to micro family businesses employing only the owner and maybe a few family members and manufacturing only one product category. According to CIAA (2006), 99 per cent of the total 282 600 companies in Europe were small and medium-sized enterprises (SMEs) with less than 250 employed and accounting for 61 per cent of the total 3.8 million employees and 48 per cent of the total €836 billion turnover in the industry.

The sector is more labour-intensive than manufacturing as a whole. However, the labour productivity varies widely by country and the disparity has increased further with the accession of new member states. Labour productivity also varies highly by size of company – the largest companies have the highest productivity.

Despite the ongoing processes of globalization of food supply chains by which supplies of raw materials, ingredients and processed products are increasingly transported and distributed over long distances, the F&D sector still has a highly dispersed localization pattern in which rural areas play an important role. Moreover, in at least ten EU countries the sector is ranked as the number one manufacturing sector in terms of turnover (CIAA, 2006) and thus plays a significant role in maintaining industrial activities throughout Europe.

3.2.2 Trends and Drivers of Change

The main drivers of change in the sector are:

- new consumer demands.
- supply chain restructuring.
- technological development.
- new regulations and policies.

New consumer demands

Consumption of food and drinks is a central element of the cultures and everyday life of people all over the world. Eating and drinking plays a decisive role in the basic social and cultural rituals, traditions and communicational patterns within families; ethnic, territorial and religious

communities; and other social groups. Markets of food and drinks products are strongly interconnected with specific needs and the occasions of customers' everyday and festive life. Despite a regular change characteristic of such consumption patterns and food cultures, overall growth in incomes and trends in societies, cultures and lifestyles are changing the demand for food and drinks. In the following, a number of consumer trends affecting food markets are briefly described.

Demographic changes The European population is expected to decrease from 455.2 million in 2005 to 431.2 million in 2050, while the share that is aged over 60 years will increase (EMCC, 2006a). This limits the potential for growth but also increases the demand for products designed to match special nutritional needs for older people.

New lifestyles and family patterns The development towards longer working hours, more leisure activities and more families with two working parents has increased the demand for semi-prepared, convenience food mainly in the form of fresh or frozen products rather than traditional dehydrated and canned food products (EMCC, 2006b). Also eating out (food services and catering) is a fast-growing market. In 2000, half of the amount spent on food in the USA was spent on eating away from home, while the share in most European countries was less than a third but growing.

Food safety Boosted by for example the BSE crisis in 1996, foot and mouth disease in 2001, and avian flu in Europe in 2006, consumers have become very aware of safety of food. For example, a 70 per cent drop in poultry consumption was seen in Italy after the avian flu in 2006.¹ Other more local safety problems are contaminated food bacteria such as salmonella, campylobacter and E. coli. The sector experiences severe mistrust from consumers, who expect industry and governments to come up with solutions.

Healthy living Consumers are increasingly concerned about problems related to obesity, nutrition, food-related diseases, and the effects on human health of genetically modified organisms (GMOs). Such concerns have increased the demand for, for instance, organic food (KPMG, 2000). Despite increased awareness of obesity and health, European consumers (compared to Americans) are still sceptical regarding GMOs and the use of biotechnology in farming and food processing (Key Note, 2004). Also regarding health issues, consumers expect industry to come up with solutions.

Sustainability Consumers are increasingly aware not only of quality of the food products as such but also of issues related to the production processes and globalization of supply chains, such as the environmental impact of production and distribution, degradation of local food cultures, animal welfare, safety, fair trade and working conditions.

Growth in niche markets Food markets are increasingly segmented and specialized in the direction of, for instance, ethnic food, organic food, vegetarian food, and local food, and this specialization trend also gives opportunities for small food producers.

Supply chain restructuring

The food supply chain consists basically of four links: (1) producers (farmers, fishermen and other suppliers); (2) processors (manufacturing industries); (3) retailers; and (4) consumers. The relationships between these four links and the dynamics and power structures that rule the actions of actors are under fundamental change (Hornibrook and Fearn 2005). According to Folkerts and Koehorst (1998), the food supply chain has been reversed from a production-driven (product push) chain with little coordination and loose relationships between the individual links, towards a market-driven (demand pull) chain with strong upstream vertical coordination mechanisms between the individual links.

One of the main factors driving this chain reversal and shifting the power balance from food processors to retailers is the ongoing concentration in the retail link, through which a relatively small number of supermarket chains have gained an immense importance in distribution and sale, and thus in the food supply chain as a whole. In 2002, supermarkets held the dominant position in sales of food, with 62 per cent of total sales in the USA and 56 per cent in Western Europe, and in most countries such sales figures are to a large extent the result of only a handful of huge retail companies. According to Millstone and Lang (2003), estimations from the UK show that half the food consumed by 57 million mouths is purchased in just 1000 stores.

The central role of supermarkets in the sale of food gives them negotiating power to influence suppliers' prices and in general to define the standards for product quality, safety and traceability, environmental impact, terms of delivery, and so on. The electronic point of sale barcode scanning system allows supermarkets to minimize their stocks and to order from suppliers only as is required and calculated on the basis of actual sales figures. Thereby supermarkets exert an enormous power over the food supply chain, which has changed from an economic system of 'selling what is produced' to one of 'producing what is sold'.

Technological development

Automation of plants and processes and new technologies are paving the way for more efficient forms of production and the development of new products. Mergers and acquisitions in the sector lead to increased investments in information and communication technology (ICT) tools to coordinate uniform data exchange across multiple production sites. Key new technologies in the sector are:

- biotechnology;
- new ICT tools for information sharing;
- e-business solutions;
- radio frequency identification;
- robotics and sensor technologies;
- nanotechnology.

Such technological development impacts on the workforce demand. The overall decrease in employment will continue in the coming years; however, some jobs will shift into services like customer services and logistics. There is increasing demand for more skilled types of labour including specialists in legislation, engineering and microbiology, and people with broader competences in reporting, communication, marketing and so on. At the lower end of the workforce there is a need for qualifications relevant to quality control and food safety.

New regulation and policies

The sector has historically been heavily embedded in national and regional agro-food policy and institutional frameworks regulating agricultural production, research and development (R&D) and innovation activities, education and training systems, working conditions, food safety control and so on. More recently, the international level of regulation has become highly important, reflecting the increasingly global character of the agro-food economic system as well as of the publicly debated problems and challenges. Relevant international regulation initiatives include:

- International trade liberalization facilitating market access, reducing export subsidies, import barriers and domestic subsidies.
- EU enlargement: for old EU states, EU enlargement means increased competition but also new markets.
- The 2004 reform of the EU Common Agricultural Policy (CAP). Policy instruments have been moved from price and production subsidies to more comprehensive farmer income support linked to

performance with respect to environmental standards, food safety, animal welfare standards, land use standards, and so on. In combination with globalization – that is, elimination of external trade barriers – this means increased competition and lower sales prices for the food industry, in particular for segments closest to agriculture such as sugar processing and dairies.

- EU and national legislation on food safety and hygiene standards are among the top issues of the political agenda, boosted by for example the BSE crisis in 1996, foot and mouth disease in 2001, and avian flu in Europe in 2006. National and EU initiatives have been launched to increase consumer confidence. They affect all links in the food supply chain, by requiring procedures to ensure that illnesses are not transmitted, food products are traceable and procedures are documented.
- EU environmental regulation regarding pollution, emission and disposal of waste, animal by-products, energy and resource savings and so on.
- EU animal welfare regulation sets requirements and standards for the breeding and transportation of living animals.
- EU certification and labelling schemes for the protection of food and drinks with a recognizable geographic origin, that is, the Protected Designation of Origin (PDO) and the Protected Geographical Indication (PGI).
- The EU LEADER programme for development and economic diversification in rural areas embodies the 'new rural policy paradigm' that is often emphasized as an important political framework supporting the emergence of 'alternative food networks' (Marsden, 1998; Marsden et al., 2000; Renting et al., 2003).

Implementation of the multifaceted range of new regulation demands in the food sector adds to costs in relation to administration and documentation as well as to investment in new equipment and adaptation of existing facilities to comply with requirements for hygiene standards, emission controls and so on. In general, large companies with administrative, technical and financial resources are better equipped than SMEs to implement the legislative requirements, while micro-firms are often exempted from regulations. Many food firms in the new EU member countries struggle to survive due to EU requirements and are subject to acquisition by Western firms. For example, according to EMCC (2006b), only 127 of 1513 meat processors in Poland in 2004 were licensed to export to the EU and no more than 1000 were expected to end up complying with EU safety regulations.

3.3 BUSINESS RESPONSES TO DRIVERS OF CHANGE

3.3.1 Emergence of New Food Production–Consumption Models

In many respects, including applied knowledge and technologies, the food sector is too diversified to describe and categorize as one homogenous type of economic activity with only one way of responding to changes in market conditions. In terms of economically important indicators like production outputs, turnover and employment, a paramount part of the food sector belongs to what is often analysed under the designation of the ‘conventional’ food industry (Sonmino and Marsden, 2006; Morgan and Murdoch, 2000; Green and Foster, 2005). However, one crucial driver of contemporary change in food markets is the so-called ‘quality turn’ of consumers in Western countries (Goodman, 2002; Goodman, 2004; Ilbery and Kneafsey, 2000; Hinrichs, 2000; Harvey et al., 2004), that has given rise to the emergence and growth of a variety of new food markets based on differentiation of the products from their mainstream, industrial ‘cousins’.

In turn, this development has provoked a discussion in the academic literature about the question of a possible paradigm shift in agro-food systems, mainly with a point of departure in the proclamation of the rise of an ‘alternative’ food production–consumption model, and mainly stemming from rural sociology and economic and cultural geography (see for instance Marsden, 1998; Murdoch et al., 2000; Watts and Goodman, 1997; Watts et al., 2005; Renting et al., 2003; Ilbery and Kneafsey, 2000; Ilbery et al., 2005; Hein et al., 2006; Hinrichs, 2000; Winter, 2003; Sonmino and Marsden, 2006).

In order to understand and describe contemporary changes in agro-food economic systems such as the ‘turn to quality’ among consumers and food businesses, a growing number of agro-food scholars apply ‘conversion theory’ (Murdoch and Miele, 2004; Murdoch et al., 2000; Ilbery and Kneafsey, 2000; Lindkvist and Sánchez, 2008). According to conversion theory, which is related to actor-network theory, supply chains of farmers, processors, retailers, consumers, public authorities, R&D organizations, and so on are considered as ‘network configurations, formed through processes of negotiation between differing entities and discursive formations’ on the basis of differing ‘repertoires of justification’ (Murdoch and Miele, 2004). Hence, conversion theory emphasizes that development, production, marketing and consumption of food is part of social and cultural discourses and interactive practices through which conventions regarding quality are constructed and justified. This, for example, could be

the specific criteria for labelling products as ‘organic’ or ‘local’. By looking at the conventions of quality that define food production and consumption systems, we are able to identify important keywords useful for specifying the categories of knowledge, technologies and learning processes prevailing in such systems.

Most scholars studying contemporary food networks seem to agree on the significance of the following quality conventions, originally suggested by Thevenot et al. (2000):

- ‘Market worth’, which evaluates worth based on the price, profitability, or commercial value of products in a competitive market.
- ‘Industrial worth’, which evaluates goods according to standards of technical efficiency and reliability.
- ‘Civic worth’, which refers to the worth of goods in terms of their general societal benefits.
- ‘Domestic worth’, which is largely based on trust and involves goods which can draw upon attachments to place and traditional modes of production.
- ‘Inspiration worth’, which refers to evaluations based on passion, emotion or creativity.
- ‘Public opinion worth’, which refers to the recognition and opinion that customers attach to trademarks, brands and packaging.
- ‘Green’ or ‘environmental worth’, which considers the general good of the collective to be dependent upon the general good of the environment.

Due to clearly identifiable differences in knowledge dynamics we will here look at three competing food production–consumption models, emphasizing different combinations of the above-listed quality conventions and with differing – though definitely not separate and contrary – knowledge and technology bases:

- ‘Industrial food’, in which the distinctive conventions of quality and competitive factors are price and efficiency and in which synthetic knowledge is decisive.
- ‘Alternative food’, in which domestic, green and inspiration qualities are crucial and in which symbolic knowledge plays a crucial role.
- ‘Functional food’, emphasizing health and nutritional effects and in which the core knowledge base is analytical.

These food models do not define non-overlapping segments of businesses and may not be useful in categorizing individual firms in all their activities

and product lines. For instance, companies like Nestlé, Unilever and Kraft rely on brands of industrial commodity products but increasingly also engage in organic ('alternative') as well as functional food markets. Rather, the suggested models represent ideal types of food production and consumption. The crucial factor lying behind the categorization is not necessarily connected with physical and tangible differences in products and productions as such, but rather with the somewhat fuzzy and socially constructed conventions of quality that are targeted in the development, production, marketing and consumption of 'industrial', 'alternative' and 'functional' food products.

The very emergence of alternative and functional food can be considered a business response to the changing production and market conditions in the sector outlined above. Alternative and functional food networks are two emerging production and business models that play rather insignificant roles in the total agro-food economy but nonetheless represent important directions for the future development of the food sector and already heavily influence the innovation efforts of mainstream, industrial producers in 'greener', 'healthier' and other directions.

In the following, the three food models are described in more detail. A particular focus is on those types of innovation efforts and responses to the drivers of change, outlined above, that characterize the models.

3.3.2 The Industrial Food Model: Characteristics and Responses to Change

Green and Foster (2005) highlight the following characteristics of the industrial food model that describe well the close relations between the production and consumption dimensions emphasized by convention theory: industrial food is based on raw materials produced by use of industrial agricultural practices exploiting advanced breeding techniques and major inputs of chemical fertilizers and pesticides, is transport-intensive, requires high-energy processing based on Fordist production technologies and organizational principles, relies on modern retailing systems and demands high-tech kitchens.

Among the different qualities that are embedded in products, price is the main distinctive quality on the basis of which industrial food products are produced, marketed and purchased.² Other qualities related to market performance and industrial efficiency, such as products' durability, safety and hygiene standard, seasonal uniformity and geographical accessibility, are important too however.

A number of factors such as increased liberalization of trade policies (not least relevant for firms closest to agriculture like sugar producers,

dairies and meat producers), increased competition from low-income countries, the growing power of supermarkets, and technological developments, all together intensify the competition among industrial producers on price factors. This in turn enhances their focus on economics of scale and increases the advantages of large-scale technologies and distribution systems. This, in turn, leads to accelerated restructuring in the form of:

- Internal rationalization and productivity raising initiatives (automation of production, optimization of logistical infrastructure, energy savings and so on).
- Acquisitions and mergers to gain economics of scale and expand markets.
- Horizontal partnerships between food processing firms for delivery of supplies to retailers.
- Outsourcing and re-localization to low-income countries to focus on core competences and cut costs.

However, industrial food is not solely produced and consumed on the basis of efficiency and price factors. According to CIAA (2006), the targets for product innovation widely recognized as central by the F&D industry (CIAA, 2006) are qualities like 'pleasure', 'taste', 'sophistication', 'exotism', 'fun' and 'convenience'; that is, sensory and/or social attraction factors.³ And in terms of product innovation, developing attraction factors such as taste, flavour, convenience and aesthetic aspects of the packaging is the main response of industrial food producers to survive in their markets.

Having said this, it must be emphasized that industrial food producers have to balance attraction factors with price and efficiency factors when deciding whether or not to introduce a new product or technology. Firms with specialized products are not to the same degree dependent on price factors and can, in the extreme case, focus one-sidedly on attraction factors.

Due to new regulative requirements and growing consumer awareness of environmental aspects of food production, 'green' conventions of quality are also increasingly important concerns for industrial food producers. These concerns are reflected in the adaptation and development of less polluting and resource-demanding processing technologies, for instance through use of new types of ingredients and additives as well as information technology (IT) and sensor systems for controlling processing. Awareness of green quality conventions are also reflected in firms' communication, public relations (PR) and marketing strategies, that increasingly put priority on specifying the raw materials and technologies

used, the efforts of reducing the environmental impact, the environment-friendly principles and values of the business, and so on.

A similar background in the need for responses to new regulation and market demands is seen in relation to safety and hygiene issues, which can be classified as a quality convention linked to industrial efficiency and the technical reliability of products. As in firms' responses to green demands from regulation and consumers, the focus of responses to safety issues is not only on isolated working tasks and processes in the individual firm, but on the whole supply chain in which it takes part. Information systems for documentation of the fulfilment of quality standards in production, storage and distribution, and the demand for traceability of foodstuff along the whole supply chain, is of central importance for EU and national safety legislation as well as for the so-called Hazard Analysis and Critical Control Point (HACCP) certification that international supermarket chains have introduced and increasingly force their suppliers to comply with (Flynn et al., 2003).

Finally, the quality convention of 'public opinion' also has increasing importance. The segmentation of markets and consumers' general mistrust in the sector due to a number of recent food scandals, as well as their growing concerns for the environment and healthy living, challenge manufacturers to adjust and dedicate their products to diverse customer groups as well as to more strategic, interactive forms of communication and PR. For this they need to develop closer contact with customers to get information on market developments and to spot trends. Among the more innovative methods of building stronger and more trust-based relations with consumers is through electronic web-dialogue, e-logistic distribution systems and, maybe more relevant for small firms, direct sales.

The most frequently used strategy to ensure consumers' loyalty and trust, especially exploited among the large multinational corporations (MNCs) that in many respects dominate industrial food production-consumption networks, is the traditional one of product brands connecting certain features of the product with certain consumer lifestyles and aspirations, by use of marketing tools such as images and positioning in advertisements. Branding is a strategy that reflects the situation of industrial food production, confronted with many complicated and multifaceted quality demands, and through which firms try to integrate a number of quality conventions such as industrial efficiency reliability, inspiration, and green and civic qualities in one brand, one logo and so on. Branding, however, can also be risky. The value of a brand can quickly erode if associated with a scandal, or just with a negative consumer trend. In such cases firms need to refocus their brand. A successful example of this is Nestlé's recent change of its brand from a baby to a nutrition focus (CIAA, 2006).

3.3.3 The Alternative Food Model: Characteristics and Responses to Change

What is here grouped in one cluster of 'alternative food' in fact consists of several types of food networks with differing main conventions of quality like, for example, organic, local, high-quality, speciality, slow food and fair-trade food. The emergence of all these strongly symbol-laden and often premium-priced types of food is subject to a huge and fast-growing body of academic literature, often using 'alternative food networks' as a common designation (for example Marsden et al., 2000; Parrott et al., 2002; Renting et al., 2003; Ilbery et al., 2005; Watts et al., 2005; Sommino and Marsden, 2006; Hein et al., 2006; Tesla and Massa, 2008).

The emerging alternative food networks represent a number of artisanal, entrepreneurial, social and territorially embedded business responses to growing public concerns about issues like environmental sustainability, health and food safety, the degeneration of territorial food cultures⁴ and the decline of traditional agro-food economies in rural areas.

Producers of alternative food respond to new customer demands through differentiating their products from mainstream food commodities by claiming to provide 'alternative' qualities. These might stem from the raw materials, the production methods, the distribution channels or the principles for trading and payment of suppliers applied by the individual company or by the whole supply chain in which it takes part. This alter-nativeness results in those specific qualities that, according to the socially constructed conventions of quality prevailing in the production-consumption networks, are defined as attractive. This could be inspiration factors like better tastes and richer eating and drinking experiences (in particular emphasized in speciality products); domestic factors like preservation of gastronomic and culinary traditions and support to local economies and supply chains (emphasized by producers of local and regional food products); green qualities such as less pollution of the environment, more animal-friendly breeding methods and healthier products (the primary focus areas of organic producers); or civic qualities such as socially fairer payment principles and economic structures (in focus for 'fair trade' networks).

Nowadays, a common feature of producers of alternative food is the abandonment or at least a reduced use of production inputs stemming from the industrial model of farming and food processing. For example, this could be no or less use of pesticides and genetically modified organisms in the growing of crops; no or less chemical additives used in processing; no 'mistrating' of natural raw materials by use of industrial process technologies as in the homogenization of milk; and so on.

Instead of standardized, generic commodity inputs from global, industrial agro-food systems, alternative producers tend to rely on – at the risk of oversimplifying the findings from a number of research case studies (see for instance Ilbery and Kneafsey, 2000; Ilbery et al., 2005; Hinrichs, 2000; Hein et al., 2006; Parrott et al., 2002; Murdoch et al., 2000; Tesla et al., 2008) – local culinary traditions and knowledge; more dedicatedly grown and processed commodities; small-scale artisanal processing technologies in which the human senses are used for surveillance and quality control; and distribution systems that are local or otherwise alternative to international supermarket retailers such as direct sales, local retailers, tourist sites and delicatessen shops – all together signalling that products are handled with human care and attention.

The terms 'alternative', 'local', 'organic', 'fair trade' and so on, as well as the ways companies differentiate themselves according to diverse definitions of 'alternativeness', are indeed ambiguous and open to symbolic meanings and values rather than based on objective, scientifically measurable criteria such as specific requirements for hygiene standards or calorie content. This ambiguity is an important part of the reasoning behind applying convention theory in explaining contemporary trends in the food sector. How to define 'organic food', 'local food', 'slow food' and so on are continuously negotiated in the social networks of farmers, processors, retailers, consumers, distributors, researchers, public authorities, politicians and so on that constitute the production-consumption system.

One of the strategies for 'fixation' of the quality convention, which can be regarded as a form of protection of intellectual property rights similar to the use of brand trademarks or patents, is setting up certification schemes and formal criteria for the achievement of such regarding particular types of products. These could be government- or industry-defined labelling schemes for organic products; EU's schemes for protection of food and drinks with a recognizable geographic origin, the Protected Designation of Origin (PDO) and the Protected Geographical Indication (PGI); or supermarkets' introduction of private label brands to guarantee, for instance, certain health, safety and environmental standards or fair trade principles.

A number of analyses (Parrott et al., 2002; Marsden et al., 2000; Ilbery et al., 2005) have found big differences throughout Europe in firms' use of EU's PDO and PGI certificates. A total of 75 per cent of products granted a PDO or PGI certification in 2001 originated in peripheral, rural areas of the Southern and Mediterranean countries of France, Italy, Portugal, Greece and Spain, while only very few firms in Northern Europe such as the UK, the Netherlands and the Nordic countries had applied for and attained certification.

Parrott et al. (2002) provide two possible explanations of the varying popularity of territorial certification schemes: cultural-institutional and structural-economical. The cultural-institutional is related to the meaning and values, primarily prevailing in Southern Europe, attached to the territory as a combination of culture, history, tradition, production process, terrain, climate and local knowledge systems, and captured by the French concept of *terroir*. The EU certification schemes derive much of their reasoning and legitimacy from this concept (Watts et al., 2005). Parrott et al. also hypothesize the existence of two contrasting European food cultures: a 'Southern' with a wealth of local and regional food specialities, and a functional, commodity-driven 'Northern'.

The structural-economical explanation highlights the different economic structures and level of industrialization of the agro-food sectors in rural areas of Southern and Northern Europe. For small and technologically less-advanced farms and food processing firms in the South the PDO and PGI schemes seem to offer attractive new market opportunities and access to urban consumers, while they represent less attractive opportunities in rural areas of Northern Europe, characterized by an industrialized, technologically advanced and volume-oriented agro-food sector as well as by less rich – or maybe rather, not primarily locally defined – culinary traditions to exploit commercially.

Many alternative food firms and networks have been innovative in exploiting new technologies like ICT and the Internet in new forms of interactive sales and distribution channels where food and drinks are purchased on the Internet by customers and delivered directly to their door. Another innovative strategy regarding distribution and sales is opening of the manufacturing site to tourists and other visitors and providing it with, for instance, a shop for direct sales, exhibition facilities and possibilities for guided tours. Thus, parts of the alternative food sector develop inspiration factors through a sector shift towards tourism and take advantage of the trend towards the increased importance of storytelling in the emerging 'experience economy'.

Alternative food producers – and especially producers of local and regional food – often emphasize the local supply and knowledge base, that is, domestic qualities. It is often stated in the rapidly growing literature on alternative food networks that these can be seen as efforts to re-establish territorially embedded food supply chains and, thus, as a relocalization countertrend to the delocalization trend in industrial food provision systems (Marsden, 1998; Winter, 2003; Morgan and Murdoch, 2000; Watts et al., 2005).

However, there are indications that alternative products are increasingly sold via conventional retail systems and that supermarket chains

are increasingly aware of the sales potential of more standardized types of alternative products like organic dairy, meat and vegetable products (Hein et al., 2006; Ilbery and Maye, 2006; Key Note, 2004; ACNielsen, 2005; Commission of the European Communities, 2004). More generally, there is increasing attention in research on alternative food networks to the question of to what extent and in which ways alternative products and productions are in fact alternative, and not just complementary to industrial food products (see for instance Sonnino and Marsden, 2006; Watts et al., 2005).

3.3.4 The Functional Food Model: Characteristics and Responses to Change

Functional food (or nutraceuticals) can be broadly classified into products naturally containing health-giving active ingredients, those fortified with extra levels to those already present, and those enriched with active ingredients not normally contained in them (Key Note, 2004).

According to Menrad (2003), in Germany functional food products have mainly been launched in markets for soft drinks, confectionary (for example chewing gum for dental hygiene), dairy, bakery, breakfast cereals, baby food and cholesterol-lowering spreads. The biggest product category on the European market for functional food is currently gut health products, in particular drink yogurts.

Compared to the artisanal, low-tech and somewhat 'return to nature' strategy employed by the diverse range of alternative food networks, functional food represents a 'forward to science' strategy. Functional food represents a science-driven model of food provision where new genomic and microbiology knowledge as well as bio- and nanotechnologies are used in the design and production of products. The critical convention of quality defining functional food markets is related to the health and nutritional effects of products, that is, specific technical functionalities of the products which can be placed under the quality convention of 'industrial worth'.

Hence, functional food does not entail a total break with the industrial food model (Menrad, 2003). On the contrary, as noted by Green and Foster (2005), functional food 'is still based on high outputs in agriculture and processing within internationally-organised production and trade'.

The importance of economics of scale factors (industrial efficiency) is clearly mirrored in the fact that the companies driving the emergence of functional foods to a large extent are large MNCs such as Unilever, Nestlé, Danone, Kellogg, Novartis and Quaker Oats, or national category leaders within, for instance, the dairy or ingredient sectors. Such companies have the needed financial resources, the R&D departments and the in-house expertise in nutrition and food technology to accomplish the long

and demanding process of developing and marketing functional foods. According to Menrad (2003), the costs of product development and marketing of functional foods far exceed the costs related to the development and marketing of traditional food products. In addition to product development there are often huge costs and long-lasting procedures related to achieving proof of the efficacy of functional food through clinical tests such as intervention studies with high numbers of consumers or patients.

Besides qualities related to product functionality and industrial efficiency, green quality conventions related to environmental sustainability are also important for the emergence of functional food; however, interpreted and followed very differently compared to alternative food networks. The functional food model takes seriously the criticisms of the environmentally destructive nature of modern high-productivity agriculture, and claims to solve environmental and human health problems by using new genomic knowledge and 'smart' biotechnologies with less negative environmental side-effects.

Contrary to the alternative food model, however, the claim of green qualities and promotion of environmental sustainability seems to cause problems rather than growth potential. Consumers, particularly in Europe (Menrad, 2003; ACNielsen, 2005; EMCC, 2006a; Gehlhar and Regmi, 2005), generally have a negative view of the use of genetically modified crops and ingredients in the agro-food sector (while they are positive in relation to their use in the production of pharmaceutical products) and have fears about their effects on nature as well as on humans.

This situation means that winning bigger market shares might be an uphill struggle for functional food producers, and that public opinion and marketing initiatives will be crucially important. Contrary to alternative food products, which often seem to carry 'symbolic capital' in terms of green, inspiration and domestic qualities positively evaluated by major consumer segments, functional food needs targeted and strategic public information and marketing campaigns to gain a positive evaluation among consumers. Opinion leaders in the field of health and nutrition issues like medical doctors, dieticians and other nutritional advisors are a major target group for such campaigns (Menrad, 2003). On the other hand, the trends towards healthy living and the demographic development towards more aged people are in favour of functional food.

Finally, maybe unexpectedly considering the emphasis of functional food on their technical functionality in terms of health benefits, several studies indicate (for example Key Note, 2004; Menrad, 2003) that inspiration quality factors like taste, flavour, convenience and packaging are also important for consumers of functional food.

Table 3.1 sums up the main characteristics of the three models of

Table 3.1 Characteristics of food production-consumption models

	Industrial	Alternative	Functional
Quality conventions	<ul style="list-style-type: none"> • Price/profitability • Industrial efficiency (e.g. safety, durability, accessibility) • Inspiration (taste, convenience) • Brand (public opinion) 	<ul style="list-style-type: none"> • Domestic (gastronomy, culinary heritage, traditional production methods) • Green • Inspiration (taste, eating experience) 	<ul style="list-style-type: none"> • Industrial efficiency and functionality in terms of health, well-being and nutrition • Green/sustainability • Inspiration (taste, convenience)
Drivers of change	<ul style="list-style-type: none"> • Increased price competition • New customer demands (safety, green, convenience) • Supermarkets growing power • Regulation (safety, environment, working conditions) 	<ul style="list-style-type: none"> • New customer demands/market opportunities • Regulation (new rural development policy) 	<ul style="list-style-type: none"> • New bioscience and biotechnologies • New customer demands/market opportunities
Responses	<ul style="list-style-type: none"> • Improvement of efficiency (profitability, safety, organizational restructuring) • Environmental initiatives • Targeted marketing, branding, communication • Creating inspiration 	<ul style="list-style-type: none"> • Creating inspiration factors (taste, freshness, tourism-related) • Creating domestic factors (artisanal methods, local gastronomic traditions) • Development of green factors 	<ul style="list-style-type: none"> • Improvement of technical functionality of products • Improvement of efficiency of technologies

Table 3.1 (continued)

	Industrial	Alternative	Functional
Responses	<ul style="list-style-type: none"> • factors (taste, convenience) 	<ul style="list-style-type: none"> • Marketing and public opinion initiatives (certification of products, close consumer relations, dedicated sales and distribution systems, storytelling) 	
Dominating type of firms	<ul style="list-style-type: none"> • MNCs • Traditional SMEs 	<ul style="list-style-type: none"> • Entrepreneurial micro-firms 	<ul style="list-style-type: none"> • MNCs • Science-driven SMEs
Core technologies	<ul style="list-style-type: none"> • Large-scale industrial process systems • ICT systems (control, documentation, management, logistics etc.) 	<ul style="list-style-type: none"> • Small-scale artisan technologies • Local production methods • Internet communication and distribution systems 	<ul style="list-style-type: none"> • Biotechnology (outsourced to suppliers) • Large-scale industrial processing systems
Spatial organization	<ul style="list-style-type: none"> • Global, dispersed location 	<ul style="list-style-type: none"> • Rural networks 	<ul style="list-style-type: none"> • Urban clusters
Regulation and policy framework	<ul style="list-style-type: none"> • Liberalization of world trade • Protectionism (EU CAP and national agricultural policy) • EU legislation on food safety and environment 	<ul style="list-style-type: none"> • New EU rural policy (CAP reforms and LEADER from sector to territory focus, geographical and organic certification schemes) 	<ul style="list-style-type: none"> • Public health and obesity campaigns • Legislation and public debates on gene technologies and DNA patents

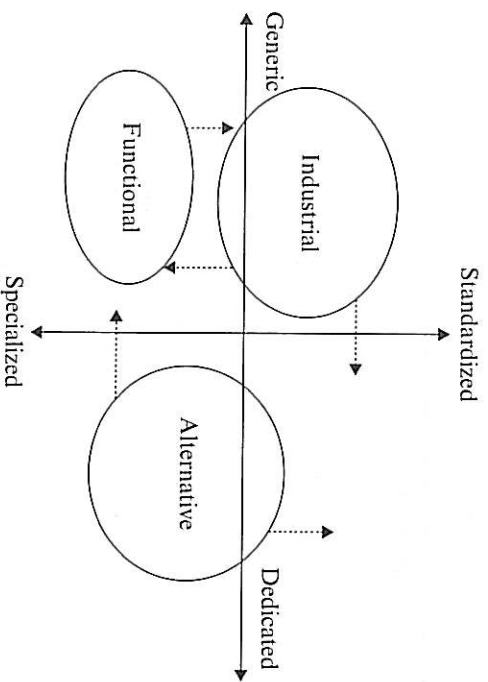


Figure 3.1 The three food production–consumption models and main directions of innovation placed in ‘worlds of production’ of Storper and Salais (1997)

industrial, alternative and functional food, including their typical strategic responses to overall changes in food markets.

In Figure 3.1, the three food production–consumption models are represented in the framework of Storper and Salais (1997), described in Chapter 1 of this book. The arrows indicate directions of main innovation efforts as responses to customer needs and show how the three models tend to ‘inspire’ each other. As an example, the large international Danish brewery, Carlsberg, recently opened a high-quality microbrewery and visitor centre, Jacobsen Brewhouse, in order to regain the market shares lost on the domestic market to the many microbreweries emerging in Denmark.⁵ In the alternative food model, innovation efforts are carried out to standardize products and technologies without losing the dedicated product qualities which differentiate them from mainstream products (for instance via certification), that is, entering the standardized-dedicated ‘market worlds of production’. Other development efforts within the alternative food industry are directed towards market expansion via developing more generic products. This strategy implies broadening of customer bases and sales through larger-scale distribution channels like supermarket chains. In the long run this might compromise the dedicated product profile that initially was the competitive advantage of most alternative producers.

3.4 KNOWLEDGE DYNAMICS

In this section we will look more systematically at the knowledge characteristics and knowledge dynamics prevailing in the F&D sector. As described in the previous section, the three models of industrial, alternative and functional food emphasize different combinations of quality conventions and this has implications for the categories of knowledge searched for, developed and applied.

3.4.1 Analytical Knowledge

An early embryonic food innovation system developed in the nineteenth century on the basis of analytical types of knowledge explored within chemistry, thermodynamics, physics, plant biology, pharmacy and medicine. These bricks of analytical knowledge were exploited in the development of those industrial agricultural and processing technologies and machine systems that are today considered mature and standard. In the decades after the Second World War the knowledge dynamics in the agro-food sector were primarily related to the optimization and diffusion of well-known technologies and Fordist production principles (Green and Foster, 2005). Today, exploration of analytical knowledge plays a less important role in the R&D efforts of the food sector.

However, some changes towards science-driven knowledge dynamics and technological innovation have occurred recently. One of these changes is caused by the introduction of bioscience and genomic knowledge in the development of new agricultural, ingredient and food processing technologies. This analytical category of knowledge allows development of, for instance, new seed types through both genetic engineering and traditional breeding methods, enhanced by a better understanding of crops’ molecular biology.

This new bioscience analytical knowledge is driving the emergence of the functional food sector. Through in-house R&D or partnership research with universities or biotech firms, mainly large food companies engage in exploration and codification of new bioscience knowledge as well as in examination of product possibilities and market potential (innovation of new products, technologies and ingredients). After a complicated process of testing and qualifying new products to market entrance, the resulting knowledge is exploited and applied in large-scale processing and distribution systems.

The future prospects of examination and exploitation of bioscience analytical knowledge are widespread for major parts of the agro-food sector, not least for what we here designate as the industrial food model. While

the technical and certification features of the more pragmatic parts of the 'organic' strategy could incorporate a bioscience-driven strategy, this is however not the case regarding the 'bio-regionalist' parts of the organic movement.

3.4.2 Synthetic Knowledge

The manufacturing processes in the sector are performed mainly by use of traditional chemical and mechanical technologies through which agricultural raw materials and commodities are processed into food or drinks for household consumption or into semi-manufactured goods for use in other parts of the sector. The knowledge used is practice-oriented, combining disciplines such as chemistry, biology, physics, pharmacy and engineering, and applying different sorts of industry-specific technical knowledge.

Due to the increasing challenges concerning environmental effects, obesity and fatness, public healthcare costs, safety, and so on, the focus of food research and educational systems has been broadened since 1980 to cover not only manufacturing processing but also the whole food chain from 'soil to table' (ATV, 2003). As an effect, public and private food research of today also engages in social sciences and humanities, for instance regarding social and cultural phenomena and changes. Still, natural science and technical research are principal and dominant, not least in terms of expenditures and number of researchers as illustrated by Menrad (2004) in a study on the German food research system.

Development of basic food manufacturing technologies mainly consists in incremental innovations that optimize the efficiency and reliability, not least in terms of increasing economies of scale and decreasing inputs of labour. These innovations are primarily accomplished through knowledge examination and exploitation in the form of in-house R&D of mainly large companies within the industrial model, as well as R&D activities of private industry research centres and public agro-food universities, R&D centres, consultancy and control institutions and so on. From these often very large private and public research organizations, new innovations diffuse into the sector through imitation, adaptation and knowledge transfer systems.

The relevance and use of such synthetic types of engineering knowledge is typical to the industrial model but is also crucial for the alternative and functional food industry. For instance, the development and local adaptation of modern organic production methods relies on the examination and combination of diverse forms of synthetic knowledge.

3.4.3 Symbolic Knowledge

Although certainly not always consciously acknowledged and professionally exploited by individual firms, symbolic type of knowledge has fundamental and widespread importance in the food sector, for instance related to creation of inspiration qualities. Cooking encompasses a clear element of artistic activity where tacit and codified knowledge about raw materials and processing techniques are combined in preparing food with, for example, an 'appetising appearance', a 'delicate taste', a 'crispy texture' and a 'bright flavour'. Description of foods and drinks is usually equipped with a huge vocabulary of associative and value-laden words and expressions, wine being the ultimate case. Also the importance of chemical additives in giving food or drinks a more attractive colour, texture or flavour is an indication of the value of symbolic knowledge. Without tacit or codified symbolic knowledge a producer of food or beverages would not survive in the market in the longer run. This is the case for industrial, alternative and functional producers, but is absolutely crucial for alternative food businesses for whom the opportunities of selling premium-priced products are connected with certain perceived product qualities additional to similar standard products.

This indicates the interconnectedness of knowledge of producers and consumers. By consuming and preparing food and drinks, consumers achieve the tacit knowledge needed to evaluate their qualities. And by consumers' purchasing of particular products and not others, producers achieve information about consumers' tastes. Yet, pure sales figures only provide limited and often rather superficial information and codified knowledge about consumers' actual preferences. Closer contacts with consumers, such as face-to-face meetings, are needed for successful product innovation. Participation in trade fairs as well as diverse forms of market research methods can facilitate such meetings and provide invaluable inputs to innovation of products, markets and distribution.

At a more general level, Asheim et al. (2006) emphasize the central importance of 'buzzing' for creation of symbolic knowledge; that is, learning through social interaction in professional communities, learning from youth and street culture or 'fine' culture and interaction with 'border' professional communities. Knowledge about food and drinks indeed seems to be an excellent example of this. Private dinners, restaurant visits, shopping, social parties and celebrations, dialogue with customers and suppliers at fairs, professional interaction and networking, and so on, are all part of food and drinks producers' provision of symbolic knowledge.

Symbolic knowledge is needed not only in the development of food

and drinks products but also in the packaging, marketing and advertising of products and, more generally, in communication and public relations with customers, suppliers and other stakeholders. The recent emergence and growth of food products, marketed and branded with designations like alternative, local, high-quality, organic, functional, fair, fast, slow, discount, and so on, is an indication of food and drinks products' increasingly symbol-laden dimension that firms need to target and hit very precisely in advertising and communication. Business consultancy firms are crucial complicit actors in developing communication, marketing and advertising strategies of major parts of the sector. The main characteristics of knowledge in the F&D sector are indicated in Table 3.2.

3.5 CONCLUSIONS

This study has outlined the overall structural features, the main drivers of change, the corresponding typical firm and network responses, and the basic characteristics of knowledge dynamics prevailing in the F&D sector. The analysis has illustrated that despite its mature and traditional character, the sector is experiencing thorough processes of change due to a number of reasons, such as new consumer demands, globalization, the growing power of retailers in the supply chains, technological development and the introduction of new safety and environmental regulation. As responses to changing markets and competition conditions, new 'alternative' and 'functional' business models are emerging in competition with the mainstream 'industrial' food model. The three food provision models emphasize different conventions of food quality, and hence have different knowledge bases and dynamics.

The study has illustrated that the sector encompasses a multifaceted spectrum of knowledge dynamics including:

- Laboratory-based exploration and codification of advanced types of analytical, bioscience knowledge.
- Plant-floor examination and testing of synthetic knowledge on new manufacturing equipment and methods that are more friendly to the environment and safer for workers and consumers.
- Socially and culturally mediated exploitation of symbolic knowledge of local culinary traditions in the development of new products and distribution channels appealing to the ever more demanding consumers.

Table 3.2 Knowledge characteristics of food production-consumption models

	Industrial food	Alternative food	Functional food
Core knowledge category	Synthetic (Synthetic)	Symbolic (Synthetic)	Analytical (Synthetic)
Important knowledge dynamics	<ul style="list-style-type: none"> ● Exploitation of synthetic knowledge (productivity rising initiatives) ● Exploitation of symbolic knowledge (product development & marketing) ● Examination of synthetic knowledge in development of regulation) 	<ul style="list-style-type: none"> ● Examination and exploitation of symbolic knowledge in product development & marketing ● Exploitation of synthetic knowledge on artisanal production technologies ● Examination and exploitation of synthetic knowledge in development of modern 'alternative' production systems 	<ul style="list-style-type: none"> ● Exploration of analytical knowledge (codification of bioscience) ● Examination of analytical knowledge (potentials and feasibility of biotech) ● Exploitation of synthetic knowledge on industrial production systems
Learning methods	<ul style="list-style-type: none"> ● In-house R&D ● Public R&D transfer ● Interaction with up- and downstream partners 	<ul style="list-style-type: none"> ● Local networking ● Public R&D transfer ● Dialogue with consumers 	<ul style="list-style-type: none"> ● University-science partnerships ● In-house R&D
External sources for knowledge	<ul style="list-style-type: none"> ● Supermarkets ● Technology suppliers ● Public/semi-public institutions (R&D, consultancy and control) ● Marketing consultants 	<ul style="list-style-type: none"> ● Network partners (horizontal/vertical) ● Customers (e.g. tourists) 	<ul style="list-style-type: none"> ● Universities and research institutions ● Ingredient suppliers

NOTES

1. Confederazione Italiana Agricoltori at <http://www.meatprocess.com/news/ng.asp?id=65866>.
2. As pointed out by DEFRA (2006), from the point of view of consumers' purchasing it is maybe more correct to say value for money instead of price.
3. As noted by Murdoch and Miele (2004), the importance of inspiration and attraction factors in industrial food, as well as the social equality advantage connected with their affordable prices, is often neglected in Marxist political economy analyses of agro-food systems that analyse and explain the popularity of industrial food by use of concepts like 'fetishism' and 'alienation'.
4. For example, the 'slow food' movement started in Italy in 1986 as a response to the opening of the first McDonald's restaurant in Rome, which was seen as a threat to traditional Italian eating habits (Murdoch and Miele, 2004).
5. See <http://www.jacobsen.com/core.html>.

4. Comparative analysis of selected European biotechnology platforms

**Philip Cooke, Carla De Laurentis,
Robert Kaiser and Michael Liecke**

4.1 INTRODUCTION

In this chapter a new knowledge-based theorization of economic geography is worked out, utilizing a variety of economic indicators regarding the medical biotechnology sector and bioscientific knowledge metrics. It will be shown that biotechnology has proved something of a pioneer sector that other industries emulate for its innovative industry organization. The medical biotechnology sector is only one of the bioscientific 'family' that together account for a significant share of gross domestic product (GDP) in the advanced countries, and a growing share in countries like India and China. Agro-food biotechnology has another significant share of many national GDP accounts, while environmental and energy biotechnology are of rising importance. Within such sectors, subsectors like bioprocessing,¹ bioengineering, bioinformatics, bioimaging and so on are also growing in significance in certain regional economies. It is a science-driven, knowledge-intensive and widely applicable group of interacting platforms that are already evolving certain pervasive characteristics for different functions, including health and safety testing and standardization (bioanalysis), civil and military security (DNA fingerprinting, biometrics) and applications in mechanical, electronic and civil engineering (nanobiotechnology), rather as information and communication technology (ICT) became pervasive during the 1990s.

To that extent they have the character of platform technologies and even general-purpose technologies (GPTs) as discussed by *inter alia* Helpman (1998). Traditional natural resource-based theories in economic geography explained the microeconomics of agglomerative economic activity relatively well. However, knowledge-based economic growth is less easy to explain and predict, although there are some aspects of knowledge economy agglomerations that are less uncertain than others. Thus this

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Development and branding of 'regional food' of Bornholm

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Content

1	Description of the TKD and the related FKDs.....	3
1.1.	Understanding the technical, social (including gender) and territorial dimensions of TKD 1	3
1.1.1	General description of the TKD and of the economic and social stakes around it.....	3
1.1.2	The topics, social actors, forms of learning, and spatial dimensions of the TKD	7
1.2.	The TKD and regional policies	22
1.2.1	LEADER.....	22
1.2.2	Other EU policies	25
1.2.3	Policies based on regional and state level interaction	26
1.3	The TKD and research hypotheses.....	27
1.4	Understanding the related FKDs	29
1.4.1	General synthesis of FKD1 and its relation to the TKD	29
1.4.2	Confrontation of FKD1 to EURODITE research hypothesis	31
1.4.3	General synthesis of FKD2 and its relation to the TKD	32
1.4.4	Confrontation of FKD2 to EURODITE research hypothesis	33
1.4.5	General synthesis of FKD3 and its relation to the TKD	33
1.4.6	Confrontation of the FKD3 to EURODITE research hypotheses	35
2.	Possible future stakes about the TKDs in their (regional and broader) context.....	36
2.1	The observed KDs and the regional context.....	36
2.2	The KDs and sectoral dynamics	38
2.3	The relations to other places, to other geographical scales and within a more mobile world	40
2.4	Suggested adaptation of regional policies	41
2.5	Synthetic findings about gender issues	43
3.	General conclusions	45
3.1	Combinatorial versus cumulative KDs, territorial relations, mobility and anchoring	45
3.1.1	Generation vs. use of knowledge	45
3.1.2	Proximity vs. distance knowledge interactions	46
3.1.3	Mobility and anchoring	47
3.2	Confrontation to existing theories	48
3.3	Specific conclusions for the region	49
	References.....	50
	Literature	50
	Interviews (WP5 and WP6).....	53

1 Description of the TKD and the related FKDs

1.1. Understanding the technical, social (including gender) and territorial dimensions of TKD 1

1.1.1. General description of the TKD and of the economic and social stakes around it

The TKD concerns the last two decades of restructuring and change of the food economy and food governance systems on the Danish island of Bornholm. On the background of dramatic overall employment decline in the food industry and related agricultural and fishing supply chains, about 40 new firms have been established with productions of specialised food and beverage products. Despite big differences regarding products, technologies and business models, a common characteristic is the use of the Bornholm origin of production as a factor causing or adding to the quality of the product as well as a common dependence on the place brand of Bornholm, the result of many years as a significant tourism destination in Denmark.

In a Danish development context lacking traditions and articulated consumer demands for food with a regional identity, this development has been pioneering. Until recently the food industry sector on Bornholm was heavily dominated by large-scale industrial processing of local fishery and agricultural supplies into standardized, often semi-fabricated products that were exported out of the island for further processing elsewhere. This type of standardised food production as well as the fishing and agricultural supplies still exist on Bornholm (as indicated in Table 1) however, the sector has experienced a dramatic employment decline due to structural and technological changes, increased and continuous globalisation, mergers and concentration, productivity initiatives, etc. Hence, despite of creation of about 200 jobs in new small food productions, overall employment in the Bornholm food industry has diminished from more than 2000 jobs to about 900 in the period 1991-2007. Also agriculture and fishing are marked by steady employment decline and structural change towards fewer firms.

In the start of the 1990'ies, beside the large-scale industrial processors of standardized products, only a few small and medium sized producers of specialty food (cheese, smoked and canned fish products, crackers, grain mill products, breads, etc.) existed on Bornholm. Many of these still exist and are listed below. These producers had well-established brands on national and international consumer markets. However, their marketing did not focus on their Bornholm origin but rather on tangible product qualities and their portfolio of products did not form a distinct Bornholm culinary heritage¹. Rather the firms were small and medium-sized individually operating niche producers, each specialized within a highly varying group of foods.

¹ Interview 19.08.08 with Lars Arnt, purchaser in Inco, a leading wholesaler company in Copenhagen.

Also the new Bornholm food products consist of varied specialty versions of generic categories of food such as cooking oil, sausages, beer, wine, chocolate, and ice cream. Hence, in a Danish food industrial context, the novelty of Bornholm food is not connected with the tangible products as such but with the marketing of these as 'regional'. Although similar developments regarding small-scale quality food are identifiable in other locations in Denmark (Manniche 2008), the varying new food products on Bornholm have been successfully exposed collectively on national consumer markets due to targeted place-branding efforts whereby Bornholm has become the leading Danish region for regional food².

The majority of new firms have less than five employees, use artisanal production methods and to a large extent, sometimes exclusively, rely on direct sales and on creation of experiences for the visiting customers, for instance by opening their production so that visitors can see how products are made. These firms depend heavily on the more than 700.000 annual tourists on the island, obviously most of them during the summer. Another group of new firms are classical manufacturers who recently have followed in the footsteps of the before mentioned group of old Bornholm niche food producers and successfully have entered national consumer markets. This group uses more conventional industrial production equipment and distributes main parts of their specialised products via wholesalers and supermarket chains.

Examples of firms in the two groups are listed in the below tables. It should be mentioned that some of the firms placed in the table of 'distribution via retail', such as Svaneke Bryghus and Svaneke Is, also have direct sales from the place of production, and that most of the firms listed as relying on 'Direct sales' also to some extent distribute their products via retailers.

Examples of Bornholm food producers relying on distribution via retail/wholesale

Name	Products	Number of employees	Year of establishment
Johannes Dam & Son	Crackers	10	1855
Bornholms A/S	Canned fish products	60	1915
Bornholm Valsemølle	Grain mill products	6	1920
Sct. Clements	Specialty cheeses and dairy products	68	1950
Bornpoultry	Poultry products	60	1997
Svaneke Bryghus	Beers and soda drinks	12	1999
Kjaerstrup Chocolate By Hand	Chocolate	10	1999
Lehnsgaard Rapeseed Oil ³	Cooking oil	6	2003
Svaneke Is	Ice cream	No data	2007

² Interview 19.08.08 with Lars Arnt, purchaser in INCO, a leading wholesaler of food and beverages to Danish restaurants, caterers and butcher shops, located in Copenhagen.

³ This firm is studied in FKD1.

Examples of Bornholm food producers relying on direct sale to tourists and locals

Name	Products	Number of employees	Year of establishment
Boisen Icecream	Italian ice cream made on local milk and fruits	2	1988
Hallegaard	Farm shop with homemade meat products	4	1989
Svaneke Bolcher	Candies	No data	1995
Røgeriet i Svaneke	Smoked fish	No data	1995
Den Gamle Skole	Honey	2	1999
Lille Gadegaard ⁴	Vineyard (berry & grape wines, distilled products)	6	2001
Karamel Kompagniet	Caramels	No data	2004

The TKD is defined as starting in the middle of the beginning of the 1990'ies with a few niche food producers who operated on their own and did not specifically use the Bornholm origin in their marketing; and developing into the state of the new food sector on Bornholm today, characterised by a number of firms that produce Bornholm food, which is marketed as regional specialities, where regional networking among firms and regional development agents has been established and a sector-crossing “cluster” for Bornholm food and culinary heritage has emerged. Because of the peripheral conditions of Bornholm, this regional food “cluster” does not have the gravity of typical clusters in the Porterian sense but is a peripheral micro version, however with sufficient impetus to not only affect regional development but also export the concept of regional food to other regions in Denmark. At the core of the cluster are the 19 food processing firms who are members of the Bornholm division of the network association Regional Culinary Heritage (RCH) - a European, interregional association established in 1995⁵. These firms have roughly 400 fulltime employees (2008)⁶. Among the in all 32 Bornholm members of RCH are also 9 restaurants, cafes and caterers, 2 delicatessen shops and 2 public agents. In 2005 the retail oriented producers established another network association, Gourmet Bornholm⁷, in order to start more formalised cooperation on marketing and business development. This organisation is in 2009 very active, has 13 members and is working toward developing a common marketing and distribution platform.

Also private and public support functions have emerged and diversified. Different sorts of business consultancy firms primarily within marketing (KIBSs) and new wholesalers and distributors have been established

⁴ This firm is studied in FKD2.

⁵ See also: <http://www.culinary-heritage.com/>.

⁶ Some of the in total 59 Bornholm firms (2008), statistically belonging to the food and drinks industry, do not count themselves as part of the Bornholm food cluster and do not take part in regional networking. This includes some of the new micro firms as well as the two largest industrial firms. One of these is the multinational fish processing company, Espersen A/S, which in recent years has outsourced most of its activities to low-cost East-European countries but still has a production unit and its headquarters on Bornholm with about 200 employees. The other is the production unit with 230 employees of the large multinational meat processing company Danish Crown with headquarters in Jutland, Denmark. The innovation activities of Danish Crown concerning the developing a specialized Bornholm pork meat production is the focus of our FKD3.

⁷ <http://www.gourmetbornholm.com/> supplemented by interview with Hans Hansen, owner of Lehnsgaard Oil, Georg Julin, Food Ambassador Bornholm, and Tim Stender, owner of Svaneke Bryghus.

supplying the food producers with services and expertise. From a starting point with just a few public sector consultants personally engaged in the issue of rural development, important elements of a regional governance system for promotion of small-scale food productions has been developed and integrated in regional policies and institutions.

The territorial level actors and networks that have played central roles, have been the formation of the Regional Culinary Heritage network, the establishment of a regional food ambassador function as well as a Food Development Centre, including a regional showroom for Bornholm food; and finally, the formation of the business network Gourmet Bornholm, mentioned above.

Table 1 presents some basic statistical data about different agro-food sectors on Bornholm. It should be noted that the figures show net results of decline in certain parts of the sectors and growth in other parts. Due to the heavy decline particularly in standardised manufacturing activities in the investigated period, the overall picture does not give a precise indication about the emerging new productions of regional food.

Table 1. Basic characteristics of agro-food sectors on Bornholm

	Fishing	Agriculture	Manufacturing of fish products	Manufacturing of other food and drinks	Manufacturing firms with less than 15 employees 1)
Number of workplaces 2005	118	457	12	39	43
Number of workplaces created 2000-05	-36	-128	-8	5	-1
Full-time jobs 2005	95	239	292	512	201
Number of jobs created 2000-05	-60	-54	-360	41	21
Turn-over 2005 (mil. DKK)	173	852	1.161	1.074	316
Growth in turn-over 2000-05 (%)	-18,4	12,2	-10,3	49,5	56,6

Source: Statistics Denmark.

1) The firms in this group, in which almost all the newly established regional food producers belongs, are included also among 'Manufacturing of fish products' or 'Manufacturing of other food and drinks'.

As appears from these statistical data, this TKD case study has not been selected for reasons related to results in job creation and economic growth that are remarkable in a comparison with other sectors and regions. However, the TKD is considered highly typical of processes of change in contemporary agro-food systems and markets in many Western countries. Additionally, the case study offers a perspective on territorial knowledge dynamics related to economic development and innovation in a peripheral region, especially one where tourism plays a major role in the economic set-up of the region. This means that the knowledge dynamics are affected by peripheral socioeconomic characteristics such as dominance of traditional low-tech economic sectors and micro-firms, weak institutional systems for research and education, low levels of education, depopulation etc. With only 43.000 inhabitants Bornholm surely is too small for specialized types of higher education and vocational institutions for food related activities, especially because the regional food productions diverge in many directions. Thus, the only educational programs relating to food production on Bornholm at the moment are basic vocational education degrees on cooking,

catering and nutrition, primarily educating and training staff for the regional tourism industry and public catering companies.

The TKD of developing a production, marketing and promotion platform for Bornholm foods and drinks encompasses a number of related knowledge dynamics, crossing a variety of knowledge contexts and economic sectors and involving elements of political and social discourse setting. Rather than science-driven creation of fundamentally new knowledge and technologies, the TKD involves social dynamics of adopting, contextualising and exploiting production and marketing knowledge originating from elsewhere. However the TKD also involves crucial elements of regional interaction among the food producers and between the food sector and other sectors such as tourism, restaurants, arts & crafts businesses.

Among the numerous topics that have been central for the territorial knowledge dynamics of creating a regional food platform on Bornholm, the following four have been particularly critical:

- Development of Bornholm food and drinks
- Territorial-level cooperation and Culinary Heritage
- Developing the experience economy in the food sector on Bornholm
- Place-branding of Bornholm food

In the following paragraph (an amalgamation of 1.1.2-1.1.4 of the EURODITE WP5 template) we will describe these topics for knowledge creation in more details and, in connection with this, investigate the important social actors, forms of interaction and learning, and territorial dimensions (the what, who, how and where).

1.1.2. The topics, social actors, forms of learning, and spatial dimensions of the TKD

Development of Bornholm foods and drinks

The food firms on Bornholm which have emerged since the start of the 1990'ies are among the pioneers in a trend in parts of the Danish (and international) food industry; a trend and innovative process which is expressed in strategies of small-scale, specialised food products, which emphasize differing quality definitions such as 'gourmet', 'artisanal', 'organic' and 'regional identity'. It is important to recall the historical point of departure in the mid-nineties in a context of 'productivism'⁸ in which the Danish agro-food economy including agriculture, processing, distribution, wholesale and retail, marketing, R&D, governance and regulation, consumption, etc. was heavily dominated by principles of standardisation, price, scale and efficiency factors including more functional and technical demands regarding hygiene, safety, health etc.

Accordingly, the studied process was initiated due to the normative, idealistic motivations of a few entrepreneurs and rural development actors, who wished to create new ways of producing and consuming food,

⁸ See for instance Goodman 2002 and Goodman 2004 for analyses and discussions of the 'productivist' elements of conventional food systems.

'alternative' to the dominant industrial food production-consumption model in Denmark. This was encouraged by new discourses in society and culture, driven by mainly urban consumers and expressed through a growing attention in the media (TV, radio, and women's-, lifestyle- and tourism- magazines) on food as a social and cultural identity-marker and on certain critical aspects of global conventional food systems related to the environment, to safety and health issues and to processes of cultural homogenisation. One of the actors contributing to the staging on Bornholm of an 'alternative' discourse regarding food production and rural development put it this way:

"It was the hope of the idealists to create diversity: to show more love in the handling of foodstuffs and to create hope regarding the development of rural areas. We are up against mainstream agriculture, drumming off with large multinational food industries in front. We see still fewer actors in farming and food manufacturing, and the remaining become larger and larger. These are reactions against this boring world." Jørgen Hammer, chairman of the board of the Bornholm Local Action Group and chairman for the Bornholm Association of Village Citizen's Societies (Sammenslutningen af Borgerforeninger), interview March 24 2009.

The idea to create alternative food on Bornholm was inspired by artisanal food production and marketing traditions in other, mainly Southern European countries but also small-scale food production and farm shops in rural Sweden were a source of inspiration. Whilst regional food traditions in Southern Europe are well-renowned and described through mainstream media such as women and lifestyle magazines and television programs, knowledge about regional rural specialties in Sweden was developed through networking between rural development actors in Scandia and on Bornholm supported via the EU program INTERREG (see paragraph 1.2). Bornholm (and Denmark in general) has weak traditions, compared to for instance Southern European countries, for regional culinary heritage, i.e. traditional food and drinks specific for certain parts of the country.

In the start of the 1990'ies, side by side with a number of large-scale industrial processors of highly standardized products, only a few small and medium sized producers of specialty food existed on Bornholm. Many of these still exist and are listed above. These producers had well-established brands on national and international consumer markets. However, according to Lars Arnt, purchaser in Inco, a leading wholesaler company in Copenhagen, their marketing did not focus on the Bornholm origin but rather on tangible product qualities and so, their portfolio of products did not form a distinct Bornholm culinary heritage. Rather the firms were small and medium-sized individually operating niche producers, specialized on highly varying sorts of foods.

Despite the lack of comprehensive regional food traditions on Bornholm to exploit commercially, including a common basis of knowledge about distinct product and technology fields, the territorial dimension was from start central in the regional thoughts about possible definitions of 'alternative food'. Due to the economic and social problems connected with the decline in the regional conventional agro-food economy, an important entrepreneurial motivation for starting new food productions was to contribute to the economic and social development of Bornholm as a rural area and community. A good example of this is provided in one of the firm-level case studies (FKD2).

However, the lack of regional food traditions meant that the ideas for concrete food products on which to establish productions, as well as the process of realizing such ideas, relied on the innovativeness of individual (overwhelmingly male) entrepreneurs. Excepting a number of diverse smoked fish products, these ideas did not tap back into old food traditions by replicating certain authentic regional products or recipes. Rather they connected to new international cooking concepts of 'fusion cuisine'; they eclectically selected categories of products, the origin of which are not necessarily regional, and provided them with a territorial dimension and interpretation by framing them in a new, contemporary storytelling about the region or the place of production, as is described later.

Accordingly, the 'picnic basket' of varying specialty versions of generic categories of food and drinks, like beer, wine, cheese, lamb meat, sausages, smoked fish, cooking oil, chocolate, ice cream etc. that today defines Bornholm food, is the result of independent knowledge adoption and learning-by-doing processes at the level of individual firms, who independently involve and interact with external actors. Product development in the new Bornholm food niche has primarily been carried out by the individual entrepreneurs - often with no specific educational and professional background regarding the targeted product category - who initially searched for codified, primarily artisanal knowledge and technologies originating from outside the region, and then applied this knowledge through practical processes of learning-by-doing and adaptation to the Bornholm production and market conditions. The feasibility of creating a successful business through such knowledge dynamics reflects the easy conditions for market entry on contemporary Danish food markets: initial demands of capital and other resources are relatively low; the demands for specialty products is unmet by other producers; and in general there are favorable opportunities for 'gap-filling' business strategies (Dahmén 1988, Shaw & Williams 1990).

The external knowledge which firms obtained through consultants pertains to professional networks organized around specific food products and technologies, thus differing for individual firms. In a few cases concerning the development of product types not usually produced in Denmark, codified (but free and not protected by patents), mobile, synthetic product and technology knowledge has been searched for and provided through international, geographically wide-ranging networks and information channels such as the internet, competitors, industry associations, technology suppliers etc. One example of this is the wine producer studied in the FKD2, and another is a producer of Italian ice-cream who bought his production equipment in Italy and provided knowledge through the Italian technology supplier⁹. However, in most cases, including the mentioned ice-cream producer, codified product and technology knowledge largely existed and was provided primarily at a national level, for instance via direct personal contacts to other Danish producers within a specific product category, and complemented with tacit elements through learning-by-doing.

This way of providing and obtaining knowledge through professional knowledge sharing networks, including competitors, is obviously possible only because the competitive exploitation of the knowledge is tied to the tacit element derived through practical use rather than tied to the simple appropriation of basic codified

⁹ Interview with Thorkild Boisen, owner of Boisen Ice Cream, February 2009.

knowledge. However, it also reflects a common characteristic of the entrepreneurs as persons with a normative, not purely profit-oriented motivation and a practical rather than theoretical approach to business development. As put by Torkild Boisen, chairman of the Bornholm division of the European association Regional Culinary Heritage:

“The Bornholm food entrepreneurs generally are very practically oriented persons. They are not theoretically minded persons who when they have a problem, ask “I wonder what might be the best to do?” They just ask “Does this work?” and jump directly into practical action. Maybe they call somebody in the industry that they trust and ask for advice. Of course this behaviour means that they make a lot of mistakes and have to start from scratch again. But they often have a very strong idea about the type of production they want and without this they would never have gotten to where they are now.” Torkild Boisen, chairman of the Bornholm division of the European association Regional Culinary Heritage, interview February 2, 2009.

Another way of ‘in-sourcing’ external product and technology knowledge is by attracting personnel with specific educational competencies and skills. However, since there is a barrier in attracting such personnel to peripheral areas such as Bornholm, there are but few examples of this. One of these is the micro brewery, Svaneke Bryghus, which was established by a regional entrepreneur without professional experiences in beer brewing but who succeeded in employing a skilled brewery master that was formerly employed in another Danish brewery¹⁰.

The two main exceptions to this general picture of adopting and reusing historical and traditional product knowledge is the product innovations in focus in FKD1 and FKD3 (see section 1.4). In both of these cases, new products (a rapeseed cooking oil and specialized pork meat) as well as the production technologies to produce them, resulted from targeted R&D activities related to universities, research organizations and large companies outside Bornholm. In general, formal R&D activities have not played a direct role in the innovation of Bornholm food products and even in the two mentioned examples, the research-based originality of products and technologies has not been emphasized in their marketing as a competitive asset.

An important characteristic of the KDs which have resulted in the development of Bornholm regional foods is the skill and persistency of the entrepreneurs by which they appropriated and now use knowledge within a specific production field. Opposed to the firms which primarily focus on direct sales to visiting tourists, the group of firms with ambitions to distribute products via wholesalers and retailers (supermarkets) on national and in some cases international markets, must be able to create certain tangible product qualities, which can compete with conventional products, and thus bring in premium prices on the market. Thus, profound synthetic product and technology knowledge is vital in particular for this group, among which there are several of the old niche producers on Bornholm, including those mentioned above. Some of these firms have scored highly in diverse product competitions and quality tests. For instance, as the only cheese producer in the world, the dairy Sct. Clemens has succeeded in being elected as World Cheese Champion twice (1980 and 1998), with its Danablu cheese (<http://www.st-clemens.dk/Engelsk/index2.htm>). The producer of

¹⁰ Interview with Tim Stender, owner of the Svaneke Bryghus, August 2008.

Rapeseed cooking oil (in focus in FKD1) recently ranked as number one in a test of cooking oil products on the Danish market organized by a big newspaper (<http://fpn.dk/mad/test/article1388445.ece>) and also Svaneke Bryghus has scored highly on expert panel tests of Danish micro breweries products. Furthermore, products from six of the local producers were selected as part of the official dinner at the royal wedding of the Danish Crown Prince in 2005. And finally, the Copenhagen-based restaurant “Kofoed’s” (a typically Bornholm ethnic surname), which bases its menu on Bornholm food products, has been included in the Michelin Restaurant Guide 2009. In 2005, twelve of the firms established the network association Gourmet Bornholm to strengthen their cooperation regarding marketing, distribution and other issues of common interest. In April 2009 the association had 13 committed members.

In summing up, the KDs of developing and producing Bornholm food products have involved firm-specific transfers of mobile codified knowledge to Bornholm from other parts of Denmark and Europe, a proceeding process of learning-by-doing, and finally, application in production with a few adaptations to local conditions. These KDs have contributed to the establishment of important links between individual firms and external professional knowledge systems outside Bornholm. Recently, the retail oriented producers have started more formalised networking i.e. regarding marketing and distribution (see below). However, due to the diversity of product categories, a common product and technology knowledge platform has not emerged and is not expected to occur. When it comes to core synthetic technology knowledge, the firms are very different and take part in varied knowledge chains and relations, and regional interaction only plays a limited role in this field. This might be a barrier for providing relevant regional vocational training and higher education programmes, which in turn could promote the further development of Bornholm food, an aspect also pointed out by regional food producers in a recent survey (CRT 2008b).

Territorial-level cooperation and Culinary Heritage

One of the first major steps at the territorial level in the development of a new Bornholm food sector was taken in 1995 with the formation of the European association: Regional Culinary Heritage (RCH) (<http://www.culinary-heritage.com>). RCH is a joint initiative between rural businesses and development organizations originally involving only Bornholm and Southeastern Skandia/Sweden, the region of Sweden closest to Bornholm with whom Bornholm has had interregional cooperation since the 1980'ies (see 1.2). The formation of the association and its activities was supported by the EU INTERREG-program and the network has developed and spread to other parts of the EU. Today there are 23 member regions representing Sweden, Denmark, Poland, Latvia, Lithuania, Germany and Spain, each with paying members from firms within the food processing industries, the restaurant sector, and distribution & retail. In March 2009 there were 32 members on Bornholm of which 19 belong to the food and drinks industry. Together they represent a substantial part of the regionally owned food industry. Since the start in 1995 recruitment of new members has been high both among the newly established Bornholm food producers and among the old group of specialized firms. This indicates that firms define themselves not only as individual actors but also as a part of a collective project of developing regional culinary heritage.

The purpose of RCH is to promote the development of culinary heritage in the member regions. From the start, and supported by former and present regional policy actors such as the board of the Local Action Group of the EU Leader+ program (see 1.2), one of the strategic goals was to enhance sector-crossing cooperation between food and tourism including the restaurant sector. Experiences related to food as a cultural marker have always been a central part of travelling and tourism, i.e. tourists travel not just to witness the unique landscape but to experience local/regional history and culture. One of the most easily accessible forms of commercializing a culture is through food – either by selling traditional culinary products or by preparing local foods in local restaurants for tourists' direct consumption. Developing food-related experiences is therefore by no means a novelty in itself. However, there has been a real shift in the way such food products are being presented to tourists as well as a shift in the heterogeneity of the available food products. Bornholm was previously known primarily for its smoked herrings and a dish called "Sun over Gudhjem". Now, Bornholm offers a plethora of not just regional products, but also new regional dishes, composed of regional raw materials. Ten years ago, tourists travelling to Bornholm could buy smoked herring in smokehouses along the coast and standard, non-descript food in the restaurant and catering sector. Now new restaurants have sprung up, which focus on preparing a modern fusion of French/Southern European and Nordic cooking, meals made up of regional food materials, the background and qualities of which are informed about on the menu and explained to guests by the waiter. The chef at one of Bornholm's leading restaurants described the development this way:

"Many restaurants on Bornholm have benefitted from the increasing supply of local food of a high quality and with a good story for customers. It has resulted in development of concept-menus in the restaurants. Ten years ago we were happy to get a local supplier of fresh quality lamb meat. Due to his way of production it was an advantage for us to buy whole lambs and not only parts of lambs such as the legs. So, besides the traditional lamb dishes, we started developing new dishes using other parts of the lamb that are not so often used in Danish cooking, the shoulders for example. We always inform customers about our suppliers on the menu and use them in our marketing. And customers really seem to like this development. They like to hear the story about the origin of their food". Claus Seest Dams, chef of Restaurant "Di 5 Stâuerna" ("The Five Lounges"), Hotel Fredensborg, April 8 2009.

It should be noted that while the English name for the association is Regional Culinary *Heritage*, the Danish name is *Regional Food Culture*. Thus, in a Danish context, the name leaves room for a re-invention of a regional food culture, such as is described above.

The sector-crossing cooperation at regional as well as interregional European level among members of RCH has contributed greatly to the development of a distinct Bornholm culinary heritage. Interregional cooperation under the umbrella of RCH has only to a limited extent involved interaction between individual firms. Interregional cooperation has mainly consisted in common marketing initiatives for the member regions (such as elaboration of a logo that all members are allowed to use) and inspirational study tours to regions abroad giving members important inputs regarding sector-crossing dimensions of regional culinary heritage and commercialization and marketing thereof.

Specifically for the Bornholm members of Regional Culinary Heritage, four study tours were organized to different rural areas of Sweden and one to Iceland in the late 90'ies. According to Hans Jørgen Jensen, secretary of the Bornholm Local Action Group for EU rural development programs, who organized the first trip for Bornholm food entrepreneurs to South-East Scandia/Sweden in 1995 and was actively involved in the foundation of RCH in 1995, practical experience with alternative small-scale food productions, farm shops, and distribution channels were more advanced in rural Sweden than in Denmark in the mid-1990's. From the Swedish perspective, Bornholm's larger tourism and restaurant sectors were considered especially interesting for best-practice experience exchange. Accordingly, mutual study trips have been organized to exchange experiences regarding subjects of general relevance - such as how to evolve from product development to sale of small-scale food productions in rural areas; how to organize farm shops and other visitor facilities; how to build cooperation and interaction with restaurants and other local distributors; as well as know-how on packaging, and compliance with regulative demands, etc.

Other territorial level activities have been the food ambassador for Bornholm food outside Bornholm, the Regional Food Development Centre and a food showroom with a number of activities promoting Bornholm food and finally, the Gourmet Bornholm association which has been described above. The knowledge dynamics involved in the work of the food ambassador and, indeed, the results of his work, will be presented later in this section; while the food showroom and other LAG instigated activities, will be elaborated in section 1.2., concerning regional policies affecting the TKD.

The development of the experience economy in the Bornholm food sector

Generally a business model based on dedicated premium-priced products and normative values depends on customer trust in and alignment to such qualities and values. Thus, close relations and dialogue with customers are needed, for instance through direct contact via for instance market fairs, marketing events, and customer visits to the production facility or via e-mails and homepage-based personal contacts and communication.

Bornholm food producers, as many others, build customer relations by adding experience elements to their products. They organise their production, building facilities, marketing and sales in ways where the value of physical products are enhanced by adding immaterial sensuous, emotional, normative, narrative and other experience dimensions. From the producer's perspective the purpose of this is to build a personal relationship to and gain the trust of the customer (if just for a moment) – a relationship on which added-value can be realised. In most cases this is not done on the basis of knowledge about costumers provided in systematized manners such as formal market and customer analyses. Rather experience elements are developed on the basis of ideas and 'instinctive feelings' of the business owners and/or, as we shall return to, via inputs from consultancy firms.

The experience elements of Bornholm food firms take diverse forms and indeed carry different weight in conjunction to more tangible competitive product qualities. To a relatively high degree, the Gourmet Bornholm group of 'classical' manufacturing firms rely on their abilities to create tangible competitive product

qualities (such as a good taste), demanded on markets outside Bornholm. Nevertheless, to maintain and develop these premium-priced markets, it is important to provide the product with a distinct identity – in this case a geographically defined identity - through stories, symbols and information that comes with the product, for instance on labels, packaging, advertising and marketing materials. They embed consumer experiences in the physical product and combine it with additional storytelling experiences that makes the consumer relate to the product.

Another segment in the new Bornholm food sector consists of firms with products which are interdependent with the tourism industry on Bornholm; i.e. they rely on tourists to come to Bornholm, and therefore, to a much larger extent than is the case with the exporting segment, rely on experience elements that cannot be separated from the production process. They give customers physical access (full or partly) to production facilities and thereby commodify the experience of personally seeing, hearing and smelling how products are produced. This model is well-suited to the demands of family tourists, thus explaining the plethora of confectionary producers of candies, chocolates, caramels, ice cream etc. A special sector-crossing version of this model is the combination of a brewery and restaurant, allowing for dialogue with and feedback from customers. The entrepreneur exploited this model mainly in the initial start-up phase before he decided to invest in larger industrial production equipment and to separate production and sales by moving his beer production to other local facilities. Thus tourists, in this case, functioned as amateur taste testers in 'the development phase of the product. These sorts of experience elements are basically made through exploitation of symbolic, architectural design knowledge, embodied in "open workshop" concepts integrating production, marketing and sale.

Natural sources of inspiration for such open workshop business concepts, were traditions for agro-tourism, artisanal production and direct sales of local food, especially characterising Southern Europe, as well as the long traditions on Bornholm for fish smokehouses, which are a distinct tourism attraction. Later the use of open workshop concepts has been expanded to glass, ceramics, textile, wood and other arts & crafts businesses on the island of which there are about 100 (2009). A few firms (including the one studied in FKD2) also engage in commodification of more advanced, complex types of customer experiences such as paid, guided tours on which visitors are told about the products, production, firm, etc.

A group of 5-10 consultancy firms (KIBS) located on Bornholm with differing backgrounds within the fields of graphical design, marketing, communication, branding and strategic management, have played a remarkable catalyst and intermediating role in the development of such marketing, storytelling and experience elements of Bornholm food producers, as documented in detail in FKD1 and FKD2. Most of these KIBS were established within a five year period around the millennium by consultants (like the entrepreneurs in the food sector, overwhelmingly male) moving to Bornholm from the Copenhagen area due to private lifestyle choices concerning improving the quality of life for themselves and their families by moving to a rural area and starting a business. This group was indirectly supported financially through diverse policy schemes targeted consultancy of small firms (see 1.2), and they thus provided an important input to the regional rural economy embodying mobile knowledge, which they in turn had achieved through partly formal educations but primarily through years of work in the urban Copenhagen environment as private consultants of companies and public institutions. This knowledge concerned, for instance, trends in cultures,

societies and consumer markets, the emerging 'experience economy', new management, communication and marketing theories and methods, business models based on dedicated product qualities and normative values, i.e. knowledge about how to identify and formulate commercially exploitable values and stories of the food producers and how to communicate them in marketing and via a coherent organization of production, distribution and sales. According to the consultants interviewed in relation to this TKD and the three FKD case studies, this sort of marketing and communication knowledge generally is based on generic principles and methods that only need contextualisation to be applicable in most parts of the economy.

Seen over the entirety of the regional process of developing a new Bornholm food sector, the regional KIBSs have played their important role only in recent years towards the end of the process, in which firms focused on commercialization and marketing. The regional KIBSs have played an important intermediating role for transferring and contextualizing urban, mobile marketing and communication knowledge into the rural Bornholm context. Both in terms of delivering concrete marketing materials and graphic designs and in terms of giving regional food producers an understanding of the implications of running experience and value based businesses. One of the consultants described the knowledge chains and his role in these this way:

"One line of knowledge transfer starts in 1997 with Pine & Gilmore's book on the concept of the 'Experience Economy'. Big international consultancy firms started using the concept in new management, marketing and communication ideas and tools, but still they were extremely abstract and superficial and used the same real-world examples again and again such as Disneyland. What I have tried to do here is to contextualize and translate these abstract ideas to the economic reality of Bornholm - for instance food producers located in the middle of tourists and arts & crafts businesses. But I would like to go a step further back in time. In the start of the 90'ies I worked in Copenhagen with things like 'value-based business development' and 'green balance sheets' for environmental organisations. And in many ways the work in the environmental planning sector with value-based business development was pioneering and the direct inspiration for how businesses and cultural institutions later on started using and communicating the principles of the experience economy." H.C. Holmstrand, private consultant, interview August 29, 2008.

The absence of regional traditions for culinary heritage, i.e. of a codified "key" list of ideal food qualities to target by producers, probably contributed to the openness of regional entrepreneurs to listen to and follow the inputs from marketing experts, moving to the island from the capital. Nonetheless, as indicated by one of the food producers in the quotation below, the "cultural" meeting between marketing experts coming from the capital area and production-minded entrepreneurs in the periphery was not without problems, and often concerned discrepancies between expectations:

"I chose the consultancy firm KB because I wanted them to have a free hand to suggest anything at all. They provided me with a branding strategy and different marketing materials. For two years I thought it was ridiculous and worthless, but then customer demands started appearing, showing that it had paid off." Hans Hansen, Lehnsgaard, interview June 17, 2008.

However, in addition to the important contributions made by individual firms, crucial experience and storytelling dimensions of Bornholm food have been created through the fundamentally *collective* process of defining and developing a 'Bornholm' culinary heritage. Again we should recall the historical point of departure in the mid-90'ies in ideas about development of alternative 'regional' forms of food production and distribution. Realizing such an agenda by definition depended on collective action and was not a project for individuals. The creation of a Bornholm culinary heritage has involved interaction and networking not only among Bornholm food producers but also between the food sector and other experience-based sectors such as tourism, restaurants and caterers, and arts & crafts workshops (ceramists, glass blowers, textile and clothes designers, etc.) as well as interregional interaction with other rural regions at a European scale. The pioneering work of the Regional Culinary Heritage network, described above, has been pivotal here.

But other actors have been active as well. Regional sector-crossing cooperation and market interaction involving firms as well as public organizations and industry associations, has emerged. In order to be marketed as part of regional culinary traditions the new food producers have made big efforts to establish delivery/supply contracts with restaurants and cafes on Bornholm, and food producers in cooperation with firms in related sectors (tourism, restaurants and arts & crafts businesses¹¹) have contributed to the development of new Bornholm culinary heritage products. For example, the national tourism promotion organization, Visit Denmark, has supported the development of a special "Love plate" - a "date" between Bornholm and Dragør, a small trendy "urban fishing village" close to Copenhagen. In both places, a ceramic artist has designed a special plate and a special restaurant menu using local food supplies. The Dragør restaurant serves the Bornholm "love plate" and vice versa. Another example is a student project carried out by students at the Glass- and Ceramics School on Bornholm, whereby students interacted with food venues on Bornholm and created pottery related to the food product and used in marketing. For example the front window of the Kjærstrup chocolate show on Bornholm features a ceramic light-pinkish glimmering cloud on which different chocolate products are displayed.

To sum up, the KDs involved in the creation of "added value" through the selling of experiences as an integrated part of food products has taken three forms. One is characterized by an insertion of mobile knowledge about communication and experience economy-based business. Regional KIBSs with backgrounds, networks and connections in urban areas play the intermediating role of contextualizing experience economy knowledge and anchoring it among regional producers. Another type of KD is hyper-local and the result of Bornholm's strong traditions of tourism and arts & crafts businesses. At firm level this involves mainly implicit knowledge about experience-based businesses, 'blowing in the wind' as a free public good and a common inspirational knowledge base. The third involves interregional sector-crossing interaction between Bornholm and member regions of the European association Regional Culinary Heritage, important primarily

¹¹ Bornholm has long-lasting traditions within tourism as well as within the arts & crafts sector. There are about 100 arts & crafts businesses on the island, employing approximately 140 persons, and organised in two network organisations: Arts & Crafts Association Bornholm (ACAB – <http://www.craftsbornholm.dk/index.php?Itemid=16>), established 2001 and with 64 members (May 2009), and Bornholmske Kunsthåndværkere (<http://www.borncraft.dk/>) established 2003 and with 19 members (May 2009).

concerning the transfer of knowledge and best-practices regarding commercialization of culinary heritage. This has provided Bornholm with new international network relations to rural areas abroad.

Place-branding of Bornholm food

The first many years of the studied TKD were a start-up phase for the new Bornholm food producers, where they developed their product and built up their technology and business organisation. Because the product idea was not always very precise, this for many was a troublesome and long-lasting process. They had perhaps succeeded in starting production and sale but until about 5 years ago the vast majority were firms dependent on local markets. For many, this was not a real problem since the ambition was to run an experience based business with direct sale and not to produce and distribute goods on large distant markets. Some, however, had ambitions of following the example of old niche producers of specialised foods and entering larger markets outside Bornholm. For the new, small firms with growth ambitions, with the group of well-established producers to a large extent were role models for how to enter markets outside Bornholm, how to build up distribution and marketing channels, etc.¹²

Still, a framework for more targeted, coordinated marketing and branding whether privately organized or based on public governance institutions, did not exist. Despite of this, the development of a distinct Bornholm culinary heritage without doubt was positively influenced by being branded as part of a larger European project. Furthermore, Bornholm indeed has long traditions for marketing cooperation between food producers and arts & craft businesses. On the initiative of the regional business council (BEC) small firms of the two sectors started formalised cooperation in 1993 through organisation of common annual 'Christmas Ship' exhibitions and sales events in December on the ferry sailing between Bornholm and Copenhagen. However, this was not a feasible platform for high-profile branding on national consumer markets.

The decisive efforts, which have resulted in a successful branding of Bornholm foods as part of a broader place-branding, were accomplished within two different, but interrelated frameworks of, on the one hand, regional policy initiatives and, on the other hand, initiatives taken by tourism organisations.

Place-branding through regional policy initiatives

From the start in the 1990'ies and throughout the development process, regional policy actors for rural development have played a central role in creating the needed institutional supportive framework for regional foods in which the Bornholm Local Action Group holds a central position (see 1.2). While the established governance structures only to a limited degree have supported firm-specific knowledge dynamics related to synthetic engineering product and technology fields, they deliberately have supported the launching of common branding activities, and thus have made a decisive contribution to the market success of Bornholm food. Two concrete policy initiated branding activities should be emphasized: the elaboration of a

¹² Interview with Georg Julin, Bornholm Food Ambassador, March 4th, 2008.

Bornholm Lifestyle magazine and the employment of a 'Food Ambassador' for the island. Both initiatives were supported by the Bornholm LAG under the EU Leader+ 2000-06 program for rural development.

In 2003 the Bornholm LAG commissioned a local consultancy firm with expertise in communication, photography, and graphic design to produce a trendy Bornholm magazine, with an urban look and exclusive design. The central content was public information about the activities launched and supported by the LAG involving three strategic priorities ('lighthouses') on regional food, arts & crafts, and business networking. Target groups were not only the citizens of Bornholm, but also visiting tourists and persons who might consider moving to Bornholm. Advertisements focused on Bornholm firms within food and arts & crafts, and depicted innovative entrepreneurs with traditional artisanal values and a love for the location, which in turn was embodied in their products. The chairman of the Bornholm LAG gave the following evaluation of the magazine, stressing the implications for regional identity formation and local policy in general:

"The magazine gave a picture of a Bornholm in harmony with itself and yet, ready to go new ways. Suddenly we got Bornholm heroes shining on the island, the wine producer Jesper Paulsen, the beer entrepreneur Tim Stender, the chocolate maker Kjærstrup, something we were acknowledged for. ...They showed a side of Bornholm that was trendy and yet compatible with the traditional and historical. (Jørgen Hammer, chairman of the Bornholm LAG, interview March 24, 2009).

Another policy-initiated branding activity was the work carried out by the so-called 'Food Ambassador', employed in 2004-05 by the Regional Food Development Centre (see 1.2). This function was established as part of the regional LEADER+ 2000-2006 strategy to promote the further development and growth of regional food and on the basis of recommendations in a research analysis on the new Bornholm food sector carried out by the Centre for Regional- and Tourism Research (Hedetoft, 2004). The visibility and branding work of the food ambassador naturally followed the first phases of developing concrete food products and business models through firm-specific KDs.

The food ambassador had a background as journalist and a long professional career in diverse types of media including TV, radio, newspapers and magazines through which he had achieved a certain reputation and name in the Danish media world. In addition to his journalism and communication skills, he had a wide ranging network of professional as well as private contacts all over Denmark, and especially in Copenhagen. He exploited these networks by spreading marketing information about Bornholm food to, among others, leading journalists in diverse media¹³, leading Danish cooks and restaurants, national tourism organisations and, not least, wholesalers and supermarket chains. The retailing sector is a highly important channel for distribution of Bornholm food since quality and specialty foods have moved from only being available in delicatessens and specialty foods stores, to being available in large supermarket chains.

¹³ The food ambassador systematically identified and listed approximately 400 freelance and employed reporters in Denmark, who currently wrote articles about food in Denmark. Among these he selected 30-40, whom he evaluated to be the most relevant for his task and to whom he directed his main communication initiatives. This list of food journalists was also made available to food producers on Bornholm along with instructions about the importance of individual firms to build up a personal relationship with some of the journalists and to systematically utilize the media in their marketing strategies.

As mentioned before, a central priority in the Bornholm LEADER+ 2000-06 strategy was synergetic interaction between food & drinks producers and arts & crafts workshops. The food ambassador saw a great branding potential in the symbioses between regional food, arts & crafts and tourism. Accordingly, his efforts of branding Bornholm food in practice was an integral part of a broader place-branding of Bornholm with a clear tourism orientation and focusing on 'unique quality products' of the island. This branding strategy was in line with the work being done in the tourism sector, as documented below.

A main contribution of the food ambassador to enhance the visibility of Bornholm food, besides encouraging the individual food producers into more professional and targeted marketing and visibility efforts, was the organization and realization of a number of events. The effects of these initiatives did not only stem from the events as individual activities but more so from the professional and consistent coordination of a concerted staging of Bornholm food through the media over a longer period of time. As a general comment regarding his exploitation of communication knowledge and social skills in networking, the food ambassador said:

"I have experiences in choir leading and my job as food ambassador was somehow similar: to make a harmony and a melody out of several individual voices." (Georg Julin, Food Ambassador, interview March 4th, 2008)

One of the branding events was a common branding trip for food producers and arts & crafts businesses to the inner harbors in Copenhagen, of which one (Nyhavn) is a main touristic site in the historical centre of Copenhagen, which attracts many visitors every day. The trip was made in an old, wooden boat from Bornholm on which visitors could see and buy the products. Many experienced-based activities and stunts were integrated in event. The ambassador had notified national and local media about the event, which accordingly was well-covered by TV, radio, and newspapers, and the boat was visited by 6.000 people.

Another event which branded Bornholm food products was the wedding of the Danish crown prince Frederik to crown princess Mary in May 2004; a national cultural event with maximum media attention and coverage. Partly due to the professional lobby work of the food ambassador, who personally had connections to members of the royal family as well as to the catering manager at the royal court, six different Bornholm food products were selected by the royal court as part of the wedding menu. According to our interview with the food ambassador, his lobby efforts were conducted through a balance between trust-creating discretion and interest-creating directness that generally helps create, maintain, and enhance commercially useful social networks. The inclusion in the wedding menu was conditioned by a "gentleman's agreement" with the royal court that the suppliers only used the event discretely in their marketing. Nonetheless, the event was a supreme quality mark and gave an invaluable branding effect for Bornholm food.

In line with the directions of the Regional Food Development Centre, who employed the food ambassador, a strategy was followed, in which branding and marketing efforts focused on selected firms with products, resources and ambitions to enter external consumer markets. The argument legitimizing such a selective strategy was that enhanced visibility of a group of 'locomotive' firms, which in the long run would also promote the remaining group of firms – i.e. to create a place brand for all Bornholm food quality foods. How-

ever, the selective strategy led to some dissatisfaction among the local food producers, encompassing many different views about Bornholm food and the right development strategy.

From the few but highly influential purchasers of nation-wide wholesale and retail chains who in fact determine what goes on the dining tables in the majority of Danish households, the food ambassador got the univocal statement, that the paramount condition for producers wishing to enter their markets, was the ability to fulfil agreed delivery guarantees, and consequently certain economic resources and personal ambitions to always meet this demand. Secondly, but also obligatory, was the demand for promotional materials, product documentation, pictures etc. telling a good story about the product, production and/or producer in marketing and advertising initiatives. Thirdly was the demand for distinct qualities embedded in the product such as its taste or ingredients, physically distinguishing them from mainstream products. Thus, in order to enter the national markets, Bornholm producers had to commit themselves to strict demands of all-year stabile production and logistical organization.

This facilitated the general acknowledgement among the Bornholm producers that they – despite differences in products and technologies and despite widespread perceptions of each other as competitors rather than partners - had certain common conditions and interests. Thus, as a result of the food ambassador's network building efforts for the group of growth oriented producers, they started a closer, more formalised type of networking. The ambassador preached the philosophy that the producers were not competitors but complementing, symbiotic partners, each dependant on the other. By actually proving, through common marketing events, that their market opportunities as individual firms could be increased by collective action and by the diversity that they represented as a group, the attitude of the producers changed in the direction of more openness and cooperation. Thus, in 2005 they established the producer association Gourmet Bornholm in order to promote the further development of markets and products.

Branding of gastronomic tourism

Also Destination Bornholm, the regional tourism development organization, has been involved in branding the new regional culinary heritage on Bornholm as part of a larger place-branding of Bornholm. Food, smoked herrings, and the opportunity to get distinct eating experiences have always held a central place in the tourism marketing of Bornholm. However, according to information from Mikkel Jensen, development manager at Destination Bornholm, his organization noticed a growing interest among Danish tourists and tourist organizations in local/regional food as integral components of tourism products as the result of the national exposure that Bornholm food producers received through the work of the food ambassador¹⁴. The participation of food producers at a travel and tourism fair in Copenhagen in 2004 as part of a common Bornholm tourism and food delegation was new in Danish tourism and food industry contexts. Destination Bornholm received a national tourism prize for this attempt to develop Danish gastronomic tourism concepts and products.

¹⁴ Interview with Mikkel Jensen, Development Manager of Destination Bornholm, September, 2008.

A major event with invaluable branding effect was a TV production with the title "The taste of Denmark" in which 'New Nordic Food' from thirteen regions in Denmark, the Faroese islands and Greenland was promoted by a leading Danish cook, Claus Meyer. The program was organized and supported by Visit Denmark, the national tourism promotion organization and Destination Bornholm coordinated the local process of recruiting firms for participation in the program. The Destination Bornholm and the participating food producers also paid a substantial amount of money to be included in the program, which also functioned as a general tourism promotion of the island. Two of the three firms studied in FKDs (FKD1 and FKD2) were included in the Bornholm program. It was made in 2006 and broadcast on a nation-wide Danish TV-channel in Denmark in June 2007 for an audience of an estimated 700.000 viewers, and again in June 2008, and has also been distributed internationally and broadcast in other countries.

"Visit Denmark wanted to show Denmark internationally as a place where food product development was done with great care. For the Bornholm food producers such an exposure through national TV channels had a very direct effect on demands and sales. For us in the tourism industry the program was an enormous catalyst for product development in the following years and was followed up by a lot of initiatives of marketing and product development, for instance using the recipes for regional food, created by Claus Meyer for the program." (Mikkel Jensen, Development Manager, Destination Bornholm, September 11th, 2008.)

The latest branding initiative has been the Food Festival for Bornholm food, organized in September 2008 and supported financially through the Bornholm LAG and private co-funding. The festival was organized by Destination Bornholm in coordination with the annual Bornholm Culture Week, an initiative run by the municipality of Bornholm presenting primarily national artists and performers within music, theatre, movies, etc. As a new element of this high-profiled cultural event 35 different 'eating experiences', especially developed for the occasion, were provided for local residents as well as visitors to Bornholm. Tourists were offered free transportation on the ferry to Bornholm to promote their participation in the so-called "shoulder-season".

Thus, branding of Bornholm food and gastronomy has been an integral part of tourism marketing and a larger place-branding of Bornholm. About the mutual benefits for food producers and tourism actors concerning such sector-crossing branding platforms, Mikkel Jensen had this comment:

"It maybe sounds as if it is tourism that has gained from the emerging new food sector. But you can turn the argument around and say that without a large tourism industry we would never have experienced such a growth in new regional types of food. I think even the most devoted representative of the food sector would agree on this. Due to its position in Danish tourism, Bornholm always had a good brand and the food producers have benefitted from this. They could tap directly from the Bornholm name." (Mikkel Jensen, Development Manager, Destination Bornholm, September 11th, 2008.)

Summing up, the crucially important task of enhancing the visibility and brand of Bornholm food on national consumer markets mainly involved dynamics of exploitation and contextualization of generic principles of

symbolic communication knowledge, adapted to the specific products, place and time. Also person-specific knowledge regarding social networking and exploitation of such for commercial purposes has been crucially important. Parallel to the development of synthetic product and technology knowledge and with the creation of experience elements related to food, the KDs related to branding have included only little R&D based knowledge and a dominance of exploitation dynamics over exploration and examination. However, as described in further detail in paragraph 1.2, the policy driven branding efforts have to a large extent been framed and directed through analytical approaches and knowledge. In territorial terms, the KDs have involved sector-crossing interaction of firms and organisations on Bornholm representing food, arts & crafts, and the tourism industry. Through this interaction an important platform for place branding Bornholm as a whole, i.e. as a place to run a business and a place to live, has been created. However, through the intermediating role of regional KIBS and the food ambassador, the KDs have also enhanced Bornholm's access to trend-setting Danish knowledge milieus through supermarket purchasers, national media, chefs etc. mainly located in the Copenhagen area.

1.2. The TKD and regional policies

Agriculture and food processing industries are sectors that are heavily subsidized and regulated by diverse regional, national, and not least EU policies, regarding, for instance, production outputs and prices, land-use and environmental planning, hygiene and safety of food, working conditions, animal welfare, health effects, certification, marketing, and rural development. The TKD of developing and branding Bornholm food not only has been framed by diverse policy initiatives but, as described in the previous paragraph, to some extent has been proactively initiated and driven by regional policy actors.

1.2.1 LEADER

Among the many policies and programmes that have affected the development of our TKD, the most influential has undoubtedly been the EU programme LEADER for rural development and diversification. The importance of LEADER is not connected with the amount of financial support but with its role in setting new societal discourses about food production and rural development in general. Since the initial launching in 1991 the LEADER program has represented a break with traditional production support to conventional agriculture and food supply chains and has launched new measures targeted diversification of rural economies as well as new bottom-up and networking principles for how to organise and implement policy initiatives. Although the LEADER program is no longer operating as an independent program, it has in practice been upgraded to form the third pillar of the EU Common Agricultural Policy program (CAP) 2007-13, including its territorial approach to rural development as opposed to the exclusively sector approach in previous CAP program periods.

The first LEADER program in 1991 was not implemented at the national level in Denmark, however on Bornholm LEADER money supported the establishment of LUIC (Landbrugets Udviklings- og Innovationssenter / Agricultural Development and Innovation Centre) as a project organisation under the auspices of the regional Agricultural Advisory Service Centre, run by farmers' organisations. Two consultants (of which

one was female) were employed to promote new initiatives for economic diversification and quality of life in the small villages and rural districts of Bornholm. According to one of the rural development consultants, Hans Jørgen Jensen, important parts of the initial work was to look abroad for inspiration regarding new small-scale productions and distribution of quality food and try to diffuse these external experiences and best-practices to local entrepreneurs who were engaged in (or considered) establishing new quality food productions. That the counselling and knowledge diffusion efforts of the LUIC staff actually contributed to encouraging local entrepreneurs into new development activities is exemplified by the FKD1 about a local farmer developing rapeseed oil. However, it is important to stress, that it is not possible to point to effects of singular policies, as the TKD describes a series of inputs over a long period, which can best be characterised as a long haul. In this process, it is also important to stress the significance of single actors, such as Hans Jørgen Jensen, who, in different capacities, have been drivers of the process over a number of years.

More formalised governance structures for promotion of regional small-scale food production were not launched until the LEADER+ period 2000-06. Since the start in 1991 but not fully developed and formalised until the last LEADER+ program period, a main element in the bottom-up LEADER principles was organisation in the eligible rural areas of EU of a so-called Local Action Group (LAG) and among the members of this group, a board responsible for defining the goals and priorities in a local LEADER development plan.

Due to this the active involvement of local communities in bottom-up development of rural areas and the building of new public-private partnerships has been encouraged. The Bornholm LAG that today forms the central organisational structure of the third pillar of the EU CAP, recruits its members among a variety of private and public actors engaged in rural development such as small businesses within different sectors, community, citizen and environment NGOs, educational and knowledge institutions, farmer organisations, youth organisations, public business services, etc.

Another very important effect of the formalisation and upgrading of the LEADER rural policy set-up is that the goals and priorities in the development plan of the LAG is approved by the Regional Municipality and integrated in regional policies and budgets, which provided the needed regional co-financing for LAG activities.

Since 2000 the Bornholm LAG has worked with "lighthouses", i.e. spearheads or foci points. One of these is the promotion of regional quality food and culinary heritage while another is arts & crafts. The "lighthouse" for food had two primary fields of activity: the establishment of a regional food development centre which included organization of a regional showroom for Bornholm food in a restored old mill, and the marketing of regional foods outside Bornholm.

Reflecting on the serious economic, social and demographic challenges on Bornholm, framing the regional policy discussions about relevant development initiatives, the chairman of the Bornholm LAG who is also chairman of the Association of Village Citizen Societies, covering the 29 local communities on Bornholm, has expressed:

“It was our hope that priorities on local food and arts & crafts and, very important, on cooperation between these two sectors, would create new firms and jobs in the rural districts. This was expected to contribute in maintaining the population in the small communities as well as the schools, shops and services. For many years these have been threatened by depopulation and by the powerful tendencies to centralisation in modern societies.” (Jörgen Hammer, chairman of the Bornholm LAG, interview April 24 2009)

Ordered by Bornholm’s Business Centre and co-financed via the LEADER+ program, a research analysis of the Bornholm food industry was carried out by the Centre for Regional and Tourism Research (CRT). While analytical research based approaches to development, as described above, have been very rare among private food-related actors on Bornholm, public and semi-public actors such as tourism organisations and local government during the recent two decades have ordered a long row of research and consultancy analyses to provide an analytical basis for decisions, formulation of strategies, launching of development projects etc. The report from the mentioned research analysis (Hedetoft 2004) pointed to the fact that the new group of small and micro firms based on quality food production were responsible for about half of total food industrial employment and that their profitability and value-added, despite entrepreneurial struggles of establishing more consolidated productions, was at least at the level of the biggest firms representing the conventional food industry. According to interview with regional politician, Annelise Molin, these analytical results were an eye-opener for the regional political establishment regarding the growth potentials of regional food producers. Until then, these producers had received indifference if not disrespect, as they were considered merely ‘alternative’ idealistic experiments with no serious regional growth potentials¹⁵.

Based on positive response from local food producers as well as the recommendations of the mentioned research report regarding strategic initiatives that might contribute to further development of the small-scale regional food sector, the LAG decided to employ a food ambassador for Bornholm in the period 2004-05 to enhance the visibility of food products from Bornholm outside the island. The successful branding efforts of this food ambassador, described in the previous section, constitute an interesting example of new types of public-private partnerships and new unconventional proactive roles of public sector initiatives. Upon completion of the food ambassador project, nine local food producers who had benefitted greatly from his work, in 2005 set up a strategic network, Gourmet Bornholm, the purpose of which is to continue the work the food ambassador started. Later more firms have been recruited as members of the organization that today (April 2009) has 13 members.

In the 2000-2006 period, the Bornholm LEADER+ program supported 21 projects, which all pertained to the development of collective frameworks for regional foods (such as the already described Regional Food Development Centre and the Bornholm Lifestyle Magazine), to a total amount of 19,25 mil. DKK¹⁶. Besides

¹⁵ Annelise Molin, interviewed 24.3.2009.

¹⁶ This is the total project amount, which was partially financed by LAG Bornholm, partially co-financed by the Regional Municipality of Bornholm as well as other sources.

the already mentioned projects, the LEADER+ program also supported, for instance, the elaboration of a regional foods website and development activities of the Regional Culinary Heritage network on Bornholm.

The financial resources available for LEADER promotion activities have been modest compared to other policy schemes such as EUs agricultural and structural funds. Nevertheless, little money has created big results. To some extent this is due to an appropriate timing of policy initiatives in line with overall trends in society and culture towards growing consumer interest – though not always articulated as market demands – in food with identity. As the chairman of the Bornholm LAG put it:

”It is not that we in the Local Action Group have been fantastically clever and competent. But we have got the famous sixth sense about what was moving in society and we have been anticipative regarding preparing and starting things before they suddenly became mainstream”. Jörgen Hammer, chairman of the Bornholm LAG, interview April 24 2009)

1.2.2 Other EU policies

As just mentioned, the Bornholm LAG prioritized support to collective framework building projects rather than support to individual firms. However, a number of applications by individual food producers have been supported by regional EU Structural Funds (ERDF) and in general, Bornholm’s allocations through diverse EU programs have been characterised by a high degree of coordination.

In the period from 2000-2006, the ERDF on Bornholm has supported our TKD in two ways:

1. Direct subsidising of SMEs within the quality foods sector on Bornholm. The ERDF subsidized the food production sector on Bornholm with a total budget of 16, 7 mil. DKK. All 11 subsidized food sector projects pertained to development of quality niche food products. In a majority of the projects, funding supported expansion of production apparatuses, which allowed the companies to expand their production and enter into “export” franchises with retailers. In three of the projects, the aim was to re-construct the SME with a new business plan. The effects of this support have not been analysed in depth, however, the relatively limited ERDF support allocated to the regional quality food sector and other food niche production at least correlates with growth in number of jobs and turn-over among the group of small food manufacturing firms (Table 1).
2. Indirect support to the quality foods industry on Bornholm through a business support scheme, which gave free counselling to support business strategies in SMEs. There was no particular focus on the foods and drinks sector – and no coherent strategic understanding of the business development counselling made available to SMEs. The idea was to support each business or enterprise on its own terms. Thus consultancy could take the form of support toward market know-how – or technical innovations. The regional instigator and responsible for the KIBS-supporting projects was the Bornholm Business Centre. Given our evidence from firm level case studies one could tentatively argue, that this ERDF initiative, perhaps inadvertently, helped build or develop a KIBS sector on Bornholm for the specialised food and drinks industry. A number of regional consultancy firms, e.g. Konnect Bornholm, Holmstrand Consulting, Born-appétit, and The Danish Food Guide, were all connected to food and drinks enter-

prises through the support of the Bornholm ERDF program and its projects to support business counselling targeted the development of SMEs.

Also the INTERREG program should be mentioned as an EU policy program affecting the TKD. The INTERREG program has supported the development of the interregional network association Regional Culinary Heritage. Through support from the INTERREG program, the Regional Culinary Heritage network has been developed and spread to rural regions in other EU countries. At the regional level, this initiative has been supported by the majority of food producers as well as a number of restaurants and caterers, who in turn have taken part in shaping and developing a distinct regional culinary heritage of Bornholm, as described before. On Bornholm, the initiative has been lead by the same persons who have functioned as secretariat and coordinator of the LAG under the LEADER program.

To conclude, as opposed to the very large funding that goes into conventional agricultural and fisheries programs via the EU Common Agricultural Policy (CAP)¹⁷, a little funding via LEADER, INTERREG, ERDF and other EU programs such as the Article 33 and the European Social Fund has gone a long way when it comes to development of niche productions and collective marketing platforms and governance structures. An evaluation of the EU CAP is certainly not the purpose here. However, taking into account the trends in number of firms, jobs and turn-over in agriculture and the food manufacturing industry as a whole on Bornholm (Table 1), we can say that the substantial EU CAP subsidizes seem to enforce rather than reduce the structural change and rationalisation in the sectors leading to still fewer jobs on still bigger units with still higher outputs (turn-over) - but not necessarily higher profitability. This trend in conventional food systems is among the issues that the LEADER program was launched to address.

1.2.3 Policies based on regional and state level interaction

Although the European and national levels have provided the framework to foster initiatives which have led to the development of a platform for regional food, the overall policy of promoting regional quality foods is an idea fostered on Bornholm. Many of the development policies for Bornholm have been developed and expressed locally: "...Bornholm society has striven goal-orientated and intensively to implement activities which seek to turn the negative development on Bornholm" (Lundtorp, 1999).

In 2001, as a result of a referendum on Bornholm to amalgamate the five local municipalities as well as the county, the Danish government made a declaration for Bornholm (The Danish Ministry of Economic and Business Affairs, 2001) which pledged that the state level of government would continue to support the development of Bornholm. The declaration mentioned a number of focus areas, one of which was to promote new initiatives within the islands' traditional competence areas. Regional heritage quality food was mentioned directly (The Danish Ministry of Economic and Business Affairs, 2001). The government decla-

¹⁷ Data provided via the data base Farmsubsidy.org (www.farmsubsidy.org), regarding the period 2000-2006 tells that Bornholm received just less than 715 million Danish kroner (ca. 95 mil. Euros) through more than 100 EU Common Agricultural Policy (CAP) schemes including LEADER. Considering the number of firms on Bornholm in the main targeted sectors of fishing, agriculture, and processing industries (Table 1), this is a substantial amount.

ration was based on the findings of a cross-ministerial work group in Bornholm, but the input to that work came from the regional level of Bornholm, i.e. the County of Bornholm's strategy *Perspectives for the Development of Bornholm 2001-2005*¹⁸.

The last policy scheme to mention affecting the TKD is the national policy on "erhvervsfremme" (Law on promotion of trade) and its regional implementation, which stipulates the setting up of so-called regional Growth Forums, including one on Bornholm. Bornholm's Growth Forum has adopted a Business Development Strategy 2007 – 2010 for the region of Bornholm (Bornholms Vækstforum, February, 2007) , and all EU structural funds (including LEADER+, when the program still existed) are only allocated in so far as the projects are in adherence with this strategy.

The pivotal strategy and work form, adopted by Bornholm's Growth Forum, is "growth through clusters", i.e. the establishment of regional work groups targeting selected regional business clusters. One of the six cluster work groups on Bornholm is the specialty food and drinks cluster, organised in the producer association Gourmet Bornholm. The workgroup consist of local business leaders, who had joined forces through the work of the former Food Ambassador project (LEADER+), and formed a formal network, the primary function of which is to create growth through collaboration on joint initiatives. The otherwise top-down method of creating cluster networks, which characterizes the other cluster work groups has met some impediments and is still in its formative stage, primarily due to the fact, that work group members need to define, what they wish to collaborate about (Villemoes, E. & Vive, P., 2008). This however, is not the case with the quality food and drinks work cluster, since it consists of SME owners, already organized in the Gourmet Bornholm network

Finally, it is important to note the role of public administration at both the national and regional level in the implementation of the Promotion of Trade policy. The policy has been lead on the national level by the Danish Enterprise and Construction Authority, which in cooperation with regional public servants, has worked proactively to promote 'Triple Helix' interaction by bringing together agents from private sectors, public authorities and knowledge institutions. On a geographically isolated island like Bornholm, this had been practiced previously, but the new discourse about cross-sectoral Triple Helix cooperation and the presence of representatives from the Danish Enterprise and Construction Authority promoting such collaboration, gave rise to a new understanding of the value and importance of such partnerships.

1.3. The TKD and research hypotheses

The distinction in the EURODITE conceptual framework between cumulative and composite knowledge dynamics and the hypothesised growing importance of composite knowledge seems highly relevant in understanding the studied TKD. The TKD can be seen as activities targeted development of a new system for production of food on Bornholm, alternative to the production system for standardised food that traditionally prevailed on Bornholm but in recent decades has experienced dramatic decline in employment. In the pre-

¹⁸ See Hedetoft, 2004 – included in the preface by former mayor of Bornholm, Thomas Thors.

liminary TKD report (CRT 2008a) it was hypothesised that the declining standardised industrial food productions on Bornholm were based on cumulative knowledge dynamics and the emerging small-scale specialised productions were dominated by composite ditto. This has been supported by the empirical findings.

The TKD of developing alternative food production and promotion systems for regional food has consisted in combination of knowledge from a variety of sectors, regions, and contexts. Knowledge from sectors such as food, tourism, restaurants, arts & crafts, marketing service, wholesale, retail, and media, has been eclectically provided and combined in development of new sector-crossing products and business models, new forms of marketing, new distribution channels etc. Culinary heritage knowledge from rural regions abroad has been provided and adapted to a Bornholm reality in the creation of a Bornholm version of regional food culture through interaction and cooperation between the above mentioned sectors on Bornholm. Also inputs of knowledge on the experience economy has been transferred from urban settings and been contextualised to Bornholm conditions.

Furthermore, actors representing different contexts and spheres of society (Firms, Markets/Networks, Policy/Governance, Science/Education, and Society/Culture) have interacted, resulting in the establishment of new channels for sharing and diffusion of different types of knowledge. Maybe due to the fundamentally composite character of knowledge dynamics in which use of existing knowledge rather than generation of new knowledge has dominated, actors from Science/Education has played only an indirect and distant role. Actors representing Policy/Governance have initiated new knowledge dynamics, mainly occurring in the context of Markets/Networks, by staging new regional development discourses and setting up new support schemes that encouraged regional networking and cross-sector cooperation as well as the development of a private consultancy sector. Both the proactive role of policy and governance actors in promoting diversification of the regional/rural economy and the intermediating role of KIBSs in bringing new types of valuable knowledge to the island have facilitated the composite dimension of the TKD.

The significance of composite knowledge dynamics for contemporary economic development is in line with the EURODITE hypotheses. However, we find it appropriate to stress that the distinction between cumulative and composite knowledge dynamics should be related to the time dimension of the product cycles in which the dynamics occur. In the initial phases of product cycles composite knowledge almost by definition will tend to prevail while cumulative knowledge may be dominant in later phases of consolidation, rationalisation and increased competition. The TKD reflects the fact that regional food in a Danish context is a new type of product, demanding new types of knowledge from a diversity of sources and regarding not only development of products and technologies but also market development, establishment of supply chains and distribution channels, building of promotion and support functions, etc. Hence, the composite nature of knowledge dynamics is not necessarily a permanent and ubiquitous characteristic of regional food systems.

The empirical findings also have supported the specific hypothesis of the preliminary TKD report (CRT 2008a) that the symbolic category of knowledge has been crucially important and decisive for realizing Bornholm's strong position on Danish consumer markets for regional food. Both at individual firm level and at collective regional level targeted and concerted efforts have been carried out to define and communicate a new story about Bornholm, to brand the island at national scale as a modern and innovative and yet au-

thetic place. In accomplishing this, professional symbolic knowledge was exploited and breakthroughs on the markets followed for new Bornholm food.

1.4. Understanding the related FKDs

The producers of Bornholm food basically can be classified in two groups: One group of 'classical' manufacturers of specialised, niche products that are distributed nationally and/or internationally to customers in retail, catering and restaurant sectors. And another group of firms based on direct sale to visitors on the site of production and adding of value to the physical products by creating experiences for customers. FKD1 represents the first group and is about the development of rapeseed cooking oil, while FKD2 represents the second group and is about the creation of a vineyard. The FKD3 case study presents quite a different model of 'regional food', not like the two others small-scale and artisanal in nature and not driven by Bornholm actors. The FKD3 concerns the innovation of specialised Bornholm pork meat as part of the highly standardised product portfolio of a multinational company with relatively weak links to Bornholm. In terms of knowledge dynamics, it could be argued that FKD3 exploits a brand which had already been developed by local firms and supported by regional development policies. Whereas FKD 1 and 2 are interrelated with local development policies as well as discourse on alternative foods, FKD 3 is a fine-tuned machine that is able to adjust to market trends within a relatively short time. In other words, our FKD1 and FKD2 paved the way via the Regional Culinary Heritage association and other local networks supported by the LEADER program and other local development funds, as well as through the systematic tooling of the media which created a Bornholm Food brand on which our FKD3 firm Danish Crown could base their new product. This is evident seen from a temporal aspect as well: whereas the Bornholm food brand took more than a decade to develop, the FKD3 Bornholm pork took less than 18 months to develop from idea until the product was in the supermarket display counter. Having said this, the FKD3 feeds back into the TKD: i.e. the development of a Bornholm quality food product such as Bornholm pork, when it is based on real taste quality, supports the Bornholm food brand and strengthens it in the minds of Danish consumers.

1.4.1. General synthesis of FKD1 and its relation to the TKD

FKD1. Development and marketing of rapeseed cooking oil from Lehnsgaard

Lehnsgaard (L) is an old family-owned farm on Bornholm that since the 1980'ies has been run by Hans Hansen (HH) whose primary production is rape crops. The seeds of the rape crop are traditionally used for industrial processing of low-value oil (Canola), utilized mainly for domestic heating and lighting, and the remaining organic material is pressed and used for animal fodder. Motivated by the wish to find ways of creating a higher value added to his rape crops and an occupation alternative to conventional farming, HH in the mid-1990'ies started developing ideas for new products and productions. As part of a process instigated by the LUIC (Local Agricultural Development Centre) and later the European association Regional Culinary Heritage, HH participated in interregional activities, which led to him buying a small oil-pressing

machine and started experiments on his farm to build a production of oil to be sold for heating of a local swimming pool. The work of the LUIC was part of a long policy process of boosting regional development through giving local enterprising people inspirational inputs regarding start-up of small-scale food production.

Simultaneously with HH's entrepreneurial development activities, EU funded R&D activities on "whole crop bio-refinery" were carried out on Bornholm by a regional R&D organization (Bioraf), involving an international network of universities and companies and coordinated by The University of Copenhagen. By combining analytical knowledge from chemical laboratory research with synthetic process engineering activities, Bioraf developed, among other things, methods and equipment for production of a rapeseed oil with healthy assets but without the chemicals, which cause a bad taste and are the reason for the traditional use of rape crops for non-food purposes.

In connection with a relocation of Bioraf in 2003, L bought the equipment and know-how for production of refined cold-pressed rapeseed cooking oil. In 2004 L was ready to send the oil on the market and thereby finally realizing a radical change of business model from agricultural growing of standard commodities for anonymous, global markets to manufacturing of a high-profile, quality product for end-consumers of private households, restaurants and caterers.

Despite the competitive healthy assets of the product compared to other cooking oils, commercialization of the Bioraf results was not straightforward but depended on development of supply chains and consumer markets in order to achieve the needed premium-prices required by relatively high production costs. Thus, marketing knowledge was crucial. As a former farmer, marketing was not a field with which HH had professional or practical experiences, however it was his central entrepreneurial idea that the oil should be produced on the basis of Bornholm supplies of rapeseeds and hence, that this was emphasized in marketing in addition to the health qualities of the oil. As a former rape crop farmer HH had knowledge about local suppliers of rapeseeds and was able to exploit this in the development of a Bornholm supply basis of the needed quality and quantities.

Building up the downstream relations to customers of distributors and retailers was more complicated. With financial support via a national LEADER+ project, L consulted a regional KIBS with expertise in marketing and communication. The KIBS elaborated a branding strategy as well as diverse marketing materials, emphasizing the authenticity of HH as farmer and entrepreneur and the Bornholm farm as the place of production. L exploited this in development of distribution and sales channels to supermarkets, restaurants, and caterers on Bornholm.

However, the important step of nation-wide distribution and sales via supermarkets followed not until a number of timely external incidents through which L got invaluable marketing effects, expressed in the fact that the volume of production increased from 35.000 liters of oil in 2004 to 300.000 liters in 2007. One external process, connecting L with highly important actors for diffusion of knowledge to consumers, was the launching in 2004 of a health campaign of the Danish NGO, The Heart Association, regarding cooking oils. Under the headline of "Rapeseed oil – the Nordic olive oil", a booklet distributed in 300.000 copies all over

Denmark promoted the use of rapeseed oil in Danish cooking and exclusively used the oil of L as the branded product.

Also in 2004, the employment of the above described regional food ambassador enhanced L's integration in external knowledge dynamics. A group of Bornholm food producers including L gained from the food ambassador's work of branding and positioning their products on a national scale as well as of encouraging them to more formalized networking. Thus, L was among the 11 founding members of the regional producer association Gourmet Bornholm. Today there are 13 members that besides of organizing common marketing and business development activities today forms one of six cluster working groups, organized by the Bornholm Growth Forum (see above).

1.4.2. Confrontation of FKD1 to EURODITE research hypothesis

The FKD1 of development and marketing of Lehnsgaard rapeseed cooking oil is an example of successful integration of, on the one hand, exploration and examination knowledge dynamics of formal research systems related to development of products and technologies, and on the other hand, exploitation knowledge dynamics of firms related to commercializing and market development. The larger knowledge biography in which L plays only the final role of commercialization and contextualization of mobile, technical knowledge is exemplary in terms of illustrating both the integration and complementarities as well as the independent contribution of analytical (chemical university science), synthetic (process engineering R&D) and symbolic (marketing and storytelling) knowledge dynamics. The symbolic knowledge dynamics of Lehnsgaard have their own eligibility, significance and value-adding role, independent from the initial scientific and engineering phases of developing the product and technology. While these firm-level symbolic knowledge dynamics were part of larger regional interaction processes through which mobile urban knowledge was anchored on Bornholm, the preceding analytical and synthetic knowledge developed by Bioraf research partners were 'footloose'. Besides being embedded in the rapeseed production technology and exploited by L, the research based knowledge was not anchored in the region.

Moreover, the FKD1 illustrates the interaction and complementarities of dynamics occurring in different development contexts. The commercialization dynamics of the firm in focus of FKD1 is temporally and opportunely embedded in and gains from dynamics in the contexts of Science/Education (development of product/technology), Society/Culture (contemporary social and cultural trends intermediated by the media and articulated on consumer markets), Governance (new policy discourses and support schemes including regionally coordinated branding), and Market/Network (interaction with KIBS and networking with other food producers on Bornholm).

The direct point of departure of L in technical R&D activities is atypical for the ways the new small-scale food productions on Bornholm in general have been developed. However, the characteristics of FKD1 of cross-contextual knowledge dynamics, i.e. interaction of actors belonging to different knowledge contexts, as well as the timely embeddedness of L in far-reaching knowledge chains is a general characteristic of the TKD of developing a new Bornholm food sector.

1.4.3. General synthesis of FKD2 and its relation to the TKD

FKD2: The creation of Lille Gadegaard vineyard

Lille Gadegaard (LG) is a traditional farm on Bornholm. The farmer, Jesper Paulsen (JP), in 1995 decided to change his activities from growing of strawberries to production of wine. Today LG produces a diverse range of alcoholic drinks including wines from berries (strawberry, blackcurrants and redcurrants), red wine from grapes as well as distilled alcoholic products such as wine liquor. However, the crucial competitive factor of the business is not related to the tangible products as such. LG is neither a traditional farm nor a manufacturing firm but a vineyard of which an important part of value-added stems from experiences, storytelling and services attached to the products and provided for visitors in the summer opening period. 90% of total sales stem from direct sales on the vineyard that besides JP has 5 employees. This business model heavily relies on the big number of tourists that visit Bornholm annually, and accordingly, on marketing as an attraction included in Bornholm tourism catalogues and tourism products such as guided bus tours as well as in the information systems of the Bornholm division of the European association Regional Culinary Heritage.

Like in the case of Lehnsgaard, the initial phase of identifying the precise business idea and developing the products and technologies was a long learning process starting in the mid 1990'ies and lasting at least 6-7 years. Thus, LG marketed the first strawberry wines in 2001 and the first red wine in 2003. The FKD2 concerns the long-lasting transition of the business model of LG since 1995 and until very recently from the one of a strawberry farm to the one of a vineyard based on activities cut-crossing the sectors of agriculture, manufacturing and tourism services.

The new knowledge basis for LG was developed through knowledge dynamics related to the three topics of wine products and production methods, vineyard experiences and design of visitor facilities, and value-based communication. JP was the central firm-level actor for the knowledge dynamics related to all three topics within which he had no educational or professional background in advance. However an innovative entrepreneurial personality and an open-minded approach in learning brought him far. JP's methods of appropriating knowledge differed from topic to topic. Synthetic knowledge about wine production was basically provided through searching for knowledge via the internet, personal visits to wine producers abroad on his holidays, and firm-internal learning-by-doing and trial-and-error.

The symbolic knowledge dynamics related to development of experiences, visitor services and value-based communication dimensions of the firm were characterised by more active contributions from and more intense interaction with external actors not least regional KIBS. In these fields LG benefitted from diverse policy support schemes available on Bornholm. Of central importance for the consultancy services was exploitation of knowledge regarding value-based communication and business models adapted to the 'Experience Economy' as well as symbolic design knowledge regarding organisation and decoration of the farm buildings including cafe, catering and shopping facilities. In this particular field also the regional traditions for tourism and arts & crafts businesses with workshops open for visitors, functioned as an inspiration basis exploited and adapted to a vineyard business concept. For instance, a group of 20 students at the

Glass and Ceramics School on Bornholm - a national further education institution with 90 students from all of Denmark, providing practical training in the crafts of glass blowing and ceramic production as well as theoretical elements regarding industrial design, business organisation, marketing etc. - made a project about LG, providing useful inputs regarding branding values, experience elements, etc. In the final phase of identifying and implementing the results of the previous phases in a more coherent and consistent concept for the vineyard and its diverse functions the main actor was a local private consultant who later was employed in the firm.

1.4.4. Confrontation of FKD2 to EURODITE research hypothesis

A central characteristic of the FKD2 is the combination of firm-internal (personal) learning processes and firm-external knowledge sources. Some of the sources were intra-regional such as KIBS and actors from related business sectors that mainly provided symbolic knowledge about experience creation, value-based business models and communication (however, often mobile knowledge originating from urban centers). Other sources were extra-regional and mainly were used for provision of synthetic product and technology knowledge. Via a variety of learning and social interaction mechanisms the business entrepreneur absorbed, examined, combined and contextualized pieces of knowledge from many places in the world that to him seemed useful for realization of his business goals.

In this sort of entrepreneurial person-based knowledge dynamics the main challenge in terms of business success is not the one of getting access to useful knowledge per se but the one of selecting the most appropriate sources, extracting the most relevant pieces of knowledge from these sources, and adapting and contextualizing them in a coherent manner to region-specific conditions such as climate and tourism markets. The access to competent regional business consultancy, supported by regional and national policy schemes, played a pivotal role in facilitating the entrepreneur in overcoming this challenge. In conclusion, the FKD2 illustrates the business opportunities connected with utilization of a growing body of mobile knowledge in the knowledge economy and the importance of KIBS for diffusion and contextualization of this knowledge.

This case also illustrates the interrelationship between the existence of institutions of higher education and knowledge types. The trail-and-error process which characterizes a good deal of the knowledge processes of the synthetic knowledge type in FKD2 is mirrored by the lack of local knowledge institutions within the food production and processing fields on Bornholm, whereas the predominance of symbolic knowledge types in the case is mirrored by the presence of the Glass and Ceramics School in the region.

1.4.5. General synthesis of FKD3 and its relation to the TKD

FKD3: Development and marketing of Danish Crown's Bornholm pork meat

The last FKD concerns a company that unlike the two small firms studied in FKD1 and FKD2 is not a part of the Bornholm food platform and has not taken part in establishing the new brand of regional food from

Bornholm. Rather, as mentioned above, the company exploited this brand after it had been established by Bornholm actors. FKD3 is about the innovation project of Danish Crown (DC) of developing a specialised production of Bornholm pork meat alongside their standardised production lines. With about 25.000 employees DC is the largest meat (beef and pork) processing company in Europe and the second largest in the world. It is cooperatively owned by Danish pig farmers. DC has a production unit with 220 employees on Bornholm – a slaughterhouse for primarily pigs, which ships its products on to other DC production units for further processing.

While FKD1 and FKD2 are supply-driven development processes of individual micro firms realised within frameworks of virginal markets, distribution systems, and support and science institutions, the FKD3 is a demand-driven innovation project occurring within a framework characterised by economically strong players, well-defined supply chains and customer relations, and large national science and consultancy institutions. FKD3 integrates actors and activities all along a well-established supply chain from farmers to supermarkets. The case illustrates the response of large conventional food processing companies to the growing consumer demands for specialised high-profile products by, among other strategies, engaging in innovation of products with a 'regional identity'.

The FKD3 takes its start in June 2006 when one of DC's biggest customers on the national market, the supermarket group COOP, contacted DC and requested a specialty pork meat product to be distributed on nation-wide scale through one or more of the supermarket chains belonging to the group. This request was not based on formal research analyses on consumer demands but on the professional intuition of COOP managers as well as on feedback from butchers and sales staff in COOP supermarkets who were directly in contact with consumers.

First phase was to define the overall parameters of the new product: what should be the defining characteristics, which would make the new product and its production feasible? COOP had initially requested an organic pork product, which in terms of development time, was not feasible. The option of focusing on the taste aspect was introduced by DC and agreed upon by COOP as a central priority for further development efforts. Such discussions basically involved symbolic knowledge about trends in Danish consumer markets and methods to address such trends via branding values and marketing.

Bornholm came into the picture, because DC previously had started but not fully realized a project on developing a specialised pig production on Bornholm. This project had built up cooperation between DC and a number of pig farmers as well as an agricultural consultant, employed in the Agricultural Advisory Service centre which is a part of nation-wide but decentralized system of agricultural consultants.

In the spring of 2007, DC and COOP visited Bornholm: they noted the emerging branding of regional quality food products from Bornholm and took Bornholm's general positive brand, based on many years as a distinct tourist destination in Denmark, into account. Partly due to the partners' visit to the small-scale cooking oil producer Lehnsgaard who emphasized the need to base the marketing on more substantial product qualities than the pure geographical origin of production, DC and COOP decided on the following parameters of the new product: 1. that the targeted Bornholm pork meat should be provided a clearly identi-

fiable better taste than competing standard products on the market and that 2. It should be named Bornholm Pork/Pig and tie production as much as possible to Bornholm.

Next phase was a firmly structured process wherein the concrete concepts of the product and its production were defined. Actors involved where all the different links in a pork meat supply chain from farmers and agricultural consultancies on Bornholm, the headquarter of the industrial processor DC in Jutland/Denmark, the Danish Meat Research Institute (DMRI) located in the Copenhagen area and owned and run by the Danish meat industry, to the retailer COOP with headquarters in Copenhagen. A main element in this was the interaction between the pig farmers and the agriculture consultant on Bornholm regarding practically, economically and legislatively feasible production methods, based on the directions and wishes of COOP as the customer.

Another crucial element was research based knowledge inputs from DMRI regarding, for instance, factors contributing to good taste of meat and, mainly in later phases, costs consequences of different aspects and dimensions of the product and production concept under elaboration. The exploited research knowledge was highly codified and often had the form of statistical tables and mathematical formulas, allowing for precise calculations of the expected cost and logistical effects for the individual links in the supply chain of farming, processing, distribution and sales of changing certain aspects in the farming link (such as the space for the pigs and their slaughtering weight). The phase was completed when a complete production manual with all specifications of the product were agreed upon by COOP, DC and the farmers.

In the final phase marketing materials including a special product logo was made by professional marketing staff from COOP and DC. An important element in the marketing strategy of COOP was the organization in the months before market introduction in March 2008 of an internal education and information campaign for the staff in the meat departments of the 80 supermarkets of the COOP chain, Kvickly, who in the end was chosen as distributor. Explaining the ideas and content of the new product concept and enhancing the professional interest and knowledge of the butchers and sales staff in the individual supermarkets with face-to-face contacts to consumers was considered decisive for the success of new product introductions.

Despite its premium-prices of 10-15% compared to conventional pork meat the Bornholm Pig from start was a market success. The initial production volume of 200 pigs weekly has been increased by 30% twice. Hence, more than 10% of total pork meat sold in Kvickly today is from Bornholm pigs.

1.4.6. Confrontation of the FKD3 to EURODITE research hypotheses

The FKD3 mirrors contemporary knowledge dynamics of large companies in mature industrial sectors like the conventional food industry. The difference in both internal resources and external, institutional resources characterising, on the one hand, a large conventional food company like DC and, on the other hand, small alternative food producers like the ones studied in FKD1 and FKD2, is striking and causes huge differences in knowledge dynamics. Occurring within the framework of a national agro-food system with a high degree of vertical and horizontal integration and well-established supply chains geared to opti-

mize the efficiency of production, the FKD3 is characterized by a high degree of cumulative knowledge dynamics.

Indeed, due to the requested demand for a new type of product, the innovation project encompassed phases of combinatorial knowledge dynamics where knowledge of actors external to the established supply chain were searched for. An example of this is the interaction with specialized small-scale producers on Bornholm regarding creation of food with regional identity which interestingly illustrates that inspiration for innovation and flows of knowledge not always spring from the large to the small firms but in the food sector of today often have the opposite direction. However, the project of developing a production concept for Bornholm pork meat fundamentally was accomplished by exploiting knowledge accumulated and developed through decades and stored in industry research systems for reactivation. The fact that generic knowledge could be applied for specialization purposes shows the limitations of conventional large-scale food industries in how far they can move away from standardization. Rather than following a specialization strategy DC follows a product diversification strategy.

Thus FKD3 is atypical for the TKD and, indeed, Danish Crown (FKD3) does not partake in any of the built up regional food production networks (Regional Culinary Heritage or Gourmet Bornholm) as does Lehnsgaard (FKD1) and Lille Gadegaard (FKD2). Indeed, to some of the small-scale food producers on Bornholm, activities such as those of Danish Crown described in FKD3 represent an indefinable threat: the exploitation of the Bornholm food brand without anchoring on Bornholm.

2. Possible future stakes about the TKDs in their (regional and broader) context

2.1 The observed KDs and the regional context

Despite the territorially far-reaching knowledge dynamics characterising the development of productions and promotion frameworks for Bornholm food, the region of Bornholm has played a crucial role both in terms of its geographically determined development conditions and in terms of its administrative status allowing for region-specific policies and support schemes.

For new Bornholm food producers Bornholm is an important and integral part of the products. The French concept 'terroir' captures an understanding of the territory as a combination of culture, history, tradition, production process, terrain, climate, and local knowledge systems that all is embedded in the food and drinks products. This concept mainly is applicable for studies of Southern European food systems based on richer local and regional culinary traditions and less relevant for Northern European food markets and production systems in a historical perspective have been more functionally oriented (e.g. focusing on safety and health of food) and driven by an understanding of food as commodities rather than cultural artefacts

(Parrott et. al. 2002). Nonetheless, although not articulated as a keyword for a regional food strategy¹⁹ the terroir concept holds some validity for understanding and describing the efforts of developing Bornholm culinary heritage from its point of departure in traditions mainly within smoking of herrings. This for instance is reflected in the cross-sector interaction with related sectors of tourism and arts & crafts, and the integration of Bornholm food in a larger place-branding of the island focusing not only on food but on broader social, cultural and economic traditions and potentials. The Bornholm 'light' version of the terroir concept permits inclusion of products without a basis on local recipes or resources, such as chocolate and caramel, based on the idea that living and working on Bornholm gives time for careful product development and artisanal craftsmanship.

The knowledge dynamics also are profoundly affected by other geographically determined characteristics of Bornholm: peripherality, insularity and rurality. Due to these characteristics Bornholm has weak institutional frameworks for research, innovation and knowledge generation and instead a higher dependency of informal interaction and abilities to connect to relevant expertise in- or outside the region.

In the branding of Bornholm the distance to big urban centres, the propinquity to a multifaceted nature, the quiet and safe atmosphere etc. are emphasized, however turned into competitive advantages for business development and quality of life of creative entrepreneurs and artists. As any other place-branding, this picture obviously is tendentious. Nonetheless, it might hold an element of truth in connection with development of regional food and culinary heritage as well as with the about 100 arts & crafts businesses on the island. It is a real question whether the lacking institutional conditions for formal R&D has been a disadvantage in the process of creating Bornholm food productions in which distance to formal science and university systems of urban areas seems not to have been a critical problem. However, there seems to be a connection between the presence of the Glass and Ceramics Schools and the predominance of symbolic knowledge types in the TKD and, on the other hand, the recessive stance of synthetic knowledge types and the lack of educational institutions which produce research on for example food and food production.

The KIBS sector on Bornholm also seems to function differently than in urban areas. Due to the insularity and the smallness of the island, we have found that many of the firms which function as KIBS in our FKDs and in the TKD, are the same people. Thus, the same consultants have been present in contact with a number of small-scale firms in the emerging food sector even though they do not offer food-specific consultancy work. Thus a cumulative knowledge process takes place in the KIBS sector, presumably to a larger degree than in a less-insular setting, where firms would be more spoilt for choice concerning consultancy work.

An analysis of the location of agro-food sectors in Denmark as a whole (Manniche, 2008) indicates that the location of small-scale food industries do not in general correlate with degree of urbanisation. Small food industries seem to locate and grow only in certain parts of the country such as Bornholm, in areas close to Copenhagen, and in parts of Jutland, indicating the significance of local-specific factors.

¹⁹ However, according to interview with Georg Julin, employed as Food Ambassador for promotion of Bornholm food, he implicitly used the terroir concept in his work.

The empirical findings from Bornholm have uncovered a number of location factors that might explain the emergence on Bornholm of new small-scale food productions. One is the long-termed and proactive role of regional policy actors, starting promotion efforts already in the early 1990'ies. Another might be the presence of persons with certain entrepreneurial characteristics that seem to be of significance for establishment of specialised quality food such as a normative and not purely profit-oriented motivation, a practical rather than theoretical approach to business development, and a certain element of charisma and creativity.

Particularly in peripheral areas, individuals of persons, firms, and organisations, showing the way to go, making a good example, are crucial. The few old specialised food producers on Bornholm, existing long before the take-off of the new trend of regional food, as well as the two entrepreneurs of the firms studied in FKD1 and FKD2 are two of the 'heroes' praised in one of the above quotations of Bornholm interview persons. The micro size of most firms means, as documented in the FKD1 and FKD2 case studies, that the business owners play a central role in the firm-internal knowledge dynamics as well as in the interaction with external actors. In some cases, even products and marketing are person-dependent and relying on the business owners as concrete persons with a face and a story to tell and a family to show on the homepage. This element of person-dependency however, rather results from the applied business models than from the peripheral development conditions of Bornholm.

A similar degree of person-dependency characterises knowledge dynamics and activities concerning the public policy and governance actors. For instance, the present secretary for the Local Action Group for rural development and diversification, Hans Jørgen Jensen (HJJ), (see paragraph 1.2), has been a driving actor for promotion of regional food and culinary heritage since the early 1990'ies. By launching and coordinating regional activities, organising study tours to other parts of Denmark and abroad, bringing new knowledge and best-practices to relevant actors on Bornholm, and more lately by transferring best-practices from Bornholm to other rural areas of Denmark as an invited speaker, HJJ has achieved a widely acknowledged position as one of the key factors behind the emergence of a new Bornholm food sector. His central role is not only appreciated on Bornholm but also - according to interview with Rita Munk from The Danish Ministry of Agriculture - at central governmental level among staff in national authorities and politicians engaged with national and EU rural policies including development plans for Local Action Groups.

Such person-dependency can assure a certain amount of continuity in activities and knowledge accumulation but also makes the knowledge networks highly vulnerable for disruptive losses and fall-backs since the accumulated knowledge only to a limited degree is embedded in regional organisations and public institutions.

2.2 The KDs and sectoral dynamics

We already several times have touched upon overall contemporary changes and dynamics in the food sector and how the TKD relates to these changes and dynamics, and thus, only a few points will be summed up here.

On the basis of reviews of research literature, industry reports, newspaper debates, and other relevant materials, conducted as part of the elaboration of the EURODITE WP3 food sector report (Manniche 2007) it is our judgment that the studied TKD is typical for one of the two main directions of change in agro-food systems in Western countries of today. Alongside the strategy of continuous standardisation, technological rationalisation and productivity increase, chosen to compete on price and efficiency factors in meeting consumer demands for cheap products, another strategy of specialisation and product diversification is increasingly chosen to meet other consumer demands for food with more exclusive qualities and identity (Gehlhar & Regmi 2005; CIIA 2006; EMCC 2006). The development of Bornholm food and culinary heritage represents the latter strategy. And in a Danish context these activities are not only typical but to some extent pioneering, not least regarding the concerted efforts of private and public actors of branding and enhancing the visibility of Bornholm food on a national scale.

The three cases chosen for firm-level studies were deliberately selected because they represent three different business models and three different responses to contemporary changes in food and drinks markets, however all following a specialisation strategy of meeting growing demands for high-profile products with a clear identity. Furthermore, the firms were deliberately selected to be able to investigate knowledge dynamics in the 'alternative food model' respectively the 'conventional food model' as these are opposed in numerous research analyses (Watts et al. 2005; Renting et al. 2003; Parrott et al. 2002; Fonte 2002; Marsden et al. 2000; Morgan & Murdoch 2000). Hence, two of the selected firms are small, locally owned, newly established firms representing the alternative model and the third is a large multinational company representing the conventional model.

One of the questions in focus of increasing research interest is to what extent and in which ways alternative food networks actually are alternative and not just complementary to conventional food networks (see for instance Sonnino & Marsden 2006; Watts et al. 2005; Goodman 2002). The empirical data has provided insight that might have a say in this debate. The FKDs indicate that representatives of the two food models indeed differ in supply bases and sales and distribution channels, however they do not constitute two totally separate systems. Alternative producers – at least in studied cases of regional food production – are often supplied with raw materials from conventional farming and wholesalers that also supply the conventional processing industry. And alternative producers, obviously mainly the group of classical manufacturers of artisanal niche products, often distribute and market their products via conventional retailers (supermarkets).

A similar picture is drawn regarding the knowledge networks and the knowledge dynamics in which producers take part. On the surface the alternative and conventional models diverge in two very different knowledge worlds. Conventional producers heavily rely on cumulative knowledge dynamics while alternative producers rely on composite knowledge dynamics and the type of actors, networks and milieus contributing to these knowledge dynamics are highly varying. However, the case studies have revealed interfaces for knowledge flows between the models. One example is the large conventional company's active interest in learning from small alternative producers as part of its innovation of a regional product. Another is the investments in large-scale industrial process equipment of some alternative producers and the related uptake of knowledge of conventional producers. On top of this, the crucially important knowledge on

marketing and storytelling is, though contextualised and exploited differently, basically common, generic and applicable in both models.

2.3 The relations to other places, to other geographical scales and within a more mobile world

The TKD is affected by the peripheral conditions of low levels of formal competences and knowledge institutions and actors that are users and recipients in national and international knowledge chains rather than generators and distributors of new knowledge. Nonetheless, in terms of establishing new external links and relations to other places, the regional change processes in focus of the TKD represents a move away from this traditional position.

The scale-oriented standardised farming and industrial processing that previously prevailed in the agro-food economy on Bornholm, mainly participated in national and international food supply chains as low-cost, resource based suppliers of standard commodities for further processing and distribution elsewhere. The interaction with external customers and other actors primarily were organised around contractual deliveries of goods and services and only rarely encompassed informal networking and knowledge creating and sharing activities.

The TKD documents new opportunities for peripheral areas of breaking with such types of external linkages and interaction forms. The 'cluster' of small-scale regional food productions indicates new rural opportunities for value-adding business activities with closer more direct linkages to profitable urban knowledge milieus and markets as well as to other rural areas at a national and international scale. The presence of KIBS with expertise in communication, marketing and branding is a regional development condition that is not common for peripheral areas and that has facilitated transfer and anchoring of knowledge from urban centres. These knowledge dynamics have contributed to the development on Bornholm of products, marketing, and business models that are adapted to satisfy the growing consumer demands for experiences, storytelling and high-profiled products.

The TKD is deeply embedded in processes that are out of control of Bornholm such as social and cultural change processes of Western societies with epicentres in large metropolitan areas, connected with demographic development, increased standards of living, individualization of identity formation, new working conditions, family structures, daily life and holiday patterns. Medias have played a crucial role in articulating and translating such changes into concrete consumer demands expressed on the markets. Furthermore, EU policy actors have set new agendas on rural development and food production models and have launched new legislative, financial and other governance instruments to support development in politically wanted directions, such as rural economic diversification.

Having said this it is important to stress that the driver of knowledge dynamics was the initiative of regional actors to search for knowledge, not active diffusion of knowledge by external actors. The emergence of a regional food cluster on Bornholm was not driven by external interests such as big companies looking for

low-costs or other location advantages. Rather it was a regionally initiated and coordinated process in which regional actors benefitted from searching, learning, anchoring, using and sharing knowledge, enabling them to create profitable productions and links to markets. To a large extent, knowledge dynamics are bottom-up entrepreneurial and governance processes, involving adaptation of knowledge to the specific Bornholm context.

Thus, the main enabling factor for more advantageous external relations is the fact that the studied knowledge dynamics are regionally pulled (bottom-up) and not externally pushed (top-down). As a result of these regional bottom-up processes Bornholm has achieved an economic renewal process that indeed has not fundamentally changed the position as a small peripheral region of Denmark. However it has contributed to a change of the regional self-image from an island marked by economic crisis, depression and dependency of external subsidies and support to an island with certain potentials and resources to create its own future. This new self-confidence truly is an important result.

2.4 Suggested adaptation of regional policies

As described above, regional policy has affected the TKD immensely - maybe primarily through the setting of new policy discourses and development agendas rather than through direct financial support. The issue of rural development and economic diversification has attained increasing centrality in EU policies mainly by integration of a territorial perspective in the EU agricultural policies and by launching of local bottom-up governance structures based on Local Action Groups (LAG). This development at the EU level has been reinforced by policies at the regional level, such as the Region Municipality of Bornholm and the Regional Growth Forum (although this is part of a national regional policy scheme, cf. paragraph 1.2). Promotion of small-scale productions of food and drinks has become a central priority of regional policy actors. For instance, co-financing of EU LAG food promotion activities has been integrated in municipal budgets. The strategies and initiatives of the Bornholm LAG have successfully encouraged sector-crossing cooperation between food and arts & crafts businesses and have focused on collective networking and place-branding activities rather than on support to individual firms and technological issues.

However, it is an open question to what extent the goals, priorities and means of regional policies, successful in the phase of establishing commercial Bornholm food productions, should be maintained in the coming phase of consolidation, further product improvements and increased competition from other Danish regions attempting to enter national markets for regional food and challenging Bornholm's position.

As discussed earlier, the weak institutional conditions on Bornholm for education, innovation and knowledge development in relation to food were not a big problem in the first phase of getting a development on the track. But maintaining and further developing the national position in specialty foods might address the need for other types of knowledge and expertise, not least within the synthetic product and technology fields that were less critical in the start-up phase.

On the island there are basic vocational educations on cooking, catering and nutrition, primarily supplying the regional tourism industry and catering units of public institutions. With only 43.000 inhabitants Bornholm surely is too small for specialized types of further educations and vocational institutions for food related activities, especially because the regional food productions diverge in many directions and are not collective oriented towards, say, cheese production. But since Denmark as a whole is lacking educations specifically targeted the needs of small-scale, artisanal food productions, it could be an option to address central government authorities regarding the establishment of such a national education on Bornholm, recruiting students not only from Bornholm but from all of Denmark. Despite the big regional traditions for arts & crafts businesses, the before mentioned Class and Ceramics School is not a regional but a state institution, recruiting students from all of Denmark as well as from abroad. A similar model might be applicable within educations on artisanal food production.

However, there are serious obstacles for the realization of this. In general, Danish students are reluctant to graduate outside the largest cities (or alternatively, in the region they are born) and in a historical perspective the establishment of the Glass and Ceramics School is the only example of large-scale educational investments on Bornholm by central level authorities. The current educational policy in Denmark is to merge and centralize universities and other institutions for further and vocational education in a few regional centers with 'critical mass' and building a new education on Bornholm would not fit into this policy.

Another relevant policy field regards branding. Due to the long tourism traditions Bornholm had a well-established brand in the Danish population long before the take-off of new Bornholm food. This definitely was a conditional factor for the emergence and success of Bornholm food producers and facilitated the branding of food as an integral part of a larger place-branding. The profound and professional competences and traditions for branding that characterize not only the public sector but also a variety of private sectors are regional assets have clear competitive potentials and should be exploited also in future.

Presently, however, the Regional Growth Forum on Bornholm is already engaged in preparing a new branding strategy for Bornholm with the headline of "Bright Green Island, 2014" and with the objective of attracting citizens and business from the rest of Denmark. Food activities are not particularly focused upon but are implicitly a part of the 'unique and creative Bornholm' that the branding strategy is targeted to address and promote. Considering the smallness of the Bornholm economy as well as real interfaces of cooperation and knowledge flows between a variety of sectors such as 'regional' food, arts & crafts, tourism suppliers, restaurants and caterers, marketing and business development firms, it seems highly reasonable to identify and pool such functionally related activities in a sector-crossing development platform alongside or maybe even instead of promotion of more narrow sector-specific industrial clusters such as agriculture, food industry and tourism.

An example of the relevance of enhanced cross-sector coordination is expressed in a local debate about the feasibility of public planning so that smelly, large-scale pig housing systems may be placed away from tourist roads to avoid the clash of co-existing policies regarding, on the one hand, increase of conventional agricultural production outputs and, on the other hand, branding of Bornholm as an ecologically sound tourism destination and a region with a high profile in regional quality foods. One may take this a step further

and discuss the subject of clashing policies in general. For instance, nationally defined land-use directives, setting the criteria and procedures for approvals of farming investments and production systems, should be compatible with regionally defined development goals and strategies.

In recent years there has been an increasing international debate about a 'new rural paradigm' (OECD 2006; van der Ploeg & Renting 2004; Goodman 2004). This paradigm shift is proclaimed to be signified by increased economic diversification of rural areas and changes in rural policies from a focus on sectors (agriculture and fishery) and subsidies to a focus on rural territories and investments in development projects within a broader range of activities including natural environments and landscapes, cultural resources, tourism and other service sectors.

The ongoing process of massive restructuring in the Bornholm food economy, i.e. the employment decline in conventional standardised production systems and the simultaneous growth in alternative specialised production systems, might be considered an illustration of such a paradigm change. However, although small-scale productions of 'regional food' have achieved a considerable weight in the Bornholm food economy the way still seems to be long before a paradigm shift is real and not just an academic buzz word. In particular there is no sign of a *general* move away from a 'productivist' development model (Goodman 2002 and 2004) in the Bornholm agricultural sector that experiences continuous structural changes towards still bigger production units with still fewer employees and a still stronger integration in global markets and supply chains. Furthermore, despite certain flows of raw materials and potential interfaces of knowledge exchange between 'conventional' and 'alternative' production networks, as indicated by the analyses, their institutional and policy frameworks to a large extent form two separated systems with only little interaction. A higher degree of integration of regional policies targeted the two 'worlds' of conventional and alternative food would be beneficial for actors in both 'camps'.

2.5 Synthetic findings about gender issues

While farming and fishing are heavily male dominated sectors, 42% of the employees in Bornholm's food processing industries in 2007 were female (source: Statistics Denmark). In particular the fish processing industry was an important employment sector for women on Bornholm, however primarily in the form of unskilled, low-paid jobs. The dramatic decline during the last 15-20 years in traditional standardised food processing industries, and in particular fish processing, has hit female employment most severely and from 1993 to 2007 the number of employed women was reduced from 842 to 370. This has caused high unemployment rates among women, since only few alternative jobs for this group of unskilled workers with experiences exclusively related to highly specialised manual routine tasks have been created in other sectors, including the newly established niche food productions. Hence, the overall restructuring process in the Bornholm food industry of has affected female employment severely.

More important to stress in this case study, however, is the dominance of men in the TKD. It should be noted that a systematic analysis of the entire new food sector on Bornholm based on a gender perspective

have not been carried through. The following is based on the people we have come directly or indirectly into contact with in this research.

There is dominance of men among the persons that have been involved in the studied knowledge dynamics, in particular in managing, decision making positions such as the entrepreneurs who have established the new food firms. However, there are quite a few family firms, where husband and wife run the firm together. For instance, of the 16 firms included in the tables on page 3 of this report, 11 are owned by men, while five are family firms, owned by a couple; none are owned by a female alone. We have no in-depth knowledge about the family firms and how the firm-internal division of labour is played out. This same structure occurs in the KIBS sector, which is dominated by small, often single owner/employee firms, where the owner is male. In KIBS firms with more than one employee we have found several cases, where there are female employees, though not at management level. In general, at the TKD level it is fair to say that the most visible promoters of new Bornholm food with a few exceptions are males. This is true at the firm level, as well as in the contexts of market/networks, policy/governance²⁰, science/education, while in the context of society/culture women seem to have been more central as consumers and media trend setters.

Concerning knowledge types, we find a predominance of females in the symbolic knowledge sphere, almost a total dominance of males in the synthetic knowledge sphere and a dominance of males in the analytical knowledge sphere. Concerning the symbolic knowledge type the female students at the Glass and Ceramics School have played a significant role in our FKD2; in the food journalism sector, we have spoken to or been informed about a number of female journalists, who have specialised in the food sector. In our research we have come across a number of female cooks who are linked to firms and produce special recipes for that firm (e.g. the FKD3 and the Bornholm firm “Den Gamle Skole Honning”). These statements are by no means based on systematic analysis.

Overall, the food sector and food supply chains are characterised by high male dominance. Women do not hold central positions, do not tend to take part in business decision making and contribute professionally primarily in marginal roles of marketing and design (traditional female jobs). However, several studies (Bech 2005; Halkier & Holm 2008; Tobiassen 2005) indicate that women are important at customer/consumer side (consumption), and in this sense can be interpreted as the drivers of the development. For instance, Bech (2005) has carried out an analysis of consumer values and practices amongst 9000 consumers in Denmark, Norway and Sweden. They have set up a system of nine archetypes when it comes to food consumption. If “older” consumers (23% in all), who tend to be traditionalists (whether male or female) are excluded, a majority of female consumers are characterised as two archetypes: “The impulsive” and “The explorers”. These two archetypes account for 30% of all consumers and 63 and 66% of them, respectively, are female. “The impulsive” are defined as having a pragmatic approach to food, find cooking fun and often try new products and recipes. They are to a high degree responsible the people re-

²⁰ It should be mentioned though, that one of the rather few regional politicians who have been actively engaged in and proactively have contributed in setting the agenda of ‘alternative’ Bornholm food and rural development, for instance via a seat in the Bornholm Local Action Group for the EU LEADER program, is a woman, Annelise Molin.

sponsible for food shopping and cooking in their homes and the group encompasses the largest share of families with children (17%). “The explorers” are food enthusiasts, who find health, news about food and organic food play an important role in their lives. They spend time with their food preparation and are often the ones responsible for shopping and cooking in their families. This study supports the conception that target groups for the New Scandinavian Cooking trend, including the new regional food products from Bornholm, are female.

3. General conclusions

3.1. Combinatorial versus cumulative KDs, territorial relations, mobility and anchoring

The EURODITE conceptual framework constitutes a highly complex basis for empirical analysis of knowledge dynamics. To investigate the given definitions of knowledge types, knowledge phases, and knowledge contexts and relate them to spatial, sectoral, political, and gender dimensions of economic development as well as to a set of theoretical hypotheses regarding contemporary regional and economic change processes, has been an analytical challenge. Most parts of the conceptual framework have proven to be relevant and useful, however its complexity and multidimensional nature makes it difficult to focus the empirical analysis and to extract the essence of its theoretical implications in a few pages.

The empirical findings of the TKD case study have been explicitly confronted to parts of the EURODITE hypotheses already in paragraph 1.3, mainly regarding the significance of composite knowledge dynamics, and more indirectly in other paragraphs. We shall not repeat these remarks but conclude the analyses by addressing the three hypothesized typologies of territorial knowledge dynamics, elaborated on the basis of the dimensions of generation vs. use of knowledge, proximity vs. distance knowledge interactions, and mobility and anchoring of knowledge. All three dimensions seem relevant and central for summing up the TKD.

3.1.1. Generation vs. use of knowledge

Due to the maturity of product cycles and technological systems in the studied sector and due to the peripheral location with only weak institutional science and innovation frameworks, regional firms only to a limited degree have generated fundamentally new knowledge for instance by means of formal R&D projects or other sorts of efforts to systematically develop new knowledge or insight. Overwhelmingly dominating in the private sector is absorption, combination and use of existing knowledge, for instance synthetic knowledge of geographically far-reaching professional networks of expertise regarding culinary heritage and production technologies, or symbolic knowledge and concepts for experience economy, value-base business models, and tools for communication, marketing and branding mainly stemming from urban centres. Also regional traditions within experience based activities such as tourism and arts & crafts form a tacit knowledge ‘blowing in the air’ that have been used by food producers as well as by regional policy actors in identification of relevant promotion initiatives. In general, policy and governance actors deviate from the

above picture of private sector actors and have been characterised by an analytical, knowledge generating approach to development of promotion frameworks. They often have organised their initiatives on the basis of specifically acquired analyses of private consultants and research institutions such as CRT.

Use of knowledge rather than generation of knowledge not only characterises development of Bornholm food but is a general characteristic of markets for premium-priced dedicated food products on which authenticity and tradition rather than novelty and change are branded product qualities. Usually, generation of knowledge is considered the pivotal driver of innovation but on the mentioned sort of markets, innovation and competition to a large extent is determined by the abilities to obtain, combine, and use existing knowledge in new ways. In this field, small firms often are more efficient and adaptive than large firms. Interestingly, the multinational meat processing company Danish Crown, studied in FKD3, contacted micro firms on Bornholm to learn and be inspired about development of specialised products as an element additional to their targeted R&D activities.

It should be stressed however, that a distinction between generation and use of knowledge does not fully capture the kind of knowledge and learning that characterises Bornholm food producers. To capture the essence of the observed knowledge and learning dynamics we need something in between generation and use such as adaptation and contextualisation. Although generation of fundamentally new knowledge is rare, very little knowledge is directly copied and used without adaptation to the specific regional and national context. A prime example of this is the creation of a Bornholm version of regional culinary heritage. Though inspired and influenced by food traditions abroad, the critical part of this creation is connected with the adaptation and contextualisation to the Bornholm setting - the Bornholm 'terroir'.

3.1.2. Proximity vs. distance knowledge interactions

The TKD is highly complex and diversified regarding territorial aspects. In fact, three of the four region types regarding proximity and distant interaction, hypothesized in Figure 3 of the EUODITE guidelines (EUODITE 2007), are applicable for different parts of the TKD.

In the field of synthetic product and technology knowledge, geographical distance seems not to constitute an inaccessible barrier for exchange and transfer of knowledge. Codified product and technology knowledge is without major problems provided via geographically wide-ranging professional sources and networks, for instance the internet, suppliers, industry organisations and competitors. After practical phases of learning-by-doing these networks of professional communities are also used for exchange of tacit knowledge. Thus, in terms of provision of product and technology knowledge, the TKD fits well into the EUODITE category of 'Networks of distant knowledge interactions'.

The picture is different when it comes to development and use of symbolic design, marketing, communication, and branding knowledge of crucial importance for creation of value-adding experience and storytelling dimensions of products. Here the TKD has characteristics of a 'Classic innovative milieu' in which diffusion and development of tacit knowledge elements depend on spatial proximity between actors in a localised

system, however, open for distant interaction and learning as well. This 'Bornholm innovative milieu' for symbolic knowledge is highly sector-crossing and involves not only food producers but also actors of related sectors such as tourism, restaurants, and arts & crafts who commonly market and brand their products with a 'regional identity'. Furthermore, the symbolic knowledge milieu encompasses a public knowledge institution in the form of the before mentioned Glass and Ceramics School on Bornholm for craftsman production and industrial design within glass and ceramics²¹ as well as two trade associations for the about 100 arts & crafts firms and a number of consultancy firms with expertise in graphical design, communication, experience economy businesses, etc.

Finally, the combination of rich intra-regional interaction and rich inter-regional interaction with production and marketing systems for culinary heritage in other rural regions of Europe, formalised under the umbrella of the association Regional Culinary Heritage, suggest a classification as 'Medium and long distance KDs between regional production systems'.

3.1.3. Mobility and anchoring

The TKD is an example of increasing flows of mobile knowledge and of the significance of regional anchoring of this knowledge in an increasingly global economy. The mobility of knowledge has two dimensions: a dimension of increased interaction and knowledge flows in geographical space, and a dimension of enhanced knowledge linkages between different sectors that were not before related to the same degree. The concept of experience economy seems to be relevant and illustrative for both dimensions.

Starting with the *sectoral* dimension of mobility, the relevance of the concept experience economy is not restricted to the classical experience based service sectors like tourism and entertainment but is applied in a variety of sectors including food. Regarding the *spatial* dimension of increased knowledge mobility, the TKD illustrates, among other things, the transfer and practical contextualisation of the abstract experience economy concept, invented and developed by social science researchers and international consultancy firms in metropolitan areas to describe new product and business forms profiting from growing consumer demands for experiences and products with a face and story. Through the intermediating roles of regional KIBSs and through regional interaction of related experience based sectors, an understanding of the concept of experience economy and its practical implications for diverse business functions has anchored among regional firms and governance actors. The cross-sector flows of symbolic knowledge among Bornholm actors concerning design, marketing, and experience based business models constitutes the main regional anchoring element of the TKD, giving the process of developing Bornholm food its distinct region-specific character and difficult to replicate by other regions.

A high degree of spatial mobility of knowledge also characterizes the fundamental initial inspiration of Bornholm food producers in culinary heritage traditions and food production, distribution and consumption cultures in other countries. Due to lack of authentic regional food traditions the development of Bornholm

²¹ The Glass and Ceramics School played a direct role for the knowledge dynamics in FKD2.

culinary heritage has eclectically tapped into international gastronomic traditions of Southern European countries as well as 'New Nordic Food', a gastronomic style or 'school' recently launched and promoted by the Nordic Council of Ministers, focusing on the naturalness and freshness of Nordic food raw materials (<http://www.norden.org/>).

So, contextualisation of mobile knowledge is a main characteristic of the TKD. In recent years other rural areas of Denmark as well as rural development actors at central government level have been highly interested in adopting the 'best-practices' from Bornholm of developing regional food. Accordingly, certain elements of reciprocal learning have started affecting the TKD. The interest of external actors might indicate that parts of the knowledge developed on Bornholm, primarily concerning establishment of policy and governance frameworks, have become mobile and transferable to other places. Still, the Bornholm experiences are difficult to bring out of its specific historical and regional context and other places will have to accomplish similar processes of contextualisation in order to truly exploit the lessons made.

3.2 Confrontation to existing theories

In paragraph 2.2 we confronted our findings with research and theories within rural sociology and economic geography regarding the question if and in which ways alternative food networks actually are alternative and not just complementary to conventional food networks. In this paragraph we only have one further comment.

As already described, the business model generally employed by Bornholm food producers, relies on premium-priced products dedicated to certain consumer segments and adding of value to the physical products through experience elements. In the terminology of Storper & Salais 1997, such firms belong to the World of Production for dedicated-specialized products characterized by trust-based interpersonal relations and dialogue between producers and customers to build mutual understandings and expectations.

The general picture from our interviews, though, is that most individual firms have a surprisingly little explicit knowledge about costumers and only few make attempts to investigate this issue in more targeted and systematic manners. The concept of gap-filling (Dahmen 1988; Shaw & Williams 1990), stemming from research on entrepreneurship in tourism, seems to be relevant for understanding a part of the knowledge dynamics behind development of experience elements of Bornholm foods. The concept gap-filling has a point of departure in a Schumpeterian understanding of the entrepreneur. Gap filling is related to the idea that economic development follows cycles, started by radical innovations which create structural demands for new products. These demands open for opportunities for entrepreneurial activities to fill the gaps in markets between the supply and demand sides. In our case the new structural demands concern food with a 'cultural meaning' - a regional identity, assured by certain qualities, i.e. the consumer knows where, how and by whom his/her food is produced. It is impossible to trace knowledge sources concerning the social and cultural identity processes in contemporary Western societies whereby consumers react to globalization processes by demanding knowledge about the who, what, where and how, of their food. But Bornholm has a definite territorial edge in this discourse because it is the most distinct region in Denmark. This dis-

tion, although fostered by geography, has been utilized explicitly by producers and regional marketing KIBSs. Thus, a natural asset has been exploited for commercial purposes by 'instinctive feeling' - as opposed to formal research - about structural market gaps.

3.3 Specific conclusions for the region

Please see section 2.4.

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Firm-level knowledge dynamics of creating Bornholm food

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Content

SECTION 1 – INTRODUCTION	4
1.1 The region	4
1.2 Regional benchmark from WP4 tool	7
1.3 The sector.....	7
SECTION 2 - THE CASE STUDIES	8
2.1. The Territorial Knowledge Dynamics – Development and branding of Bornholm food....	8
2.2. FKD1: Development and marketing of cold pressed rape seed kernel cooking oil from Lehnsgaard.....	12
2.2.1 Introduction.....	12
2.2.2 The sequence of events and phases in the knowledge biography.....	13
2.2.3 Development of product and provision of technology	13
2.2.4 Development of business concept, branding strategy and marketing materials	17
2.2.5 Marketing, distribution and branding events	19
2.2.6 Gender issues	22
2.3. FKD2: The creation of Lille Gadegaard vineyard	23
2.3.1 Introduction.....	23
2.3.2 Development of business idea	25
2.3.4 Development of wine products, part one - Berry wines	26
2.3.5 Development of wine products, part two - Grape wine	27
2.3.6 Development of the value basis and business model of the vineyard	29
2.3.7 Development and commercialization of experiences and visitor facilities	31
2.3.8 Overall summery of the knowledge biography.....	34
2.3.9 Gender issues	36
2.4 FKD 3: Bornholm pork meat of Danish Crown.	36
2.4.1 Introduction.....	36
2.4.2 Development of basic idea	37
2.4.3 Specification of product and production concept	41
2.4.4 Preparing farmers, processing and marketing	46
2.4.5 Gender issues	48
2.5 Findings and conclusions from the FKDs.....	49
SECTION 3 CONCLUSIONS AND COMPARISONS	53
3.1 Conclusions about micro-level knowledge dynamics.....	53
3.2 Conclusions in relation to the WP5 main parameters.....	55
3.2.1 Generation/use	55
3.2.2 Mobility and anchoring.....	56

3.2.3 Proximity vs. distance knowledge interactions.....	57
3.3 Conclusions in relation to WP6 hypotheses.....	58
3.4 Conclusions about abstract categories of knowledge	59
3.5 Policy conclusions related to regional knowledge dynamics	59
SECTION 4 GENERAL CONCLUSIONS	61
4.1 Conclusions of knowledge case studies (FKDs) based on the empirical findings	61
References.....	63
Literature.....	63
Interviews (WP5 and WP6)	65

SECTION 1 – INTRODUCTION

1.1 The region

Peripherality

The island of Bornholm is situated in the Baltic Sea and lies relatively close to the Swedish shore and relatively far from the “mainland” of Denmark. Due to Bornholm’s geographically remote position, relatively small population (just less than 43,000 in 2007) and low degree of connectivity to the rest of Denmark in terms of transport and communication systems, it can be argued, that Bornholm is the only real peripheral part of Denmark. Bornholm’s remoteness and history has created a strong shared island identity, which forms an important platform for building cooperation on the island – potentially across the public-private divide and between economic sectors.

In a EURODITE perspective, Bornholm is the smallest region and the only peripheral region. In a knowledge perspective this means that Bornholm is highly dependent on knowledge institutions located in other regions of Denmark or internationally. The population on Bornholm is relatively under-educated and this challenge is stressed in that the education opportunities are particularly limited at the level of further educations, thus limiting the opportunities to build a knowledge-based economy in the region.



Figure 1. The location of Bornholm

Transport

Bornholm as a regional economy is influenced by its relative remoteness to the wider economical system it is a part of. Accessibility is a central challenge to Bornholm’s economy. The challenge refers not only to long transportation time, but also to lack of capacity and frequency, which seri-

ously impedes 'exporting' opportunities. Thus, manufacturing industries are not as weighty in the regional economy as in Denmark as a whole. The main transport services are:

- Ferry service Rønne–Ystad (South Sweden) with connection to train and bus services to the city centre of Copenhagen. Door-to-door travel time is about three hours.
- Night ferry service Rønne–Køge. Køge is situated 30 km south of Copenhagen. Travel time is about 6½ hours.
- Airline service Rønne–Copenhagen Airport. The flight takes 35 minutes.

The number of ferry departures varies depending on the time of the year – from just a few daily departures during winter to several connections during peak season. Both summer and winter there are several daily flight departures.

Administrative status

Following a national administrative reform, effective from January 2007, Denmark consists of five regions and 98 municipalities. In this structure Bornholm has a unique position in that the island is concomitantly a municipality and (in some respects) a region. Although it formally is part of the Copenhagen Capital Region, it has certain regional privileges and responsibilities delegated to Danish regions regarding forming its own 'Regional Growth Forum', responsible for instance for allocation of EU structural funding, and developing its own regional business development strategies.

Population

While the Danish population in general is showing an upward trend, the population of Bornholm is gradually declining – from 47,605 in 1979 to 43,245 on 1 January 2006. This is a reduction of some 4,360 people which is 10 per cent of the present population. According to the forecast produced by Statistics Denmark the population of Bornholm is expected to drop by 5 per cent each year and it is estimated that in 2020 the population of Bornholm will have declined to around 41,400. As in many other peripheral regions, the declining population is due to negative net immigration and an overrepresentation of elderly people.

The lack of job opportunities is the most significant barrier to turning net immigration in a positive direction. To many people Bornholm is attractive for settlement due to the relaxed and safe atmosphere and the natural surroundings. However, despite a radical drop in unemployment in recent years the small labour market and long distances to other labour markets create substantial barriers to settlement.

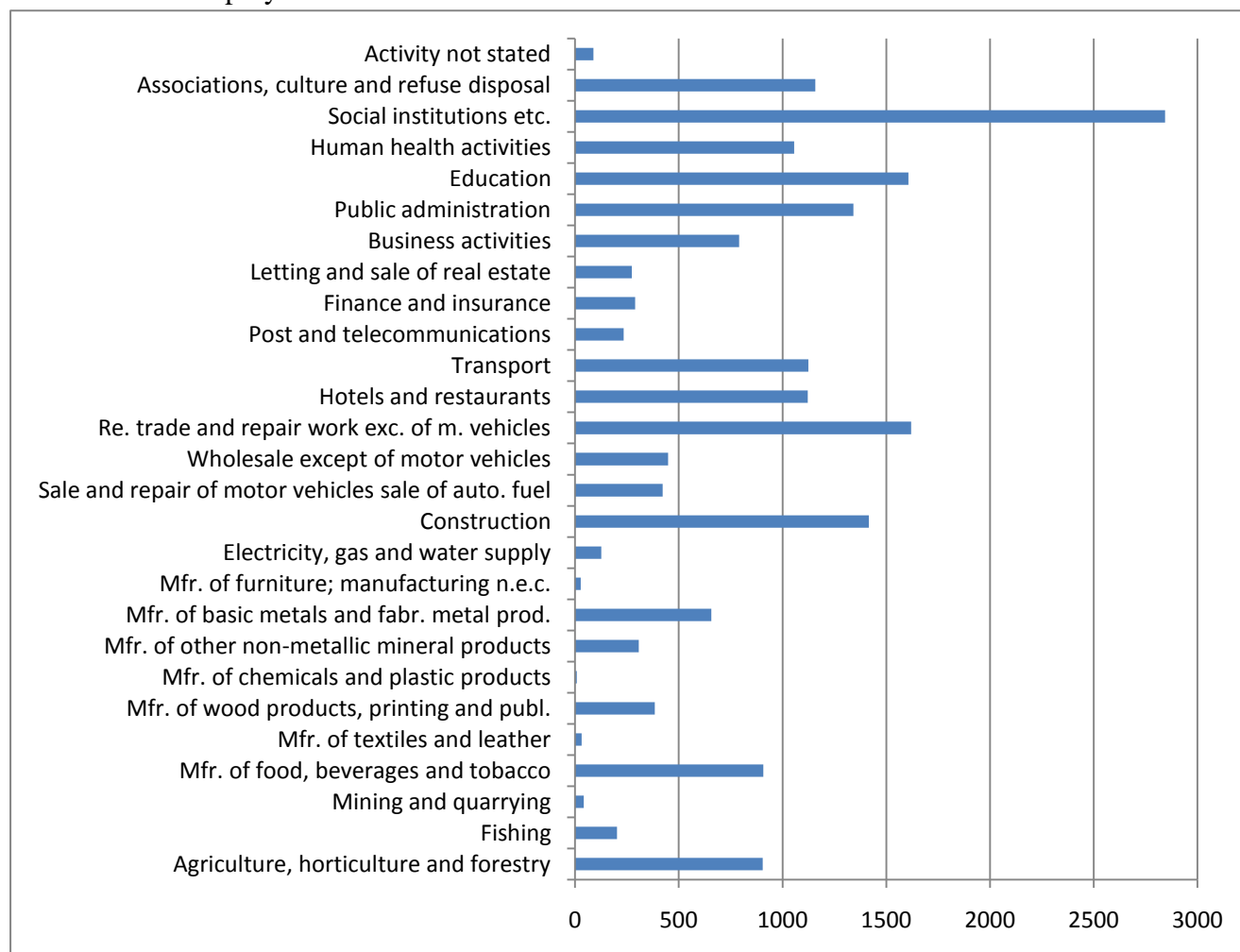
Employment and income level

The Danish economy has experienced an economic boom since the middle of the 1990s which has led to an ever dropping unemployment rate until the global finance crisis began autumn 2008. The development on Bornholm has not been as positive, however, the recent years the economic boom has reached Bornholm as well. From 1996 to 2008 unemployment on Bornholm dropped - from 11.5

to 5.2 per cent. The financial crisis has also reached Bornholm and the unemployment rate was 6.4 per cent marts 2009.¹

Main sectors

Table 1. Total employment Bornholm 2006



Source: Statistic Denmark 2008.

Like in Denmark as a whole, public sector activities play an important role in the Bornholm economy (cf. table 1). The nucleus of the private sector is formed by three sectors: 1. Fishing, agriculture and connected manufacturing industries of food and beverages, 2. Tourism and 3. Metallic industries. This business structure is typical of what is generally seen in peripheral areas. As described below, employment in the agro-food sectors is declining, but jobs have been created in new small businesses with niche food products. The emergence of these productions is in the focus of the Territorial Knowledge Dynamics case study. The tourism industry has been showing a growth potential in recent years.

¹Labour Market Region Capital & Sealand and Statistic Denmark, April 2009.

In the rest of Denmark business sectors such as financing, business services and public and personal services are showing an upward trend, but in general these sectors have not experienced the same level of growth on Bornholm. However, as is described in the firm level case studies in this report, a few consultancy firms within marketing, communication and business development have been established in recent years and have provided important knowledge inputs for the new artisanal food producers.

Another type of economic activity in which Bornholm has long-standing traditions and which also has formed and inspirational basis for some of the new artisanal food producers, is arts & crafts businesses such as small workshops with glass blowing, ceramic production, wood cutting, design and manufacturing of clothes, etc. (spread over several of the sectors shown in Table 1). There are about 100 arts & crafts businesses on the island, employing approximately 140 persons². Due to these traditions within arts & craft business there is a national Glass and Ceramics School on Bornholm - a further education institution with students from all of Denmark, providing practical training in the crafts of glass blowing and ceramic production as well as theoretical elements regarding industrial design, business organisation, marketing etc. This school has been involved in the knowledge biography studied in FKD2 in this report.

1.2 Regional benchmark from WP4 tool

Not relevant in this report.

1.3 The sector

The sector in focus for this report is the food and drinks industry. On Bornholm this sector traditionally was heavily dominated by large-scale industrial processing of local fishery and agricultural supplies into standardized, semi-fabricated products with relatively low value-added, that were exported out of the island for further processing elsewhere. This type of standardised food production still exists on Bornholm but has experienced a dramatic decline due to increased and continuous globalisation, mergers and concentration, productivity initiatives, technological change etc. Hence, the employment in the Bornholm food industry as a whole was diminished from more than 2000 jobs to about 900 in the period 1991-2007³. Also in agriculture and fishing there is steady employment decline and structural change towards fewer but bigger production units and firms.

However, alongside the dramatic employment decline in traditional industrial processing and conventional farming, about 40 new (small and micro) firms with small-scale productions of specialised

² Information from Arts & Crafts Association Bornholm (ACAB – <http://www.craftsbornholm.dk/index.php?Itemid=16>), one of two associations on Bornholm for arts & crafts businesses with 64 members (May 2009). The other association is Bornholmske Kunsthåndværkere (<http://www.borncraft.dk/>) with 19 members (May 2009).

³ Statistics Denmark.

‘quality’ food and beverage products and with about 200 employees have been established since the middle of the 1990s.

These overall contemporary trends in the agro-food economy, i.e. the continuous employment decline and concentration of ‘conventional’ food production systems and the simultaneous emergence and growth of ‘alternative’ specialised food productions are in accordance with the conclusions in the EURODITE sector report on the international food industry (Manniche 2007).

Table 1 presents basic statistical information about different sub-sectors of the agro-food economy on Bornholm. It should be noted that the figures are net results of decline in certain parts of the sub-sectors and growth in other parts that are not distinguishable in the statistical data set. Due to the heavy decline particularly in standardised manufacturing activities in the investigated period, the picture drawn of the development in these sectors does not give a precise indication about the emerging new productions of regional food.

Table 1. Basic characteristics of agro-food sectors on Bornholm

	Fishing	Agriculture	Manufacturing of fish products	Manufacturing of other food and drinks	Manufacturing of firms with less than 15 employees 1)
Number of workplaces 2005	118	457	12	39	43
Number of workplaces created 2000-05	-36	-128	-8	5	-1
Full-time jobs 2005	95	239	292	512	201
Number of jobs created 2000-05	-60	-54	-360	41	21
Turn-over 2005 (mil. DKK)	173	852	1.161	1.074	316
Growth in turn-over 2000-05 (%)	-18,4	12,2	-10,3	49,5	56,6

Source: Statistics Denmark.

1) The firms in this group, in which almost all the newly established regional food producers belongs, are included also among ‘Manufacturing of fish products’ or ‘Manufacturing of other food and drinks’.

SECTION 2 - THE CASE STUDIES

2.1. The Territorial Knowledge Dynamics (TKD) – Development and branding of Bornholm food.

The TKD concerns the last two decades of restructuring and change of the food production and governance systems of the Danish island of Bornholm. On the background of dramatic employment decline and structural rationalisation in farming, fishing and standardised industrial processing, regional entrepreneurs and politicians have been motivated into efforts of creating new types of firms and jobs that could turn the negative trends of conventional food production and contribute to diversification of the regional rural economy. Thus, as mentioned before, since 1995 about 40 new firms have been established by regional entrepreneurs all with productions of specialised food and beverage products. Despite big differences regarding products, technologies and business model, a common characteristic is the more or less direct use of the Bornholm origin of production as a factor causing or at least adding to the quality of the product. This marketing strategy builds on the already

well-established brand of Bornholm on the national scale created through the long regional tourism traditions.

This development has been pioneering in a Danish development context marked by lacking production traditions as well as articulated consumer demands for food with a regional identity. The products result from often long-lasting entrepreneurial processes that only very rarely involved targeted R&D activities and consist of varied specialty versions of generic categories of food such as cheese, oil, crackers, bread, beer, wine, chocolate, and ice cream. Hence, in a Danish food industrial context the novelty is not connected with the tangible products as such but with the marketing of these as 'regional'.

The new food productions, the majority of which are micro-firms with less than 5 employees, basically can be classified in two groups. One group of firms are 'classical' manufacturers who have followed in the footsteps of a handful of old well-established Bornholm producers of niche products and have succeeded in entering national consumer markets. This group uses more conventional industrial production equipment and distributes main parts of their specialised products via wholesalers and supermarket chains on national markets. A second group of firms to a large extent, sometimes exclusively, relies on direct sales, artisanal production methods and adding of value to the products by creation of experiences for the visiting customers, for instance by opening their production so that visitors (mainly tourists) can see how products are made.

From a historical point of departure in the middle of the 1990'ies with only a few niche food producers on Bornholm who operated on their own and did not specifically use the Bornholm origin in their marketing, regional networking among firms has started, and a sector-crossing cluster for Bornholm food and culinary heritage has emerged. Because of the peripheral conditions of Bornholm, this regional food cluster does not have the gravity of typical clusters in the Porterian sense but is a peripheral micro version, however with sufficient impetus to not only affect regional development but also export the concept of regional food to other regions in Denmark. At the core of the cluster are 19 food processing firms who are members of the Bornholm division of the European network association Regional Culinary Heritage that was established in 1995 and has been an important platform for regional as well as interregional networking regarding development and commercialisation of regional food (<http://www.culinary-heritage.com/>). These 19 firms have roughly 400 fulltime employees (2008). Among the totally 32 Bornholm members of Regional Culinary Heritage are also 9 restaurants, cafes and caterers, 2 delicatessen shops and 2 public actors. In 2005 some of the producers established another network association, Gourmet Bornholm (<http://www.gourmetbornholm.com/>), in order to start more formalised cooperation on marketing and business development.

Also private and public support functions have emerged and diversified. Different sorts of business consultancy firms primarily within marketing and communication as well as new wholesalers and distributors have been established supplying the food producers with services and expertise.

Furthermore, from a starting point with a few public sector consultants and politicians, personally engaged with the issue of rural development, important elements of a regional governance system for promotion of small-scale food productions has been built and integrated in regional policies and

institutions. Proactive, persistent and coordinated regional policy initiatives, mainly launched and financed via the EU program LEADER for rural development and focusing on common branding and networking rather than on product and technology development of individual firms, have been critical for the emergence of the new Bornholm food cluster and for the more recent integration of the branding of Bornholm food as part of a broader place-branding.

The TKD analyses the knowledge dynamics involved in the development and branding of Bornholm food and culinary heritage as well as in the formation of network, promotion, and governance frameworks around this process. This encompasses a bundle of related knowledge dynamics, crossing a variety of societal contexts and economic sectors, and involving elements of political and social discourse setting. Rather than science-driven creation of fundamentally new knowledge and technologies the TKD involves social dynamics of adopting and contextualising production and marketing knowledge originating from elsewhere. In the lack of rich, authentic regional culinary heritage to tap into by Bornholm food producers, important inspirational sources for commercialization have been culinary traditions and rural business forms from Southern Europe and other Nordic countries. Another inspirational source has been the abstract concept of ‘Experience Economy’, brought to the island and transferred to the food producers by a number of newly established private consultancy firms. However, contextualisation of the region-external knowledge to the specific geographic and market conditions and possibilities on Bornholm has been crucial.

The TKD also involves critical elements of regional interaction among the food producers as well as between the food sector and other sectors such as tourism, restaurants, and arts & crafts businesses. This interaction forms a central element in a concerted branding of Bornholm food as an integral part of a broader place-branding that has been staged by regional policy actors as well as by the regional tourism industry.

Among the numerous topics that have been involved in the territorial knowledge dynamics, the following have been particularly critical and thus, are analysed in detail in the TKD case study:

- Development of Bornholm food and drinks
- Territorial-level cooperation and Culinary Heritage
- Developing the experience economy in the food sector on Bornholm
- Place-branding of Bornholm food

The TKD case is not selected of reasons related to results in job creation and economic growth that are remarkable in a comparison with other sectors and regions. However, the case study offers a perspective on territorial knowledge dynamics related to economic renewal and innovation in a peripheral region. This means that the knowledge dynamics are affected by peripheral socioeconomic characteristics such as dominance of traditional low-tech economic sectors and micro-firms, weak institutional systems for research and education, a small population with low levels of education, etc., however by strong entrepreneurial motivations and new rural policy discourses as well.

Additionally, the TKD may provide insight in more universal trends in agro-food production and consumption systems in many Western countries regarding growth of ‘alternative’, ‘high-quality’

food in general (Goodman 2003; Renting et al 2003; Murdoch et al 2000; Watts et al 2005; Winter 2003; Manniche 2007) and growth in ‘regional’ and ‘local’ food in particular (Parrott et al. 2002; Testa & Massa 2008; Hinrichs 2000; Murdoch et al. 2000; Ilbery & Kneafsey 2000). Also the three firms studied in this FKD report are selected because their business models and innovation activities seem to be distinctive and typical for contemporary changes in international food and drinks markets, for instance towards ‘short supply chains’ (see for instance, Renting et al 2005; Kneafsey et al 2003; Ilbery et al 2005) and ‘sector boundary shifting’ (van der Ploeg & Renting 2004). The firm selected for the FKD1 study represents the above mentioned group of ‘classical’ niche producers and is about the development and marketing of rapeseed cooking oil, while the firm studied in FKD2 represents the mentioned group of new food producers based on direct sales and creation of experiences, and concerns the creation of a sector-crossing vineyard.

Due to the enhanced positioning of the Bornholm food brand on Danish consumer markets a third model for production of ‘Bornholm food’ recently was introduced. This model of ‘regional food’ is not like the two others small-scale and ‘alternative’ in nature. Rather it is the specialisation model of a conventional multinational meat processing company, Danish Crown, represented on Bornholm with a production unit. Led from headquarter in Jutland the company developed a specialised production of ‘Bornholm Pork’ as a diversification strategy regarding a part of its highly standardised product portfolio. This sort of product diversification strategy is in line with more general trends in the conventional food industry (CIAA 2006; EMCC 2006; Murdoch & Miele 1999) and the innovation process of developing Bornholm pork meat is in focus of FKD3.

As described above, in a Danish food context characterised by large-scale standardised production and distribution systems, specialty food and drinks with a regional identity are relatively rare. Accordingly, establishing and marketing such productions is a pioneering task to be accomplished in an institutional environment, including research and innovation systems, organised primarily to satisfy the demands of large, often multinational companies and supply chains. In this respect the three firm cases are differently related to the TKD of developing networks, promotion and governance systems for Bornholm food and culinary heritage. As will be presented below, the two small firms studied in FKD1 and FKD2 have been deeply integrated in and have both gained from and contributed to the long regional process of developing alternative food production and distribution networks on Bornholm, starting in the beginning of the 1990’s. As opposed to this, the large firm studied in FKD3 is integrated in well-established national supply chains and innovation systems, and is not to be considered a part of the newly developed business ‘cluster’ of Bornholm food. The company only started exploiting the brand of Bornholm food when this brand already had achieved a position of the Danish consumer markets. On the other hand, the national distribution of the resulting Bornholm pork meat unquestionably contributes to the marketing and branding of other ‘Bornholm food’ products.

2.2. FKD1: Development and marketing of cold pressed rape seed kernel cooking oil from Lehnsgaard

2.2.1 Introduction

Lehnsgaard is the name of an old family-owned farm on Bornholm. Until 2004 the income of the farmer, Hans Hansen (HH), mainly depended on growing of rape. The seeds of the rape crop are traditionally used for industrial processing of a low-value oil (Canola), which is used mainly for heating and lighting houses and the remaining organic material for animal-fodder. Rape is globally the third most important oil crop after palm and soy and in the tempered climate belt the only one. In 2004 Lehnsgaard marketed a refined, cold-pressed rapeseed kernel oil and thus realized a radical change of business activities from agricultural production of bulk standard raw materials for anonymous, global markets to manufacturing of a high-profile, quality product for end-consumers of private households, restaurants and caterers.

The refined oil of Lehnsgaard and the technology by which to produce it are the result of R&D activities carried out on Bornholm by an inter-regional R&D organization (Bioraf) with links to the University of Copenhagen. Among other things, Bioraf developed methods and equipment for production of a rapeseed oil upholding the healthy assets of rape seeds but avoiding certain chemicals that give the oil a bad taste and that are the main reason for the traditional use of rapeseed oil for non-food purposes. Despite the competitive healthy assets of the product compared to other cooking oils on the market such as olive oil, commercialization was not straightforward but depended on, among other things, development of consumer markets, including a brand, and supply chains. HH purchased Bioraf's equipment and know-how for production of rapeseed cooking oil and succeeded in bringing the product the important step from technical development to nation-wide distribution and sales via supermarket mainly through branding and marketing initiatives emphasizing not only the tangible health-related assets of the product but also intangible qualities of 'Bornholm identity and authenticity'.

Yet, the success of Lehnsgaard is not remarkable in purely economic terms such as number of employees (6 in 2008, including the wife of HH) and turnover (which was 8 million DK in 2008). Lehnsgaard has received considerable media attention and public recognition. For instance, in 2004 a cook book distributed in 300.000 copies by the Danish NGO, The Heart Association, promoted the use of Lehnsgaard oil due to its documented health assets, and the Lehnsgaard rapeseed oil has been presented and well promoted also through the TV media. In July 2008 Lehnsgaard's cold pressed rape seed kernel oil won a blind-tasting test in a leading national newspaper.

Also Lehnsgaard is a well-renowned firm at the regional scale. HH is "the good example" which is often brought forward when one wants to promote regional Bornholm food: HH as a person is reliable, the quality of his product is unquestionable, it is based on local raw materials where HH is uncompromising; it is based on a proud, dedicated production line, again uncompromising concerning production standards. HH is a very visible promoter of not only his own product, but of quality food and drinks products of Bornholm and he is an avid participant in many of the joint marketing events that promote Bornholm food.

FKD1 analyses the knowledge dynamics involved in Lehnsgaard's process of commercializing the rapeseed oil product developed via public R&D, i.e. Lehnsgaard's process of developing a new business model and the needed value-adding production, supply, marketing and distribution systems allowing for commercialization of the product. However, since these firm-level dynamics can be considered a spin-off of technical R&D and only the final commercialization part of a larger knowledge biography, the preceding R&D phases are included and shortly described below although they did not directly involve Lehnsgaard.

2.2.2 The sequence of events and phases in the knowledge biography

The development of manufacturing activities on Lehnsgaard was a relatively long-termed process of transition, although the main changes were accomplished in a rather short period of time. In fact the process started back in 1995 when HH got the idea of pressing oil from his crop of rape seeds. In the eight following years HH were engaged in developing products, production methods and facilities, however not particular intensely and targeted and therefore without reaching the phase of commercializing. In 2003 HH got the opportunity of buying Bioraf's buildings, machines and methods for rapeseed production and the purchase October 2003 accelerated the commercialization process radically. In only six months HH prepared for market introduction which included completion of the production facilities as well as development of a new business concept and marketing strategy as well as initial efforts to identify customers for distribution and sales to end-consumers. The phase after market introduction in March 2004, mainly involved branding, marketing and distribution in order to develop the consumer markets. Hence, the following phases in the firm-level knowledge biography can be identified:

1. Development of product and provision of technology (1995 – October 2003)
2. Preparing for market introduction: Development of business concept, branding strategy and marketing materials (October 2003 – March 2004)
3. Marketing, distribution and branding events (March 2004 – July 2007)

2.2.3 Development of product and provision of technology (1995 – October 2003)

In the summer of 1995 HH was invited on a study trip to South-East Scandia, Sweden, the region of Sweden closest to Bornholm and with whom Bornholm has had interregional cooperation since the 1980's. The trip was organized by the coordinator of the Agricultural Development and Innovation Centre on Bornholm (LUIC), a now closed project organization under the umbrella of the local farmers' Agricultural Advisory Services, and was targeted experience exchange and mutual discussions about future interregional cooperation regarding promotion of small-scale production and sales of regional food. At that time HH was considering the options of increasing the value-added on his farm by replacing or supplementing his conventional farming activities with other types of production such as processing of crops. One of the options that HH discussed with the before-mentioned coordinator of LUIC was to press oil from his rape seeds and use it as an energy source to heat a local swimming pool. On the visit to Sweden, HH visited a farmer, who demonstrated how his in-

dustrial oil press machine worked and this pushed HH in his decision to invest in, what had so far been a loose idea. Two weeks later he bought an oil press from a farmer in Jutland, Denmark and installed it in an unused building on his farm.

HH had neither educational nor professional background for oil pressing nor for manufacturing, distribution and marketing in general. He has a vocational degree in farming and by working as farmer since 1984 (originally as a pig farmer, later growing of crops) he had got tacit knowledge and practical skills within a broad range of technical, machine-related areas. In addition to agricultural expertise in growing different sorts of rape crops, he had knowledge about and collegial relations to other local rapeseed farmers which in later phases were exploited in building a local supply basis.

HH exploited his practical technical skills in experiments on his oil press machine to produce rape seed oil. This was, however, for several years carried out more as a hobby than as a goal-oriented business development activity. A main obstacle in this phase for commercial use of the oil for food purposes was regulative demands concerning hygiene in the place of production. HH realized that it would be very expensive to change the shed or other parts of his farm in order to achieve the needed formal approval for food processing.

In this initial pre-commercialisation phase of maturing and concretizing his basic idea of starting some sort of small-scale manufacturing alongside or instead of his conventional farming activities, an important platform for inspiration and collegial exchange of information and experiences was the interregional European association Regional Culinary Heritage in which Lehnsgaard was member since it was established in 1995. This association was as a direct result of the before mentioned interregional cooperation between Bornholm and South-East Scandia but today has member regions in Denmark, Sweden, Germany, Lithuania, Latvia, Poland and Spain. It has the purpose of promoting culinary heritage and small-scale alternative production and distribution networks in the member regions through, for instance, sector-crossing cooperation between farmers, food producers, restaurants and caterers, specialty food retailers etc. According to interviews with HH, taking part in activities and discussions within a network of actors with similar ideas and motivations in the region as well as in other regions was important particularly in the initial phase, marked by vague ideas regarding concrete products, business model, markets, distribution forms, regulative demands etc.

Simultaneously and geographically very close to Lehnsgaard, R&D activities on ‘whole crop bio-refinery’ were carried out by the Bioraf Denmark Foundation, an internationally oriented non-profit R&D organization on Bornholm, which was established in 1988. Lehnsgaard delivered rape seeds for the R&D activities in the Bioraf project. Among the outcomes of the Bioraf research project was a refined cold pressed rape seed kernel oil and methods and equipment for processing it. The activities were financed via diverse EU research programs such as ÉCLAIR (<http://www.biomatnet.org/secure/Eclair/F169.htm>) and FAIR (<http://www.biomatnet.org/secure/Fair/S1137.htm>), national research funding, regional EU funding as well as co-financing by private partners. The R&D were carried out by an international project consortium with the Faculty of Life Sciences at the University of Copenhagen as the coordinating lead partner and involving, among others, the Danish pharmaceutical firm and producer of enzymes Novozymes A/S (part of Novo Nordisk A/S), the UK firm United Milling Systems, the German pro-

ducer of centrifugal equipment and Westphalia Separator AG, and universities and research institutes from Greece, Ireland, UK and Germany.

The purpose of the project was to develop sustainable and commercially feasible production systems – whole crop bio-refineries - based on renewable, local resources and separation and refining of diverse anatomical and chemical components of agricultural crops such as rape and wheat mainly for non-food purposes for instance within chemical industries. It was a special aim to aid commercialisation of research results regarding utilisation of agricultural crops for high-value products by breaking down some of the barriers related to lacking supply chains of farmers, processors and wholesalers/retailers and main efforts were focused on integrated production (growing) and processing of rape seed. According to Hilmer Sørensen, chemist at University of Copenhagen and involved in the chemical aspects of the R&D, the rape seed research was concretely motivated by the wish to develop cost-reducing methods for oil processing and for utilisation of the remaining ‘press-cake’ for isolation of diverse proteins and other chemicals with high market value.

During the initial research in 1991-92 high quality oil and protein were produced by enzymatic fractionation of rapeseed that allowed for the preservation of certain healthy assets of the oil and for avoiding those chemicals (glucosinolates) that give the oil a bad taste and are the reason for the traditional use of rape seed oil for non-food purposes. Rape seeds have a high content of the amino acids omega3 and omega6 that humans need, but only have few natural sources of. Additionally, compared to other types of vegetable oils such as olive oil, rape seed oil has a very low content of multi-unsaturated fats and generally an advantageous balance between proteins and amino acids. Thus, in terms of health, rape seed oil is a highly competitive fat product.

However, the chemical and process engineering experiments on extraction of the oil based on aqueous enzymatic processes failed in terms of production costs and commercial feasibility. Consequently, in order to decrease production costs, other processing methods (not involving use of enzymes but mechanical cold pressing of dry seeds) were developed by Bioraf during the 1990’s. In this work, one of the engineering challenges was to control the pressure on the seeds so that the right chemical qualities of the oil could be provided. Since the most refined type of oil, which also gives an advantageous taste, is the result of pressing seeds without peel, i.e. the kernel. Methods and milling equipment for a gentle peeling of seeds before pressing were developed and installed in the research centre. Lehnsgaard was one the local farmers supplied rape seeds of the needed quality.

In 1999 Bioraf’s large EU research projects was completed and among the concrete results was ready-made production equipment for peeling and pressing of rape seeds. Nevertheless, despite the winning results of the chemical and engineering research, the overall conclusion, mainly regarding the none-food potentials of rape seeds targeted by the R&D, was less optimistic:

“By focusing on added value products and including farmers’ cooperatives and industry in the development (innovation) chain, it has been possible to demonstrate added values of more than 100% over traditional refining for oilseed rape. Similar approaches have been applied to wheat bio-refining. However, the higher the added value due to further refining, the higher the processing costs. Although promising possibilities exist, a commercial breakthrough for increased non-

food use of farm crops is not imminent. This is due to the relatively low cost of raw materials based on fossil fuels and the well-developed and widespread use of production technology.”
(<http://www.biomatnet.org/secure/Fair/S1137.htm>)

In connection with the closing down of the Bioraf project, project management made several attempts to on the one hand, sustain the research capacities of the project as well as, on the other hand, to develop the research production facilities into a commercially feasible production. The period is a bit muddled, and we have not been able to uncover the exact temporal dimensions; let it here suffice to briefly describe the different attempts that were made to exploit the knowledge created by the Bioraf Project, commercially.

To this end, Bioraf had, toward the end of the 1990s, started cooperation with an entrepreneur on Bornholm regarding commercialization of the research results for food purposes. The Bioraf building and production facilities had the necessary hygiene authorization for industrial food processing, and the entrepreneur made a leasing agreement with Bioraf to use the buildings and equipment for production of cooking oil. The entrepreneur actually succeeded in introducing oil (named Allara), onto the market around the year 2000. The oil was distributed via specialized retailers as well as to a number of restaurants on Bornholm. However the product was not successful and the entrepreneur went bankrupt, leaving debts to both Bioraf for his leases - and to HH for rape seed supplies.

At this stage the project manager and a leading employee of Bioraf decided to attempt to commercialize project results themselves. They became formal business partners and contracted HH to deliver rape seeds. They contacted a large number of supermarket chains across the country and marketed the idea of cold pressed rape seed kernel oil. Through their contacts with supermarkets, they were given a distinct impression, that cold pressed rape seed oil was a product which had a growing demand. They did not, however, know anything about business and thus were unable to close any deals, and their ambitions soon dwindled.

Partly due to this unfortunate situation, Bioraf activities and equipment in 2003 was about to be relocated to a similar agro-engineering R&D centre in Lolland, Denmark, “The Green Centre” (<http://www.greencenter.dk>), to the regret of certain actors on Bornholm, such as the board of the local capital fund, “Bornholm’s Sparekassefond”, which owned the Bioraf building. The board of the fund knew about HH’s experiments with oil pressing on his farm, and contacted him for a discussion about his interest in taking over the production equipment.

In October 2003 HH purchased the Bioraf equipment and completed production facilities through investing in and installing a bottling and labelling apparatus. At the time that HH took over the production facilities, all former employees of the Bioraf project had left, and the apparatus had not been used for some time. Due to his agricultural background, HH had previous experience with mechanics and he was able to prepare the machinery for mass production himself. He hired the food consultancy firm, Danish Food Guide, to develop a self-regulation program for the company. This was done by a female consultant, Signe Folke, who originally had a bakery education and has since completed a degree within process technology and nutrition.

During this period of intense synthetic knowledge development, HH approached the local Business Support Centre (BEC, Bornholm's Erhvervscenter) and asked if they could help him: he needed consultancy concerning developing his business idea, one of which was to bottle his oil in clear glass rather than the usual dark-green glass, which is characteristic of many Danish cooking oils. The BEC could not help him directly, but referred him to a local company producing aquavit, which had its own bottling apparatus. The company in turn referred him to a packaging wholesale firm in Copenhagen, now named Boman Trading, who, without charge, passed on valuable information about bottle prices, qualities as well as consumer preferences concerning design. The agent spent a lot of time helping HH find a cheaper bottle with the right elegant design (the supplier of the chosen bottle is German). Today, the packaging wholesale firm is one of Lehnsgaard's three suppliers of cardboard packaging.

Compared to the first entrepreneur engaged in commercializing the Bioraf research, HH had important agricultural knowledge about growing and harvesting of rape crops with optimal qualities for oil production, and additionally, HH was able to exploit his collegial relations to other local rape crop farmers. HH has provided guidelines for his rape crop suppliers concerning how to provide the right crop qualities for instance connected with when to harvest and which rape sorts to use. This contact base was also useful in the first six months of HH taking over the production facilities, before he started getting his cooking oil on the market, because the farmers could buy up the oil he was producing and use it for animal fodder, whilst HH was getting his production facility to run smoothly.

2.2.4 Development of business concept, branding strategy and marketing materials (October - December 2003)

Despite the long phase of preparing a change of Lehnsgaard's activities and business model, HH did not have precise idea regarding who the customers might be and how he could reach them through marketing and distribution channels. In fact, not even the product category was finally decided. In addition to the obvious idea of selling the oil as cooking oil, HH, as mentioned above, considered using the rapeseed oil as a heating source. Another non-food product type, which was considered by HH, was that of using the refined oil as a major ingredient in a sun protection lotion. During the initial phase, HH had been in contact with a potential investor for realization of this idea on the German market. They were in contact with a pharmacist who specializes in non-perfumed, natural products in cosmetics, who were to develop a suntan lotion based on the rape seed kernel oil. This idea never fully matured, as will be explained below. Interestingly, Lehnsgaard rape seed oil is an important ingredient in a number of cosmetic products today. Production is, however, strictly limited to artisan "home" products made by local cosmetic producers and sold to tourists. Lehnsgaard does not utilize this aspect of his oil in his marketing.

In order to obtain advice about how to prepare the business for market introduction, especially in terms of marketing and distribution, HH contacted a local consultancy firm, Konnect Kommunikation, in October 2003. The firm was newly established on Bornholm and run by four individual consultants (three male partners and a female consultant), who had recently moved to the island from Copenhagen. The firm had competences within branding, communication and marketing and due to its deliberate business strategy on the Bornholm market to utilize professional knowledge on brand-

ing, communication and consumption trends on a mission to transform the Bornholm economy by introducing new business forms, Konnect Kommunikation has functioned as a central KIBS⁴ agent in the regional process of developing ‘new Bornholm food’ (see our TKD). The consulting requested by HH was partially funded through an interregional project on commercialization of small-scale food production in different peripheral regions in Denmark, financed via a number of Local Action Groups under the LEADER+ EU program, including the one on Bornholm⁵. The project did not fully fund the Lehnsgaard branding process, though, and HH invested some of his own initial capital in it.

Konnect Kommunikation led a dialogue and discussion with HH targeted elaboration of a branding strategy for Lehnsgaard in which the first step was identification of the product concept and the fundamental values to communicate through branding and marketing. By exploiting tacit professional knowledge about corporate branding as well as about overall trends in society and culture and by taking into account the entrepreneurial characteristics and personal views of HH underlying his thoughts and words about his business ideas, a managing consultant of Konnect Kommunikation (male) advised HH to choose the idea of producing cooking oil rather than sun protection crème. From a marketing and branding point of view, a story about a sun protection crème produced on a farm on Bornholm might not be consistent with consumer markets for high-profile products. According to the advice of the consultant a growing number of Danish consumers add new cultural, social and political dimensions to food and drink and are willing to pay premium-prices for products that embed such dimensions. To meet these demands it would be more reliable with a branding story emphasizing the entrepreneurial values of HH as a farmer, his old traditional family farm on Bornholm and the exclusive, healthy assets of the product. The goal of the branding strategy was to achieve market success by branding the product as a unique product on the market, whose qualities were unparalleled: the oil has documented health assets, a distinct geographical identity as well as exclusive aesthetic qualities related to colour and taste.

HH agreed on this strategy and a Konnect Kommunikation consultant (gender: female) in December 2003 presented a palette of marketing materials for Lehnsgaard including logo, bottle labels, product information letters, as well as diverse sorts of graphics for use on Lehnsgaard’s website, created by HH’s brother (<http://www.Lehnsgaard.dk/>).

At this point in time the consultancy services of Konnect Kommunikation did not satisfy HH’s expectations of a detailed business plan, including how to deal with the crucial issues of distribution and logistics. Today, after having experienced the effect of the provided marketing materials and having experienced that the ‘promised’ consumer demands actually were real and existed, HH evaluates the services of Konnect Kommunikation more positively and of greater value. Nonetheless, as a farmer without experience in marketing, HH had to reconsider his initial way of thinking that having provided good professional marketing materials automatically would sell the products. HH realized that larger practical marketing and branding efforts were needed, not only because cus-

⁴ KIBS stands for Knowledge Intensive Business Service.

⁵ Lille Gadegaard, the focus of FKD2, also received assistance via this particular LEADER+ project, though via services from another consultancy firm.

tomers needed information about the new competitive qualities of his product, but also because vegetable oils are not integrated in the traditional food cultures of Denmark and other Northern European countries like they are in for instance Southern European countries.

Hence, HH used the marketing materials in personal visits to supermarkets, delicatessens, restaurants and wholesalers on Bornholm and a few in Copenhagen, informed about his product, gave bottles of prototype oil, and succeeded in getting an agreement with some of them about delivery and sale of the oil. Here HH to some extent profited from the efforts of the preceding entrepreneur that had marketed the oil Allara. However, compared to the Allara oil, the oil produced by Lehnsgaard had an advantage that was valuable in marketing: a 100% local supply basis. As the chef in a Bornholm restaurant said:

“We used the Allara oil in our restaurant because it had good cooking qualities, it had a wonderful colour and because it was produced by a Bornholm firm. We really have tried to support the development of regional food and to use regional raw materials in our cuisine and our guests often request information about the origin of their food. The Allara oil was a good product but it was not always made on the basis of Bornholm rape seeds. So from our perspective the Lehnsgaard oil is even better because Hans Hansen guarantees for his local supplies”. Claus Seest Dams, chef of Restaurant “Di 5 Ståuerna” (“The Five Lounges”), Hotel Fredensborg, interview April 8, 2009.

2.2.5 Marketing, distribution and branding events (March 04 – July 07)

In order to seriously develop and expand the Danish consumer markets for Lehnsgaard’s oil, more large-scaled branding and positioning efforts were needed than those performed by HH via personal visits to potential customers and distributors in the initial phase of preparing for market introduction. Among the reasons for the failure on the preceding entrepreneur on Bornholm (Allara), who carried out the first attempt to commercialize the cold pressed kernel oil developed by Bioraf, probably were lack of a professional marketing strategy and, perhaps even more importantly, wrong timing concerning market introduction. As described below, Lehnsgaard’s market introduction in March 2004 meant that the product, to some extent “accidentally” gained invaluable branding effects through a number of initiatives, which were led by firm-external actors, but which radically enhanced the visibility and acknowledgement of the product on consumer markets.

At a food fair in Copenhagen in the spring of 2004, organized by the farmer organization “Dansk Landbrug” (Danish Agriculture) HH had a stand, where he presented his new product, and was here contacted directly by a representative (gender: female) from “Hjerteforeningen” (The Danish Heart Association), a Danish NGO which focuses on promoting research and information about heart related diseases. The representative was project coordinator of a new project, “Danish Rape Seed Cooking oil”, the object of which was to launch a public information campaign in Denmark on the positive effects on human health of replacing animal fat products such as butter and margarine with mono-saturated fat products, such as rape seed cooking oil. The project was a partnership lead by the Danish Heart Association with The Fruit, Vegetables and Potatoes Research Association and Agrova Food. The Research Association is a branch organization of producers of non-animal food stuffs,

while Agrova Foods is the food division of the umbrella organization of The DLehnsgaard Group, the largest agricultural supplier in Denmark. The project ran from May 2004 until December 2005 and was funded through the national Innovation Policy. Due to the fact that Lehnsgaard was the only producer of cold pressed rape seed kernel oil (the others were less-refined oils) and because of his professionally elaborated marketing materials including the fact that he was the only cooking oil producer at the time who used clear glass bottles, the project coordinator invited Lehnsgaard to be a part of the project and to include the oil in a cooking booklet that was an element in the information campaign.

Hence, Lehnsgaard was presented in a series of information products (two booklets and a poster) in 2004, where his oil had a prominent position. However, maximum exposure to consumers was reached in May 2005 through the release of the first edition of a cooking booklet, which was printed in 200.000 copies and distributed nation-wide as a supplement to a popular women's magazine "Hjemmet" (The Home). Under the headline: "Rapeseed oil – the olive oil of the North" the recipe booklet promoted the use of rapeseed oil in Danish cooking. Lehnsgaard's oil had a prominent position in the booklet, which was so popular, that it was re-printed later in 2005. Together with Lehnsgaard's other and simultaneous marketing efforts, product information was readily available and marketed through several channels.

There are two other examples of branding initiatives with significant marketing effects for Lehnsgaard that were initiated and conducted by external actors in collaboration with and - at least to some extent - financially supported by Lehnsgaard, which are noteworthy. The first is the selection of Lehnsgaard rapeseed oil as one of six Bornholm food products used in the dinner menu at the royal wedding of the Danish Crown Prince in May 2004, a cultural event with maximum media coverage. The lobbying work, which paved the way for this national branding of Lehnsgaard oil and other Bornholm food products, was done by the so-called Food Ambassador, who was employed by the Local Action Group on Bornholm under the EU program LEADER+ to promote small-scale quality food⁶. Although selection for the wedding menu was conditioned by a 'gentlemen's agreement' that suppliers to the royal wedding could only use the event discretely in their marketing, (as opposed to the formal title of "supplier of the Royal Danish Court", the event has had a tremendously positive effect for the promotion of Bornholm regional food. However, Lehnsgaard was not content to be a supplier to the royal guests. He also was a co-sponsor of an event carried out by the before mentioned organisation Danish Agriculture, whereby 130 farmers made free breakfast for the crowds on the streets of Copenhagen, who were in town for the Royal Wedding. Thus, all fried eggs served at the "Peoples Breakfast" on the morning of the wedding had been fried in Lehnsgaard oil. Needless to say, such events contributed invaluablely to the branding of Lehnsgaard oil.

The last example concerns presentation of the Lehnsgaard's rapeseed oil via the TV media. In 2006, Claus Meyer, one of the leading Danish cooks and the key developer and advocate for the concept of 'New Scandinavian Cooking', supported by the Nordic Council of Ministers, prepared a series of six TV-programs with regional, specialty food and drinks from the Nordic countries. Meyer invited

⁶ See the TKD about Bornholm food for a more detailed description of the work of the Food Ambassador.

Bornholm to be the location for one of these programs and with the tourism development organisation, Destination Bornholm, as intermediating actor, the Lehnsgaard oil and other Bornholm food and drinks products (including the strawberry wine of Lille Gadegaard, see FKD2) were selected. However, the presented producers had to pay a substantial amount for participation. The program was shown on a nation-wide Danish TV-channel in Denmark in June 2007 for an audience of approximately 700.000 viewers, again in June 2008, and has also been distributed internationally and broadcasted in other countries. According to HH, the large-scale exposure through national TV broadcasting had immediate effects on the demands for the Lehnsgaard's oil and due to the public recognition of Lehnsgaard rapeseed oil, resulting from the TV presentation June 2007, this is chosen as the ending point of this knowledge biography. It should be noted, though, that Lehnsgaard has developed four special types of cold pressed rape seed kernel oil; an organic version; and three herbal varieties.

Lehnsgaard's participation in major branding events like the above described was obviously conditioned by qualities of the product as well as HH's competent marketing, managerial judgments, and well-developed entrepreneurial instinct for being in the right place at the right time. However, one of the main reasons for the commercialization success of Lehnsgaard rapeseed oil is the perfect timing of, on the one hand, the needs and resources of Lehnsgaard in different phases of the innovation process and, on the other hand, opportunities deriving from firm-external dynamics taking place in other knowledge contexts such as technical research of universities and science systems, trends in cultures and consumption patterns, changing debates in medias, and creation of new support functions provided by regional governance systems.

To further elaborate on the last of these firm-external dynamics, contributing to the commercial success of Lehnsgaard rapeseed oil, the market introduction of Lehnsgaard oil was perfectly timed with the employment of the above mentioned regional Food Ambassador in March 2004. Following the strategy directions of the employing board of the Bornholm LEADER+ Local Action Group, the Food Ambassador from start prioritized identification of a group of 'locomotives' among the many newly established food firms on Bornholm with special potentials and ambitions to build up markets outside the island. Lehnsgaard was among these firms that as a group represented a palette of varying food and drinks producers.

The Food Ambassador engaged in diverse forms of marketing and branding initiatives for the firms both individually and as a collective of firms. Lehnsgaard gained from these activities in a number of ways, for instance through the mentioned inclusion in the royal wedding dinner May 2004. The Food Ambassador also assisted Lehnsgaard in the making of a contract with a wholesaler, Nordlie, in Ringsted/Denmark summer 2004 regarding distribution of Lehnsgaard oil to large public caterers all over Denmark, and in the summer 2005 the Ambassador organized a trip to Lehnsgaard of purchasers representing two large Danish supermarket chains, Kvickly and SuperBrugsen, during which a contract for nation-wide distribution starting autumn 2005 was agreed upon. As a normal element in such contracts Lehnsgaard had to pay a substantial annual amount for access to the shelves and marketing campaigns of the supermarket chains.

Finally, Lehnsgaard gained from the work of the Food Ambassador through his initiative to establish formalized network cooperation between the selected locomotive firms, starting with a meeting on Lehnsgaard November 2004. This cooperation, mainly concerning common marketing, distribution and general management issues related to commercialization of small-scale regional food, quickly deepened and led into formation of a network association, Gourmet Bornholm, for common promotion of Bornholm food.

In summing up the knowledge biography of Lehnsgaard's rapeseed oil it is important to stress the interaction with firm-external actors and the gains from dynamics occurring in other development contexts. In an overall perspective, the commercialization of Lehnsgaard oil (as well as of many other new Bornholm food and drinks products) is a story about the fundamental embeddedness of economic activities in specific social, cultural and political conditions and thus, about the importance for business development of timing and alignment in relation to such conditions. However, the case study also illustrates the integration and complementarities of, on the one hand, knowledge dynamics of formal research systems related to development of products and technologies and, on the other hand, knowledge dynamics of firms related to commercializing and development of markets. The large knowledge biography in which Lehnsgaard plays the crucial, final role of commercialization is exemplary in terms of illustrating the integration and complementarities of analytical, synthetic and symbolic knowledge dynamics. The mainly symbolic knowledge dynamics of Lehnsgaard have their own eligibility, significance and value-adding role, independent from the initial scientific and engineering phases of developing the product and technology.

2.2.6 Gender issues

The innovative forces in FKD1 have primarily been driven by Lehnsgaard oil's male owner. Although his wife works in the firm, she is not a part of firm management and she is not a part of the brand of Lehnsgaard oil.

The primary dynamics which have shaped this case pertain to 1) the cumulative analytic and synthetic knowledge created by the BIORAF Project, an, as far as we have been informed, entirely male-dominated research process; and 2) symbolic knowledge processes which have been locally and personally created and adapted by a number of agents concerning branding, marketing and networking. A majority of the partners here are male (the Konnect Kommunikation management group and the Food Ambassador), while the Danish Heart Association project coordinator was female. One must be careful not to "over-conclude" based on the fairly limited number of actors involved in this case, but it is interesting to note, that while Konnect Kommunikation Management was made up of three male partners, the consultant who actually produced the branding material for Lehnsgaard is a female. Thus, there seems to be a division of labour in the consultancy firm, whereby the over-all strategy is drawn-up by male management with clients, and the more concrete marketing/branding material, is executed by female graphic designers.

The "Danish Rape Seed Cooking Oil Project", superficially at least, appears to be more gender-neutral. It was lead by the Danish Heart Association and was organized around a steering group con-

sisting of a two-person management team (one male, one female) from the Danish Heart Association, a two-person representation (one male, one female) from the Research Association on Fruits, Vegetables and Potatoes and a number of male rape seed oil producers. We have not been able to ascertain any profound gender-based divisions of labour in the project, as it no longer exists. However, it remains clear that Lehnsgaard's contact to the project primarily went through the female project coordinator, who seems to have managed the project on a day to day basis. All the recipes, which were developed using rape seed cooking oil, and introduced in the project, were developed by female cooks – and targeted a female consumer group.

2.3. FKD2: The creation of Lille Gadegaard vineyard

2.3.1 Introduction

Lille Gadegaard is the name of a traditional farm on Bornholm that today is operated as a vineyard. The owner is a farmer, Jesper Paulsen (JP) who in 1995 decided to change the activities on his farm from growing of strawberries to production of wine. Today Lille Gadegaard produces a diverse range of alcoholic drinks including wines from berries (strawberry, blackcurrants and redcurrants), red wine from grapes as well as distilled alcoholic products such as wine liquor and, from 2009, whiskey. The farm has 2.9 hectares with wine stocks from which about 18.000 bottles of red wine is produced annually. This probably makes the vineyard the largest of the total 23 wine producing firms in Denmark.

However, the crucial competitive factor of the business is not the physical products as such. Lille Gadegaard is neither a traditional farm nor a manufacturing firm but a vineyard of which an important part of value-added stems from experiences, storytelling and services attached to the products and provided for customers mainly on the farm in the opening season from May to October such as guided tours through the fields and winery. 90% of total sale of Lille Gadegaard wine products stems from direct sales on the vineyard; the remaining 10% is distributed via specialty shops on Bornholm and in the rest of Denmark, mainly in the Copenhagen area.

The FKD2 analyses the knowledge dynamics involved in the transition of the business model of Lille Gadegaard from the one of a strawberry farm employing only JP, to the one of a vineyard based on activities cut-crossing the sectors of agriculture, manufacturing and tourism services, and employing 6 persons including JP. The analysis specifically focuses on the knowledge dynamics involved in development of the tangible as well as intangible dimensions of products allowing for premium-prices while other aspects of the business transition process such as changes of administrative systems are only sporadically looked at. In other words, the FKD2 is about the creation of a new knowledge base for Lille Gadegaard regarding its productive, value-adding activities.

The development and commercialisation of the vineyard business model of Lille Gadegaard has involved a variety of interrelated knowledge dynamics regarding a number of different topics, involving different types of actors and interactions, and taking place throughout the whole period of 1995-

2008. The simultaneousness of knowledge dynamics related to different topics and firm functions complicates the task of dividing the knowledge biography into separate sequences and phases with only (or mainly) one topic in focus of activities. However, the FKD2 can be broken down into four main, temporally overlapping phases focusing on different topics (the what):

1995-2000: Development of the basic business idea

1995-2003: Development of wine products - berry wines (part 1) and grape wine (part 2)

2000-2003: Development of the value basis and business model of the vineyard.

2001-2008: Development and commercialisation of experiences and visitor facilities.

Below we will describe the differing topics, actors, and spatial dimensions of the knowledge dynamics through which the business model and value-adding activities of Lille Gadegaard vineyard were realised. A chronological structure of the presentation is intended but due to the complex nature of the FKD2 consisting of several interrelated and temporally overlapping firm-level knowledge dynamics this is not always possible. Before presenting the FKD2 we will shortly describe the competence and professional profile of the business owner JP since he plays a paramount role in all of phases.

JP has no formal education on any of the mentioned topics in focus for knowledge dynamics. He has a vocational agricultural education on farming (the Green Card). The first few years after graduating he was a pig farmer but in 1980 he changed his farm to strawberry production. Like in the earlier change from pig farming to strawberry growing, he accomplished the transformation to wine production applying his tacit, multifaceted knowledge and skills stemming from running a farm (growing crops, fertilisation of soil, climate, operation of agricultural machinery, maintenance of buildings, economic administration, etc.) However, he also is benefited (though maybe not activated before) with other personal competences and entrepreneurial characteristics such as creativity in getting ideas about new products and ways of using and organising his farm, openness to change, curiosity and an inquisitive approach in learning, interest in face-to-face contact and dialogue with customers, and skills in storytelling not least in giving technical agricultural and production matters a personal, relevant and lively dimension. It should be noted that the former strawberry farm was run partly on the basis of distribution via wholesale/retail and partly via a 'self picker' concept where household customers visited the farm and themselves picked strawberries for their private consume. Thus, JP already had practical experiences with a business model based on direct sales to visiting customers.

Nonetheless, JP obviously had to supplement his agricultural core skills and personal competences and talents with specific knowledge about the above mentioned topics and, as appears from below, this was done by applying a variety of different sources (local as well as distant) and learning methods (internet searches, learning-by-doing, use of consultancy services, employing expertise, etc.) by which external knowledge was adopted and internalised (contextualised) in a highly autodidact manner. According to interview with Torkild Boisen, Chairman of Regional Culinary Heritage Bornholm, and confirmed also by the FKD1, an autodidact, opportunistic, and practical approach to product and business development characterises many of the new food producers on Bornholm.

2.3.2 Development of business idea (1995-2000)

In 1995, due to tough conditions and negative trends in the strawberry markets on which JP operated, he realised that his strawberry farming activities were no longer profitable and had no future. Although he had other income sources, partly from other minor agricultural produces like honey, but mainly from his family's paid task of fostering kids taken away from their families by social authorities, he wanted to somehow change his farm-related business activities. Together with the head of the local primary school, who as a person like JP was highly engaged in the social and economic wellbeing of the rural community in which Lille Gadegaard is situated, JP discussed and developed the idea to use a local, closed-down dairy for production of strawberry wine, made on the basis of produce from Lille Gadegaard, and thereby creating a new local working place with a number of jobs of a kind that were new on Bornholm and that could contribute to social and economic renewal of the community.

This business idea of 'strawberry wine production with a local, social profile', however, was never realised due to many reasons such as the troubles and time demanded for developing appropriate wine products (the knowledge dynamics of which are described below), lack of finance to start up production in the closed dairy, and the decease of JP's partner, the head of the school, in 2000. After the decease of his partner in 2000, JP was left alone in realising the business idea and he decided to move the wine development activities from the former dairy and to a room on his farm, previously used for honey production and with the needed formal hygiene approval for food production. However, JP's initial motivation to change his business in directions contributing to social and economic revitalisation of the community and his point of departure for defining and creating 'local food' in certain social assets and networks of the community rather than in certain old culinary traditions of the region, is noticeable and a general characteristic of 'new Bornholm food'.

The initial phase of developing a new business concept resulted in the idea of operating Lille Gadegaard as a vineyard open for visiting customers and with direct sales through a farm shop. JP had diverse inspirational sources for this idea. One source was his holiday visits to wine producers in France, Germany and the Netherlands that provided him important inputs about how to commercialize products through the design of packaging, farm buildings etc. Another inspiration source that was implicitly known rather than explicitly searched for by JP, was the widespread regional traditions on Bornholm for business concepts depending on the big number of tourists that visit Bornholm during summers such as fish smokehouses and arts & crafts businesses within glass blowing, ceramics, textile design etc. These tourism dependent business forms are based on open workshop concepts where production and sales facilities are architecturally integrated and visitors personally can see how the production processes are carried out.

Regarding the specific aspect of how producers in a rural development and market context can start-up and commercialize new types of small-scale productions of food and drinks, a main inspiration for Lille Gadegaard - like for Lehnsgaard described in the FKD1 - came through informal networking with other producers of 'regional food' on Bornholm as well as abroad, linked to the European network association Regional Culinary Heritage (<http://www.culinary-heritage.com/>). Specifically for the Bornholm members of the association, four study tours were organized to different rural areas of Sweden in the late 90'ies in which JP participated. According to Hans-Jørgen Jensen, secretary of

the Bornholm Local Action Group for EU rural development programs, who was involved in the organization of these trips and actively involved in the foundation of the association in 1995, the emergence and practical experiences of alternative small-scale food productions, farm shops, and distribution channels started some years before and were more advanced in rural Sweden than in Denmark. From the Swedish perspective, Bornholm's larger tourism and restaurant sectors were considered especially interesting for best-practice experience exchange. According to interview with JP he learned a lot from dialogue with colleagues in Sweden on his trips there regarding subjects of general relevance on how to evolve from product development to sale of small-scale food businesses in rural areas, for instance related to organization of farm shops and other visitor facilities, packaging, marketing, distribution, etc. Informal networking with other Regional Culinary Heritage members on Bornholm was also helpful in later business development phases. For instance, regional networking provided Lille Gadegaard an important contact to the firm Danish Food Guide on Bornholm in 2002, where owner Poul E. Larsson and, particularly, his partner Signe Folke, developed a mandatory self-control hygiene regulation system for Lille Gadegaard. While Signe Folke primarily was concerned with hygienic control systems, Paul E. Larsson focused on regulations pertaining to wine labeling.

However, despite the progresses in developing the business idea and the opening of a farm shop in 2001, the business concept had still not found its final form and content.

2.3.4 Development of wine products, part one - Berry wines (1995-2001)

In an initial and rather long phase of 5-6 years, in which JP made his main income from other activities, he mainly was engaged in developing a product basis for his new business: strawberry wine. These activities were purely firm-internal, involving only JP, and were trial-and-error and learning-by-doing types of activities carried out through a practical approach in which JP asked "does this work?", rather than "what is the best way to do?"

Nonetheless, he started with a text-book searching for recipes for strawberry wines but only found one in an old, Danish cooking book for household-use. For hygienic and durability reasons this recipe suggested boiling of the berries before adding of yeast cultures and fermentation. He engaged in explorative experiments with different sorts of strawberries, however, after 3 years of experimentation he had to conclude that the process was simply not applicable for commercial purposes since it resulted in brownish colour and bad taste of the wine. JP therefore engaged in more targeted internet searches at homepages of strawberry wine producers in France and Italy on which he looked for useful information about production methods and found that they did not use boiling of the berries but basically the same method as in grape wine production by use of adding of sulphur as well as yeast cultures, enabling the start and finalisation of fermentation in a chemical environment with sulphur. Accordingly, through new trial-and-error experiments he found the most appropriate berry sort and method. In finding the right strawberry sort he exploited his agricultural knowledge from strawberry growing, since, as in grape wine production, the most appropriate sorts need the right balance of acid and sugar.

He also in this phase engaged in development of wines from other sorts of berries such as sparkling wines of blackcurrants and redcurrants, using similar experimental trial-and-error methods and, in this initial product development phase, only his own preferences of taste to examine and evaluate the resulting quality. Indeed, his knowledge dynamics in this field of activity truly were about trial-and-error. The berry wine products were not fully developed and ready for sale until 2001 when JP opened a farm shop on Lille Gadegaard.

2.3.5 Development of wine products, part two - Grape wine (1998-2003)

During JP's phase of developing berry wines, the EU was about to prepare the formal recognition of Denmark and other former non-recognised countries for commercial production of grape wine. Inspired by a number of holiday visits to wine producers in France and Germany in the late part of the 1990's, JP got the idea of producing grape wine besides of berry wines.

If the goal of JP had been to produce grape wine of an internationally exquisite quality he might have followed another and more professionally grounded and targeted strategy in starting grape growing and wine production than the one applied – or perhaps he might have decided not to start at all. However, the goal was less ambitious to be among the first in Denmark with a red wine product that could be part of the product portfolio of Lille Gadegaard.

Anyway, considering the specific climatic conditions in Denmark, starting growing grapes for commercial wine production is not a straightforward task and certainly has been a pioneering development project in which knowledge and experiences from traditional wine producing countries, on the one hand, have been crucial and yet, on the other hand, needed adaptation to local conditions to be applicable. JP accomplished the provision of new basic knowledge about grape growing and wine production by a combination of two methods.

The one was repeated holiday visits to wine producers abroad including collegial talks and walks in the fields and wineries together with the wine producers through which JP mainly was provided practically useful and tacit knowledge but also made a lot of personal observations, facilitated by his generic agricultural knowledge (JP calls this “visual learning”) regarding growing and production methods, etc. The other method was searches for codified knowledge on growing of grapes and on wine production, mainly on Internet homepages of wine producers of which most were German as JP lacked skills in other foreign languages. Also in his internet searching he applied the method of ‘visual learning’ from pictures of production equipment, working processes, design and organisation of buildings, etc.

Mainly a study trip of two weeks on a vineyard in Geysenheim/Germany in 1999, his close collegial talks with the owner, provided JP crucial knowledge about growing of grapes and production of wine which for JP had a demystification effect regarding the task of producing wine. However, the study trip also gave him important inspiration regarding the business concept of a vineyard with value-adding experiences, services, packaging etc. Also a visit in 2000 to a newly started wine producer in Maastricht/the Netherlands, was important, mainly regarding knowledge on how to start wine

production in an area, not recognised by consumers as a wine district and thereby depending on good marketing and media attention. Furthermore, a wine producer close to Copenhagen who some years before had started wine production and who was chairman for the newly established Danish Association for Wine Producers, was contacted in 2000 and requested useful information and advices. However, according to JP, this consulting was made in an atmosphere of unwillingness to hand over practical lessons and experiences, the critical ‘secrets’ of producing wine under Danish conditions, to a potential competitor and thus, was not considered very useful by JP.

In 2000, when the EU recognition of Denmark as a wine producing country was launched⁷, JP planted the first stocks of red grapes on his farm. By colleagues and internet information JP was advised to use the sort Rondo since this is the most appropriate for the Danish climate. The planting of stocks marks the start of a process of examination knowledge dynamics based on learning-by-doing and trial-and-error to build up more tacit, practical knowledge. As JP lacked practical experiences in grape growing he made many mistakes and paid his lessons the hard way. For instance, in his initial process of searching for useful knowledge on the internet and at colleagues abroad he was not provided the crucial information that newly planted grape stocks have to be protected from frost during the germination period, and so he lost a big part of his stocks the first year. Typical for the serendipity, characterising JP’s learning processes, the information about this agricultural fact and a method on how to protect the stocks was provided by a former wine producer from Hungary who as a tourist on Bornholm occasionally visited his farm in 2001 and fell into conversation with JP.

JP harvested the first grapes in 2002 and started his first production of red wine. Also in this field his way of providing the required knowledge was internet searches and talks with colleagues abroad. As metal tanks or wooden barrels for wine production are expensive, JP invested in plastic tanks and used these for the first two years of grape harvest. By a similar incidental way of developing his wine production through inputs from visitors, as was described above, a wholesaler from Jutland/Denmark, trading with diverse sorts of production equipment, in 2003 visited Lille Gadegaard as a tourist and informed JP that he had a complete set of used tanks in stainless steel including cooling system, appropriate for wine production, for sale for a favourable price. JP bought the equipment and started the usage of it from 2004 and onwards. His first red wine was bottled and ready for sale in 2003.

To indicate the continuous efforts to develop new products and diversify the product portfolio that characterises Lille Gadegaard, JP opened a distillery in 2005 for production of diverse sort of aquavits, liqueurs and alcoholic products. In 2009 the first whiskey will be launched after three years of maturing on wooden barrels. The knowledge dynamics of realising this sort of production was basically the same as those involved in the above described product development activities. This included, firstly, search for codified knowledge on internet homepages of producers (for instance, a sort of ‘reverse engineering’ whereby pictures of production equipment were studied for direct replication of production processes) and secondly, personal firm-internal trial-and-error and learning-and-doing.

⁷ The allowance of producers to inform on the etiquette also year and place of production and type of grape and thereby the upgrading of Danish wine from table wine to wine with a regional origin, was not given until 2007.

2.3.6 Development of the value basis and business model of the vineyard (2000-2003)

In 2000, JP was contacted by a private consultant (HCH) who recently had moved to the local community from Copenhagen where he had worked as communication consultant for, mainly large, public as well as private organisations regarding ‘value-based business development’ with a focus on environmental planning, for instance about how to organise ‘green balance sheets’, how to implement a set of basic (normative) values in an organisation, and how to communicate these values to customers in order to improve their public profile. According to HCH, the pioneering activities in value-based business development within the environmental planning sector, starting in the early 1990’ies, in many respects were the direct inspirational ground for how businesses and cultural institutions later on in the 90’ies practically started promoting and realising the communicative principles of the emerging ‘experience economy’. HCH also had a professional record within this field, for instance via jobs for museums in Northern Jutland and as director in 1999 of Nature Bornholm (a nature museum).

HCH found the vineyard business concept of Lille Gadegaard highly interesting and started conversations with JP. These conversations soon developed into more targeted sessions of sparring, at this point in time (2000) of a purely private, voluntary character, and this, had a significant impact in moving the transformation process of Lille Gadegaard into a phase with a more strategic and professional approach in maturing a coherent vineyard business concept.

Due to his above described professional background as communication consultant, HCH had skills and experiences in assisting business managers in defining those fundamental set of values that they want to profile and communicate, and accordingly, should integrate in all parts of their organisation. HCH applied these skills in consulting talks with JP through which they identified some basic values on which the vineyard could be built and developed and not least, on which the storytelling about the products, productions and farm could be told⁸. In short, the resulting set of symbolic business values of Lille Gadegaard consisted in a combination of ‘the innovative and honest entrepreneur who left his conventional farming’, the ‘old, authentic Bornholm farm’, and the ‘original types of new Bornholm wine products’. An overall important value identified as one of the main pillar of Lille Gadegaard was constantly to innovate new products and services from one year to the next to create a curiosity among customers and urge them to return back and experience the news.

Besides working as a private consultant on Bornholm, HCH was part-time employed as a teacher at the Class and Ceramics School on Bornholm - a nationally recognised further education of 3 years with 90 students from all of Denmark providing practical training in the crafts of glass blowing and ceramics as well as theoretical elements regarding industrial design, business organisation, marketing etc. by which the 90 students (the vast majority female) are encouraged and trained to start-up their own business after graduation. As teacher within these business oriented topics of the school, which also included practical project work, HCH in 2003 organised an educational project for 20

⁸ The owner of Lehnsgaard in focus of FKD1, had similar professionally intermediated sessions defining his value-basis, carried out at more or less the same point in time of the business development process, after the initial product development and before the commercialisation phase.

students, aiming at making an analysis of the business concept of Lille Gadegaard and suggestions for a total plan of the design and organisation of its functions, experience dimensions and visitor facilities. HCH functioned as a tutor for the students during their project work. Among the results of the student project, which was free of charge for Lille Gadegaard, was a written design manual for an ‘experience-based vineyard’, including the use and design of the different farm buildings, as well as a physical model of the farm, made in carton and big enough to allow walking inside it along the paths between its buildings.

Only some of the concrete suggestions of the manual and physical model were followed by JP. However, it was a sort of a ‘eureka-experience’ for him seeing his farm in model perspective, and together with the written manual the model gave him a much better understanding of what his business concept actually was about and how it could be realised. According to JP, this output also resulted from the process of accomplishing and taking part in the student project and his many talks with the almost exclusively female students that he described this way:

“This kind of persons is so creative and so inspiring to talk with. Everything is thrown up in the air, and discussed and analysed and given new perspectives that I never myself would have thought of.” (Interview, 24.02.09)

Summing up the effects of this student project, JP underlined its overall conclusion, on which the suggestions regarding further development of Lille Gadegaard were based, that JP as a person and entrepreneur was the critical and competitive element in the Lille Gadegaard business concept rather than its wine products as such. This conclusion made JP reconsider his whole approach in developing his business and made him realise that some of his personal characteristics such as his constant, multifaceted product development projects, his practical, non-academic and entrepreneurial approach of ‘learning-by-doing’, his singing Bornholm dialect and lively way of communicating and telling stories to customers, should be emphasised and exploited rather than hidden away as irrelevant and unprofessional aspects of the Lille Gadegaard vineyard.

This process of explicating and codifying of the symbolic value basis of Lille Gadegaard, carried out through dialogue and interaction with intermediating consultants and students, was crucial for the later communication, marketing and storytelling efforts of the firm as well as for the further development of the business as a whole. Though it did not result in any formal and detailed manual or script for organisation and performance of business functions such as PR, marketing and product development, it provided JP with a critical, professionally grounded, personalised and contextualised knowledge about the distinct competitive assets of his firm and products and prepared him for communicating a certain story to customers that increased their willingness to pay premium-prices for his wines. As we shall return to later, efforts were done in a final development phase to refine and give the storytelling and business concept of Lille Gadegaard a more coherent and consistently form.

Despite, or maybe due to the well-elaborated and professionally intermediated point of departure for storytelling and communication, the marketing efforts of Lille Gadegaard in terms of advertising are not big and mainly consist of traditional means such as

- An internet homepage (<http://www.a7.dk/>), launched in 2001, upgraded and provided with online purchasing facilities in 2003, and with payment facilities (Visa) in 2007 and MasterCard (2008). Mirroring the importance for the vineyard of JP as a person, he uses pictures of, among other things, himself and his young daughters.
- Advertisement spots on the TV information system on board the ferry to Bornholm.
- Advertisements in the weekly magazine of the Bornholm tourism industry, informing about the week's events.
- Inclusion on the website information systems of the European association Regional Culinary Heritage.

In the development of a customer basis, Lille Gadegaard has benefitted largely from the efforts of the regional tourism industry and the tourist development organisation, Destination Bornholm, of marketing the emerging new food sector on Bornholm as part of a larger place-branding, for instance by inviting journalists of national newspapers and magazines to visit Bornholm and producers of Bornholm food, including Lille Gadegaard. These efforts are further described in the WP5 report.

Another major step in creation of the customer base of Lille Gadegaard was a number of performances of JP in TV-programs on nation-wide Danish channels of which the main were:

- When the first red wine of Lille Gadegaard was ready for sale in 2003, JP made a note on his homepage that the wine would be launched for sale on 1st of August. Due to a growing attention in Danish medias on cuisine related topics and of specialty, regional and organic food products, this note had reached the attention of the hosts of a popular morning news program, God Morgen Danmark (Good morning Denmark), sent on a nation-wide Danish TV-channel. They invited JP in the studio for an interview about his products and business at the very day of launching the wine.
- In 2006, Claus Meyer, one of the leading Danish chefs and the key driver of launching and developing the concept of 'New Nordic Food', supported by the Nordic Council of Ministers, prepared and made a series of TV-programs with regional, specialty food and drinks from the Nordic countries. Meyer selected Bornholm as location for one of these programs and, among other Bornholm products, he was particularly interested in the strawberry wine of Lille Gadegaard. Also the Lehnsgaard oil, studied in FKD1, was part of this TV-program, which was shown on nation-wide TV-channels in Denmark 2007 and again 2008, and the programs have been distributed internationally and shown in other countries as well.

Such large-scale platform for branding and marketing of Lille Gadegaard, facilitated by crucial external knowledge inputs regarding value-based business models and communication, obviously has played a role for the establishment of Lille Gadegaard's customer basis.

2.3.7 Development and commercialization of experiences and visitor facilities (2001-08)

The opening of a farm shop in 2001 provoked the need to further develop and organize the value-adding experiences, services, and visitor facilities of the farm. The visiting customers often re-

quested to see the fields and winery facilities and stated many kinds of questions about the production and products, and JP realised that he needed to somehow organise his customer services. Hence, alongside JP's continuous work to develop his wines, targeted efforts were made in the years 2001-2005 to develop the experience and service aspects of the business. This, for instance, included:

- Introduction in 2003 of paid guided tours at two scheduled times at certain weekdays on which JP take visitors through his fields and winery, tells about his products and production, and ends with tasting and sales of wines in the shop.
- Also in 2003 the opening of a cafe serving his wines as well as coffee and cakes. In 2005 the kitchen facilities of the cafe was upgraded and three persons (a cook, a bartender and a waiter/dish-cleaner) were employed to run a restaurant, initially with á la carte menu. The cafe/restaurant concept, however, has been changed every year but now seems to have found a viable 'bodega-inspired' form with a tapas menu.
- Introduction of camping sites on a field on the farm, free to use for visitors.
- Introduction of barbecuing and outdoor tables for serving of food. Also the style and menu of the barbecuing has been changed in the course of time.

JP quickly found the basic concept of his guided tours in a form, emphasising humour and giving visitors a funny experience rather than a lot of technical details. According to JP's experiences, making visitors laugh enhances their purchasing in the shop and generally they are not interested to hear about technical aspects of his products. He uses the conclusion of the student project, pointing to the importance of his personality rather than technical and sensory aspects of his wines. As an example, in his field with wine stocks he has placed big election campaign posters of the female leader of a Danish right-wing political party and as part of telling about the main seasonal tasks and troubles of growing grapes he tells in a cheerful and kindly way that these 'scare crows' helps keeping away birds from his grapes when they stop on Bornholm in September on their way to the South for the winter. According to JP, his performances on his guided tours are praised by visitors when they give comments and feedback in his guest book. A local tourist operator (female), organizing bus tours to Lille Gadegaard (see later) gives the following evaluation of JP as a guide:

"JP is very clearly a crowd-puller and one of the main attractions on our visits to Lille Gadegaard. So it has not been needed to discuss with him how he might improve his storytelling or behave differently. On the contrary, other tourist guides working for us, are sent on courses to learn what JP already masters." (Interview 24.02.09, Eva Madvig, Bornholm Tours).

Interestingly, in productions like the one of Lille Gadegaard where value-added is connected with storytelling made in immediate conjunction with sale and consumption, there are opportunities for creation of value-added on the basis of types of products that traditional retail oriented wine producers maybe have to waste or at least decrease the sales price of. In the guided taste sessions JP also uses wine from years with less good harvest and tell his customers "Here you can taste how the wine becomes in years with bad weather".

The number of daily visitors rapidly increased after opening. Besides individual guests coming on their own initiative and with their own means of transportation like cars or bicycles (in 2008 the

daily number of this type of visitors was 3-500), an important segment of visitors is groups of bus tourists. This customer segment was developed due to a contract signed in 2004 with a local tourism operator, organising bus trips for tourists on Bornholm, mainly Norwegian and Swedes and very few Danes. On these bus tours to different attractions on Bornholm, a stop is made at Lille Gadegaard and the tourists get a guided tour and a visit in the wine shop. The number of busses increased year by year and in the summer 2008, Lille Gadegaard was visited by in total 90-100 busses with averagely 35 tourists. This customer segment almost exclusively consist of people of +60 years while other customer segments who visit the vineyard on their own initiative, though also mainly tourists, are more diversified. On average, the number of daily visitors in 2008 was 5-600.

By observing the purchasing patterns of the visitors, JP and his cafe/shop staff found that female customers, when together with their husband, very often were decisive for which products the couple bought and that they preferred the sweeter types of wines in his product portfolio. JP therefore organised a taste panel of women for testing the results of his product development activities and for giving inputs for further product development. The panel consisted of local residents who had no professional training or competences in wine tasting but were 'only' ordinary people living on Bornholm. According to JP this taste panel has been very important for further development and refinement of his wines.

Two additional consultancy projects were carried out in this phase of development and commercialisation of customer services. The first in 2004 was carried out by the above mentioned consultant, HCH, this time on paid terms, and was co-financed via a regional support scheme targeted development of micro-businesses, instigated by the Bornholm Business Centre as a project supported via the EU regional development fund⁹. The efforts in the consultancy project of HCH focused on two different issues: 1. identification of the customer segments of Lille Gadegaard and their specific preferences regarding products and services, and 2., improvements of administrative and managerial aspects and implementation of an IT-based economic administration system allowing for calculations of marginal costs and profits on diverse activity fields and more profitable setting of prices on products.

The second consultancy project was carried out in 2005 by two graduated designers (both female) from the regional Glass and Ceramics school on Bornholm, now working as private consultants in Copenhagen, funded via the EU LEADER+ programme as part of an interregional Danish project. This project mainly resulted in suggestions to improvements of the aesthetical and architectural design of the farm, for instance regarding painting and decoration of the shop and cafe/restaurant, moving of a fold used for grassing cows to a place more visible for visitors, and improvement of the logistical structure and signs on the farm to better control the flow of visitors which especially is needed when tourist busses arrives.

In the last couples of years the main developing activities of Lille Gadegaard have consisted in a sort of 'weeding out' of the many services provided to visitors in order to identify a more coherent and consistent vineyard concept and storytelling, and to identify and focus on the most profitable and

⁹ The project is further described in paragraph 1.2 of the CRT WP5 report.

exclusive parts of the product portfolio. The issue of a coherent vineyard concept in which products, experiences and facilities are consistently developed and presented for customers, also at earlier occasions had been addressed by the assisting consultants. One of these told:

“Jesper is extremely innovative and full of ideas. The constant changes and the ever broadening product portfolio is a part of the business. It is important for the storytelling. It has to be dynamic and a bit chaotic to fit with Jesper as a person. But at the same time, he has a farmer’s aesthetic sense and taste and likes ugly plastic signs at the road, barbecuing event with lots of meats and sausages and so on. And he certainly not always keeps the agreed guidelines of the consults. He is totally uncontrollable. But the activities somehow has to fit together, there has to be a certain degree of consistency.” (H.C. Holmstrand, private consultant, interview August 29, 2008.)

The final activities of refining the concept are to a large extent inspired by yet another private consultant, Stig Westermann (SW), running the firm Bornappetit, with whom JP got in contact in 2004. SW mainly worked as distributor for some of the Bornholm food firms, and started consulting JP on voluntary private basis (like the initial contacts with HCH, described above). His consultancy services mainly regarded distribution of Lille Gadegaard wines to retailers and setting of prices. According to SW, price setting is extremely difficult for production-minded persons like JP, who usually set them too low to be profitable. Thus, SW assisted Lille Gadegaard in new and more profitable price-settings and in negotiating a contract with a local wholesaler on distribution of wines to specialty shops outside Bornholm.

However, the lacking consistency of some of the activities of Lille Gadegaard also sprung to the eyes of SW. For instance, SW advised JP to reduce or find another form for the service provided to visitors of free camping on the farm. According to interview with SW, campers asking for recharging of their mobile phones and walking on the farm in pyjamas do not go hand in hand with the storytelling of an exclusive vineyard. In the same line of identifying a more coherent concept, Lille Gadegaard in 2007 changed its cafe menu to Spanish-inspired tapas. In 2008, when SW was employed on Lille Gadegaard as manager of the cafe, the present and very successful menu was identified, consisting of food and drinks products mainly from other Bornholm producers.

2.3.8 Overall summery of the knowledge biography

The FKD2 concerns the transformation of a farm from strawberry growing to vineyard activities – types of activities that not before were performed on Bornholm and that only 23 firms in Denmark as a whole presently are engaged in. The owner of the firm is a central actor in all phases of the biography that started in 1995 and to some extent is still ongoing.

In an initial phase of 5-6 years the owner was engaged in developing strawberry wine on the basis of strawberries, grown on his farm. This was done through searches of codified synthetic production knowledge as well as by experimental trial-and-error and learning-by-doing. During this initial phase, he got the idea of making the farm into a vineyard based on direct sales to visiting customers. This was inspired by holiday visit to wine producers abroad, by the regional market potential con-

nected with the big number of tourists that visit Bornholm during summers as well as by networking activities related to the interregional European association, Regional Culinary Heritage. This networking related to other food producers and rural development actors on Bornholm as well as to similar types of actors in Sweden.

In the initial phase he also got the idea of being among the first in Denmark starting production of grape wines. He provided synthetic knowledge on this topic through the internet and from study trips to wine producers in countries with bigger traditions in this field, mainly a producer in Germany. He applied the provided knowledge in practical experiments on the farm similar to those applied in development of strawberry wine in order to adapt it to the region-specific conditions for wine production and to build up the tacit knowledge dimensions. The strawberry wine resulting from his experiments was ready for sale in 2001 when a farm shop was opened, and the first red wine was bottled and ready for sale in 2003.

Through a sequence of consultancy services and sparring sessions from 2000 to 2003, provided by regional KIBS and students from a Glass and Ceramics School, and supported by diverse regional policy schemes for business development, the symbolic value-basis and the business model of the vineyard was identified. Among the consultancy services was an analysis of and suggestions to the business concept of Lille Gadegaard including its symbolic value-basis and a plan for the design and organisation of its functions and experience dimensions. The analysis in 2003 concluded that personal characteristics of the owner formed the critical and competitive element in the vineyard concept rather than qualities of the wine products. This conclusion and the dialogue with private consultants and students at the Glass and Ceramics School helped the owner in getting a concrete and contextualised understanding of the concepts of 'Experience Economy', value-based business models and storytelling.

On the basis of this new insight, the development and commercialisation of the experience elements and the visitor facilities of the vineyard that already had started in 2001 with the opening of the farm shop, entered a more targeted and professionally grounded phase. This phase involved further assistance of a communication consultancy firm in Copenhagen in design of visitor facilities. It also involved marketing efforts primarily targeted the regional market of tourists and tourism defined channels of advertising and diffusion of information. These led to a contract with a Bornholm tourism operator regarding scheduled guided tours for bus tourists which boosted the customer basis. The owner also was engaged in communication and visibility events through national media. Here he exploited his storytelling competences and his insight in the value-profile of his business that was explicated through intermediating consultants. During the recent 2-3 years main efforts have been done to identify and implement a more coherent and consistent concept for the vineyard and its diverse functions. In these efforts the main knowledge actor has been a local private consultant who lastly was employed in the firm.

2.3.9 Gender issues

In an overall view, the FKD2 has been dominated by male participation and decision making. Inside the frame of the firm, the male business owner has been the highly dominating and almost lonely driving actor, and – with few important exceptions - women only marginally and indirectly have been involved in the FKD2. Among the changing staff in the café and the shop, women have been employed as waiters and sellers of wine products and due to these tasks they have been involved in firm-internal customer observations regarding shopping patterns. As described above, these observations concluded that female customers often decide the purchases of couples and families visiting the shop and thus, constitute a central segment to target in product development. In turn, this made the business owner organize a panel of women to taste the products and give inputs to product development. This indicates that women at the demand side have played a central role, pulling the knowledge dynamics of the firm in certain directions not only regarding development of wine products but maybe regarding development of the vineyard as an experience based business as well.

Also in the network of firm-external actors, related to the development of the Lille Gadegaard vineyard, such as consultants, technology suppliers, competitors of wine producers abroad, small-scale food producers on Bornholm, Sweden and other places, males have dominated. This reflects the fact that the employment in the food sector as a whole is dominated by males.

However, external female actors have given crucial knowledge inputs to the knowledge biography as well. The group of almost exclusively female students on the Glass and Ceramics School created the maybe central knowledge input to the identification of the value-basis of the vineyard and played an important role in visualization and concretization of the practical content of experience based business models. Also two female private consultants in Copenhagen gave important contributions to the elaboration of the aesthetic design and logistical design of the vineyard.

2.4 FKD 3: Bornholm pork meat of Danish Crown.

2.4.1 Introduction

Danish Crown (DC) is the largest meat (beef and pork) processing company in Europe and the second largest in the world. There are about 25.000 employees of which about 10.000 are in Denmark and annual turnover is about 7.3 billion Euro. DC is cooperatively owned by Danish pig and cow farmers, with headquarters in Randers, Denmark. DC is the world's largest exporter of meat. On Bornholm there is a production unit with 220 employees – a slaughterhouse for primarily pigs, which carries out initial cutting and sends it to other production units outside Bornholm for further processing. Accordingly, DC's links to Bornholm are different than those of the two other firms studied in FKD1 and FKD2 who are locally owned and have been directly involved in establishing the new brand of Bornholm food. Bornholm is of limited strategic interest for Danish Crown, as only a marginal share of total turnover is related to the island. Since the DC slaughterhouse on Bornholm is the only one on the island, it plays a crucial role for farming of pigs and cows as well, since transportation of living animals for slaughtering outside the island would be complicated and increase the

costs heavily. The short transportation time of maximum one hour between farmers and the slaughterhouse, contributes to better animal welfare and decreased levels of stress hormones in the meat, and is indeed another advantage of keeping the production unit on Bornholm.

In recent years the conventional meat industry in Denmark – and here DC is the absolute dominant player, performing 82% of slaughtering of pigs and 57% of cows - has gone through processes of mergers, acquisitions and geographical concentration on still bigger production units and thus a standardisation of product lines. The subject of closing or reducing the production unit on Bornholm has frequently been debated in the local press and among local farmers and politicians. However, the innovation project of developing and marketing a ‘Bornholm Pig’ suggests that DC is maintaining its priority and interest in Bornholm as a location for production rather than having plans of downsizing the Bornholm unit. This interest might have been enhanced due to the quickly achieved sales success of new Bornholm Pig products – all present production of ‘Bornholm pigs’ is sold and the originally targeted volume of production of 200 pigs per week was few months after launching of the products increased by 30% and with further 30% in October 2008. In August 2008 Bornholm pig products stood for about 10% of all pork meat sold via the nation-wide supermarket chain, Kvickly.

The difference in both internal resources and external, institutional resources characterising, on the one hand, a large conventional food company and, on the other hand, small alternative food producers, is striking. While FKD 1 and FKD 2 are supply-driven development processes of individual micro firms realised within a framework of virginal markets, distribution systems, and support and science institutions, the FKD 3 is a demand-driven innovation project occurring within a framework characterised by economically strong players, well-defined supply chains and customer relations, and large national science and consultancy institutions. FKD 3 is an innovation project integrating actors and activities all along a well-established supply chain of agriculture, agricultural consultancy, industrial processing, industrial research, distribution and retail. The innovation project of DC is selected for a case study because it is considered an exemplary illustration of how large conventional food processing companies respond to contemporary changes in consumer markets towards growing demands for specialised high-profile products by, among other strategies, engaging in innovation of food products with a ‘regional identity’.

The studied innovation process can be divided in the following phases:

1. June 2006 – February 2007: Development of the basic product idea
2. March – September 2007 : Specification of product and production concept
3. September 2007 – March 2008: Planning of production and market introduction

2.4.2 Development of basic idea (June 2006 – March 2007)

Alongside the dominating process of rationalisation and standardisation of low-market product lines, national and international customers (mainly supermarkets) are demanding high-market products, which in turn have forged DC’s development of specialisation strategies for such quality products. The story of the development of ‘Bornholm Pig’ is an example of a successful specialisation strat-

egy. In June 2006, DC was contacted by one of its biggest customers on the national market, the supermarket group COOP¹⁰, who requested a specialty pork meat product to be developed and distributed on a nation-wide scale. At the time, COOP's two main national competitors had had specialty pork products on the market for several years. These products both focused on animal welfare aspects of their product. COOP had previously launched 3-4 different types of specialty pork products without success and had therefore discontinued production.

COOPs request for a specialty pork product at this time, was the direct result of a firm-internal feedback mechanism, whereby front office workers (here: butchers who work in supermarket meat departments) annually participate in a training- and feed-back session organised by COOP head office. The objective is to inform and train staff in new products, production methods, regulative requirements, etc. but also to get feedback and new ideas regarding products and concepts from staff with a direct contact to consumers. In the spring of 2006, local butchers expressed the intuitive feeling that there might be sales potentials in a quality, high-profile pork product. COOP already had a series of quality meat products within other meat categories: beef, veal, lamb and poultry. At the same time, butchers made it clear that the demand for organic meat in general was bigger than they were able to supply, and that customer demands were growing. Thus the initial request was for DC to produce an organic pork meat product series. This was an obvious preference for COOP, which has a market strategy to be dominant regarding supplies of organic food with a strong organic profile encompassing approximately 500 organic products in their portfolio.

The idea of providing a specialty/organic pork product was discussed at COOP management level with the director of meat purchasing, Esben Meyer, responsible for 'upstream' contacts to suppliers (in this case DC) in charge. These initial internal discussions also involved the two meat portfolio managers of Kvickly (Jimmy Andersen) and SuperBrugsen (Per Hansen), two of the five supermarket chains belonging to the COOP group. What the precise product concept should be and what the market potentials might be were not defined nor investigated at this point of time, for instance through targeted consumer research. The idea was considered potentially important, not so much due to expectations of higher profits on specialty products than on standard products, as the need to satisfy growing consumer demands for a more diversified and varied supply of food products in general, for more exclusive, high-profile types of products in particular, as well as for providing shoppers with new products in order to enhance their shopping experiences as an activity in its own right (Jimmy Andersen, Meat Portfolio Manager, Kvickly).

Torben Pedersen, DC Sales Manager for pork meat, whose primary customer is the COOP Group, was from the onset – and throughout the entire process - responsible for product development. DC does have an "innovation group" that normally would have coordinated and lead new product development activities. However, as described in more detail below, the process of developing the Bornholm Pig was not 'business as usual' and did not follow the usual organizational procedures and departmental responsibilities. Throughout the process from product and concept development to mar-

¹⁰ Coop Denmark A/S is Denmark's leading consumer goods retailer. It operates the chains Kvickly, Kvickly xtra, SuperBrugsen, Dagli'Brugsen and LokalBrugsen as well as the subsidiaries Irma A/S and Fakta A/S. Coop Denmark has, together with the cooperatives, an annual turnover of approximately DKK 40 billion and 27,000 employees. Coop Denmark is owned by the cooperative FDB, which has 1,6 million members.

ket introduction, TP personally functioned as the key person coordinating the contacts between the persons, departments, companies and organizations involved. As is very often the case of employed in the food industry, even at management level, TP has no academic education, but a vocational education as butcher and a long professional career working in different parts of the meat supply chain, including employment in a butcher shop and sales representative for COOP.

DC quickly convinced COOP that the initial idea of developing an organic pork meat product was not feasible due to regulative demands, which meant that switching from conventional to organic pig production would be a two-year process.

Having excluded the organic option, DC and COOP needed to discuss which distinct quality/qualities should distinguish the product from DC's standard pork products. COOP did not have strong views on this, not was Bornholm as a defining element in the product of importance to them. DC and COOP discussed possible product concepts: The special quality targeted in the innovation process could be 'excellent taste', 'safe and healthy', 'animal friendly', 'regional identity' or other qualities of particular attraction for segments of Danish consumers. But the option of focusing on the taste aspect seemed particularly interesting for DC and COOP since the existing competing specialty pork products on the Danish market – (products that were supplied by DC to COOP's main supermarket competitors) - emphasized animal welfare, but were not distinguishable from standard products regarding taste.

In 2004, DC in cooperation with a number of pig farmers on Bornholm had been involved in a project to establish a specialized pork production based on the Antonius race of pigs. The object was to launch a pork product with a 'regional identity' on the Danish market. This project was never finalized, primarily due to insecurity about the consumer demands. This project, however, meant that DC already in 2004 had applied for and received the formal trademark registration of a 'Bornholm Pig'. This trademark registration was later exploited and a contract was signed with COOP that the two partners had exclusive rights to market products using the name of 'Bornholm Pig'.

TP had only recently been employed by DC, and had therefore not been involved in the previous Bornholm project, but when met by COOP's request for a specialty pork meat product, it was an obvious option to reintroduce this desk drawer project, whose working title had been 'Pigs on the rocks' (pointing to the - in Denmark - renowned rocky geology of Bornholm). By doing this DC could take advantage of the established, but not fully exploited, competences and production facilities on the involved Bornholm farms. Additionally, and perhaps more importantly, the brand of new Bornholm food and the many emerging small-scale producers of Bornholm food had, in the meantime, evolved and become more clearly profiled due to regional branding efforts (see the TKD report), and thus was an extra attraction for the two partners. Bornholm had other potential advantages for choosing it, as a distinct production area: As mentioned before, there were a number of farmers on Bornholm, who had already changed this convention pig farming facilities and had both the necessary capacity and competences to carry out a specialized production. This was also the case concerning the local agricultural consultant, Stig Andersen (SA) from Bornholm's Agricultural Advisory Services, who had also been involved in the previous activities. Finally, Bornholm as a geographically isolated region has the lowest level of Salmonella bacteria in pigs in Denmark. This fact

has not until now been used in the marketing of Bornholm pork products, but it might be crucial for DC's future possibilities of exporting special as well as standard Bornholm pork meat, as absence of Salmonella bacteria is a regulative precondition for exporting to several EU countries such as Sweden and Finland.

As a first step in the process, DC in February 2007 arranged a blind test of the taste of different types of pork meat. The purpose was to establish if the costumer, Coop, wanted to focus on taste as the primary quality, which defined the specialty product. The blind test took place at Coop headquarters in Copenhagen and involved 10 professionals from Coop and DC. Participants were asked to taste an Antonius Pig, an organically produced pig, a conventionally produced Danish pig and a conventionally produced German pig. The test confirmed participants' decision to focus on taste, as 9 out of 10 tasters agreed that the Antonius Pig by far had a distinctively better taste.

In the period leading up to the blind testing in February 2007, and before presentation of the idea of developing a 'Bornholm Pig' to top level managers of COOP and DC, TP had done a preliminary survey of factors, which specifically affect the taste of pork products. Firm-internally, TP contacted a 'breeding and meat quality consultant' (Birthe Pedersen, BP) and a 'special production consultant' (Martin Villadsen) in the farmer-service section of the Pork Division at Danish Crown in Randers, Denmark. Birthe Pedersen is knowledgeable regarding factors which influence the taste of pork meat as well as the economic consequences of applying such factors. BP has the responsibility of being updated with external research activities of relevance for the Pork Division of DC and to provide the organization with needed research based knowledge and expertise on specific issues. DC very rarely carries out formally organized, firm-internal research projects, since it has free access to qualified and multifaceted research carried out by the Danish Meat Research Institute (DMRI)¹¹.

Through DC's firm-internal channels to external research resources, TP was provided with information from numerous research projects pointing to several factors influencing taste, such as the race of pigs, fat percentage, intra-muscular fat, maturing, fodder, breeding methods, etc. but also to agro-economic calculations indicating that a priority on the taste factor of the meat would increase the production costs for farmers and decrease the efficiency in the processing link. Accordingly, higher sales prices should be expected. Still, since prices of pork meat in general are lower than prices of other types of meat, it was evaluated that it was possible to realize a competitive and profitable production. The knowledge about these factors and production processes was applied more directly later in the innovation process when the basic idea of focusing the innovation project on the taste aspect was agreed upon by top managers of COOP and DC.

¹¹ DMRI is a research organization in Roskilde close to Copenhagen, owned by the Danish Pig Farmers' Association via the Danish Bacon and Meat Council (the processing industry in which DC has a central role). It was established in 1954, and with a staff of 87 scientist, 27 technicians and 20 laboratory technicians (<http://danishmeat.eu/DMRI.aspx>). DMRI services to companies in the Danish meat industry also include development and maintenance of the data systems of the industry, a library function and patent surveillance. DC contributes to the research activities of DMRI via a special national regulative arrangement by which all farmers and food processing industries (i.e. not just meat) are charged production taxes as a support to research and information activities of common interest for the Danish agro-food sector as a whole (http://ferv.fvm.dk/Oversigt_over_fonde.aspx?ID=13747).

TP presented his description of the basic product concept at a meeting held at the Coop headquarters in conjunction with the blind tasting test in February 2007. Only optional ideas and abstract concepts were presented including the need of basing the product on a substantial, genuine quality and not only the marketing slogan of 'Pigs grown up on Bornholm'. However, in his presentation TP integrated the knowledge achieved via his initial investigations regarding central aspects of the innovation idea such as the main factors of importance for creation of taste, possible cost dimensions, and advantages and disadvantages of Bornholm as location for production in terms of farming, consultancy, suppliers, slaughtering and processing, logistics, branding and marketing.

COOP and DC agreed upon the idea of working toward a quality-based pork product, where taste elements were the defining factor, and where welfare elements, had some importance (working thesis: 75 % taste, 25 % welfare). It was also decided to explore and concretize the idea of producing it on Bornholm.

Accordingly, the over-all physical qualities and symbolic values to embed in the product and to brand in the marketing were identified by combining, on the one hand, tacit symbolic knowledge on trends in consumer preferences and, on the other hand, codified analytical research based knowledge on pig production methods and agro-economy – and the actual concept development phase could start.

2.4.3 Specification of product and production concept (March 2007 – October November 2007)

As the first step of investigating and specifying a possible Bornholm pig concept, TP organized a two-day trip to Bornholm in May 2007. DC was represented by himself and Martin Villadsen, while Coop was represented by Esben Mayer and the two Meat Portfolio Managers from SuperBrugsen and Kvickly (Jimmy Andersen, JA). Both companies also had representatives from their marketing departments with them.

In order to prepare the meeting TP had asked the agricultural consultant on Bornholm, Stig Andersen (SA), to organize a number of meetings and visits to local farmers, food producers, and the fodder supplier on Bornholm. SA has an academic education in agronomy and is employed as consultant and specialist in pig farming in a nation-wide but decentralized system of agricultural consultancy, Danish Agricultural Advisory Service, employing totally 3.500 professional consultants, run on private conditions by the individual local associations of farmers in Denmark. This decentralized agricultural consultancy system dates back to 1875 and has historically played a crucial role in transferring the newest knowledge and technologies to Danish farmers (predominantly characterized by high-technology, standardized, large-scale oriented production methods), developed through public university and sector research as well as private research of farmer and industry associations such as the Danish Meat Research Institute. As usual for all services provided by Danish Agricultural Advisory Service, SA was paid by DC for his services in the Bornholm Pig innovation project, and in general, DC solely paid the costs connected to the development of the new product.

SA functioned as an intermediating actor between DC and Bornholm actors, i.e. the fodder supplier and the five farmers, who had been involved in the previous specialist pork production activities in order to identify their professional interest in participation in this new project, how far along a specialization strategy they were willing to change their farming, and what potential difficulties there might be in meeting special demands regarding local origin of the fodder. As already said, the discussions of the product and production concept generally had a very open character at this point in time. The discussions focused on product qualities such as better taste, more animal friendly breeding methods, and local supplies of fodder but the weight of these issues were not clarified. For TP it was a priority to involve farmers that were motivated not only by expectations of higher profits but also were professionally competent and shared the ideas of specialized pig farming, animal welfare, meat with good taste and local origin, etc.

At the meeting in May on Bornholm, DC and Coop representatives visited three of the above farmers, who were interested in joining the production project. They also visited the local slaughterhouse and viewed the production facilities here. Moreover they visited Lehnsgaard, a small-scale producer of a cold-pressed rape seed kernel oil, described in FKD1, and the grain miller firm Bornholms Valsemølle. The purpose of these visits was to give first-hand impressions of the branding and storytelling potentials of small-scale productions of quality food on Bornholm. According to TP, The visitors found the meeting with the entrepreneur, Hans Hansen (HH), especially rewarding. HH represented, what at the time was a relatively new trend on the Danish food markets, regional food, and was highly inspiring in terms of clarifying the critical need for certain product qualities, which supersede the geographical origin of production, i.e. that viable business ideas regarding food products should be based on substantial product qualities such as rich taste experiences and not only a smart marketing slogan about Bornholm. This reassured DC as well as Coop about the market potentials of a Bornholm Pig product concept based on the parameters of, firstly, eating experience and taste, and secondly, however weighted less important, animal welfare.

Another part of the two-day visit was a meeting with the former 'Food Ambassador', who in 2004-2006, had been responsible for the promotion of small-scale Bornholm food products, and although he no longer held the post, was still heavily engaged in the promotion of regional food of Bornholm. According to our interview with Jimmy Andersen (JA), Fresh Meat Portfolio Manager Kvickly, the dialogue with the Food Ambassador was marked by his general scepticism (supposedly expressed on behalf of Bornholm firms and inhabitants) about the good intentions of large economic players like DC and Coop, representing conventional agro-food systems. With some relevance, the Food Ambassador pointed to the risks of damaging the regional efforts of establishing the brand of Bornholm food based on small-scale local producers. Since these views, according to JA, were stated in an, for them, entirely unanticipated attitude of mistrust, COOP and DC after the meeting agreed not to involve any Bornholm actors who were not directed involved in the supply chain of the product, in future discussions about the product concept.

Among the specific questions discussed at the meeting was the volume of production. These discussions in which JA and other involved marketing staff gave important input, ended in agreeing on starting at a rather modest level and then increasing the volume according to the demands of consumers. An argument for this was that 'all sold' creates its own demand but also that it was impor-

tant not to overload the meat departments in individual supermarkets with unsellable meat and thereby erode the motivation of the staff, evaluated as crucial for the sale. Thus, it was agreed to start with a production of 200 pigs a week, meaning that 5-7 farmers had to be involved.

The trip also confirmed TP's opinion that Bornholm would be a suitable place of production due to the presence of several important conditions:

- a number of potentially interested farmers;
- a qualified agricultural consultancy system, including an established relation to a competent consultant;
- a DC processing unit with (after a few, inexpensive changes) the needed capacity, equipment and competences for processing, cooling, process controlling, administration, logistics, etc.;
- and finally, a well-established and generally positive image of Bornholm in general and of Bornholm specialty food in particular in the Danish population due to the island's position as main tourism destination and the recently emerging business sector of Bornholm food.

The meeting on Bornholm concluded with decisions on naming the new product 'Bornholm Pig' and using Bornholm as the place for production, which in practical terms also meant that a majority of the fodder would be of local origin. It was also agreed that the targeted product qualities, except for the place branding embedded in the name of the product, should be 'a difference in taste' and, though of less importance 'better animal welfare', even if this meant higher production costs and sales prices than those of the competing specialty pork products on the market.

The visit to Bornholm May 2007 was followed by a period of time which lasted until September 2007, wherein DC and COOP, in close dialogue, specified the content of the product and production concept.

DC has a set standard of internal approval and coordination practices when it comes to development of new products. This insures that all aspects, economic consequences, strategic potentials, possible problems regarding supply chains, etc have been considered. In the case of product development of Bornholm Pork, however, DC changed some of these procedures. The project idea did go through the initial internal project calculation procedures mentioned above. For example it was investigated whether there were plans of downsizing or closing the Bornholm production unit. But, rather than placing the project in the hands of the innovation team, Torben Petersen as responsible for the COOP account became project manager and was given a free hand to include personnel from other sections of DC. Due to the close customer relationship between TP and especially the Fresh Meats Portfolio Manager at Kvickly, Jimmy Andersen, TP involved marketing personnel directly in the project process and they were paired with marketing personnel from COOP. According to our interview with TP, there was no doubt however, that COOP played the primary role of deciding all central elements in the production concept and that DC's role was primarily focussed on meeting the requests and decisions of COOP.

At the COOP end, decisions and management of initiatives regarding nation-wide introduction of new products in the five supermarket chains under the COOP group, are normally organised at cen-

tral management level. However, COOP and Kvickly soon decided that a regionally branded specialized pork product could be marketed as more exclusive, if it at least initially were only sold through the Kvickly chain. The Kvickly chain has a higher number of premium-priced, specialized products, than do the other chains. COOP therefore decided to solely involve staff representing the supermarket chain Kvickly, and from this period in time (May 2007) the project was carried out by DC and the Kvickly Fresh Meat Portfolio Manager as well as quality control and marketing divisions from COOP.

In the period following the May meeting on Bornholm, Danish Crown focused on providing economically feasible as well as practical solutions to product demands made by COOP. Key knowledge inputs to specification of the product and production concept came from the meat research institute DMRI as well as from the agricultural consultant on Bornholm, SA. As mentioned earlier, TP had already collected DMRI research knowledge via the DC consultant on meat quality, for instance, concerning which races of pigs to provide a good taste connected to the specified production processes. According to the existing research, however, the most important factor for producing a good taste of pig meat is related to the amount of intramuscular fat in the meat and since this - until a certain limit - increases by the age and weight of the pigs, meaning longer breeding periods. The increased weight compared to conventional pigs, not only increases production costs during breeding, but also during slaughtering, as a higher proportion has a too high fat percentage and thus, has to be rejected as Bornholm pigs. Furthermore, another cost-increasing factor connected with production of heavier pigs, is EU animal welfare directives that demand more space for animals above a certain weight. Production of heavier pigs therefore emphasizes the need for farmers to 'super-optimize' utilization of space by mixing heavy (fast growing) animals with less heavy (slow growing) animals in the individual boxes in order to comply with the regulative demands of a certain average area of space per kilo of animals. These economically important issues obviously had to be considered and taken account when DC made contracts with pig farmers.

Throughout the phase of specifying the production concept, research based knowledge from DMRI was exploited by DC staff mainly in translating of specific wishes of COOP and DC regarding possible aspects of the product concept into economic production figures. This could be cost and efficiency consequences related to questions such as how much space the pigs should have, what weight they should have when slaughtered, and what the transportation costs of different farming and processing methods might be. Accordingly, the exploited DMRI research knowledge primarily concerned optimization of efficiency aspects of production, processing and distribution. Due to the easily accessible, highly codified and detailed character of existing meat industry research knowledge these sorts of calculations were relatively straightforward.

In all of these practically oriented processes, the Bornholm agricultural consultant SA played a crucial role as in intermediating actor between the farmers and DC/COOP. This was also the case concerning finding practically and economically feasible solutions concerning pens and housing systems for pigs. Again animal welfare compared to costs, were considered. The critical priority of DC and COOP regarding housing systems was that they were in compliance with existing Danish and EU regulative demands as well as with coming legislation. SA exploited his knowledge about local farmers and existing pig housing systems on Bornholm in selecting the farmers to involve in produc-

tion of Bornholm Pigs. Five of the seven farmers who in the end signed a contract had been involved in the previously attempt to start production of Antonius pigs and all had modern housing systems complying with regulative demands.

Another specific question which was discussed as part of the production concept was which feeding strategy to choose. Also in this area, important inputs were provided by the agricultural consultant SA. Choice of feeding strategy involved considerations regarding different types of local fodder and their availability in the required quantities (living up to requirements concerning 70 % of the fodder being produced on Bornholm), vis-à-vis actual fodder access (living up to requirements concerning intramuscular fat in the pork). Interestingly, a possible local source of fodder that was discussed at length by DC and SA is the rape seed cakes that are the residual of the production of rape seed kernel cooking oil produced by Lehnsgaard (see FKD1). This option, however, has not yet been exploited, but is an especially attractive perspective in enhancing the local profile of the Bornholm Pig product in future.

In August 2007, COOP sent employees (1 male, 1 female) from its quality control department to a number of the Bornholm farmers to see and hear whether the targeted production methods and specifications, not least in terms of animal welfare, fitted into the image, reputation and policies of COOP. The concluding remark from this quality control was that the present specifications were too close to conventional pig farming to call it 'animal friendly' and more substantial differences were needed. They also felt that other factors than that the pigs were grown and slaughtered on Bornholm needed to be identified and emphasized if using the name of Bornholm Pig. Such factors could be Bornholm's position as the region in Denmark with the lowest level of salmonella bacteria, as well as the relatively low transportation time on Bornholm of maximum one hour from farms to the slaughterhouse, thus producing lower levels of stress hormones which affect the quality of the meat. These specific advantages of Bornholm could have market importance, since health risks related to salmonella bacteria infections and animal welfare problems related to long transportation time for living animals at that time were hot issues in Danish media due to several TV documentaries. Apart from these comments, the outlined concept was approved by the COOP quality control.

The discussions and wishes of COOP and DC about possible elements to integrate in the production concept, involving feedback from a close and practically oriented dialogue between SA and the Bornholm farmers, ended in a number of specific demands that were written into a finally agreed production concept in October 2007, including regulation on pen and housing systems, Bornholm origin of fodder, increased space demands compared to conventional pork, use of straw and rubber on pen floors, race specifications, slaughtering weight, meat/fat proportions, quality control at slaughter and further processing.

On the basis of these specifications, the total expected production costs for farmers were calculated, the payments to farmers from DC for delivery of Bornholm Pigs, taking into account the additional costs compared to conventional pig farming, were negotiated and contracts with farmers were signed. Furthermore, SA elaborated a specific quality manual with information about the precise requirements of the concept the involved farmers.

2.4.4 Preparing farmers, processing and marketing (September 2007 – March 2008)

In this phase efforts were made to implement the specified production concept on the seven contracted farms as well as in the DC processing unit on Bornholm. Focus was, however, on developing the needed material for marketing and advertising as well as internal promotion and information sessions targeting on the one hand, DC farmers, and on the other, front line staff in Kvickly supermarkets. DC was responsible for the up-stream contacts, i.e. the farmers, while DC and Kvickly marketing worked closely together concerning marketing and internal information processes in Kvickly. Product launch was the 12th week of 2008 (March).

On the basis of the elaborated production quality manual, SA had individual consulting sessions with the farmers regarding how to implement and satisfy the requested demands. No formal education was needed as the farmers already had the basic knowledge and skills to fulfill the conceptual demands but for COOP and DC it was important that farmers achieved a common understanding of the overall concept and followed the same routines and procedures. The implementation process was relatively straightforward due to the involvement of the farmers and the agricultural advisor SA since the beginning of the process.

Preparation of the DC slaughtering unit on Bornholm for the new processing of 200 Bornholm pigs weekly, was also without major complications. The main issue was to prepare a new process line having exactly the same steps as the conventional lines, (which process approximately 8000 pigs weekly), i.e. slaughter, quality control, cutting into main parts, and final transport to DC's processing unit in Ringsted, Denmark where the meat is fine-cut before delivery to the customers, in this case the main logistical center of COOP. However, the workers cutting the meat in the Bornholm unit only needed instructions and guidelines about a few small differences of the cuttings as compared to those used in conventional processing, provided by central DC training staff on a single training visit to Bornholm.

The capacities of the quality control systems in the Bornholm unit were critical for establishing the new product. The quality control systems are electronic and use advanced forms of probes, sensors and scanners to measure a variety of parameters of the meat before and after slaughtering. The needed adjustments to the electronic control programs and stamps for the Bornholm Pig production were made by the Danish Meat Research Institute. If a piece of meat from a Bornholm pig gets remarks at the end-control, all parts of that particular pig are discarded and used as conventional meat. The discard rate of Bornholm pigs is relatively high at 20-25%, the main reason being a too high fat percentage due to the animals' unrestricted access to fodder.

The marketing staff of COOP, Kvickly and DC was involved in the process already in the concept development phase but from November 2007 the work of preparing the marketing efforts and elaborating the material used in a launching campaign took a more practical form. Coordinating persons were Kvickly Meat Portfolio Manager JA and DC Sales Manager TP but generally it involved the marketing departments of Kvickly, COOP and DC as well as other persons. Taking into considera-

tion the overall male dominance of the agro-food sector, expressed by several interview persons, the representation of females was relatively high regarding staff involved in marketing functions.

The question of identifying the name of the new product has already been discussed in the first steps of the development process. The option of naming the new product Bornholm Pig was a natural consequence of the following argumentation:

”The Bornholm brand clearly played a role. We prioritize niche productions in many of our high-profile products such as beer from micro breweries. When the option of Bornholm pork meat was suggested by Danish Crown, I thought it was obvious to try. Consumers generally relate Bornholm to something positive. We had a clear idea that this could turn into a success; there is awareness of the place, knowledge about the island on which to create a good story, with values, that people recognize.” Interview Jimmy Andersen, Meat Portfolio Manager, Kvickly, August 21st, 2008.

A main issue for the marketing departments was to define the overall identity of the new product and on this basis, the design of marketing materials. A point of departure for a dialogue between the marketing departments of Kvickly and DC was the layout used in for Kvickly’s high-profile Premium beef. Kvickly wanted to exploit consumers’ recognition of the design and logo used for Premium beef and their general acknowledgement of the high quality of this particular meat product by marketing the new pork products with a comparable and recognizable layout. Kvickly therefore provided DC’s marketing department with sketches of designs close to the ones used for the Premium beef, for instance regarding forms and colors, and requested DC to elaborate on more final designs. After many proposals, discussions and working hours DC and Kvickly agreed on the design of a series of marketing and information material. Additionally, a (female) cook, who works freelance for COOP developed a number of recipes using the Bornholm pork meat as the primary ingredient. These recipes were part of a special section about the new Bornholm Pork product, which was included in Kvickly’s weekly advertising leaflet, distributed to all Danish households just before product launch in March 2008.

An internal education and information campaign for staff in the meat departments of Kvickly supermarkets was considered crucially important. Experience had shown Kvickly, that the motivation and marketing efforts of the staff with face-to-face contacts to consumers in supermarkets were decisive for the success of new product introductions. Accordingly, in the months before market introduction, Kvickly organized three sessions in different locations in Denmark targeted butchers and other employees in the meat departments and explained the ideas and content of the new product concept to them in order to stimulate their professional interests and knowledge.

This very well might have been one of the factors for the relatively quickly achieved nation-wide sales success of Bornholm Pork, despite its premium-prices at 10-15% more than conventional pork meat prices. The average market share of Bornholm pork meat was in August 2007, five months after launch and after a 30% increase of the initial production volume, averaging at 9.2% of total pork meat sold via Kvickly supermarkets. The share is highest in Kvickly supermarkets where staff seems to have given the products the best welcome such as on Bornholm (with 30% of sales), in

Copenhagen and in a number of places in Jutland, but the distributed meat has sold easily almost everywhere. By October 2007 yet another 30% increase of production volume was decided and the distribution adjusted to local differences in demands also regarding specific parts of the pigs.

It is important to stress the extremely structured and detailed scheduling and planning principles and routines that characterise large economic actors in the conventional agro-food sector such as DC and COOP. Kvikly's marketing department has a set schedule, whereby they commence production of marketing materials 20 weeks in advance of product market introduction. This in turn locks the preparation process of the new products, i.e. in the case of Bornholm Pork, all the reorganisation of the first generation had to be in place. This way of scheduling and accomplishing innovations obviously stresses the need for structured planning and formal procedures but also indicates the fundamentally efficiency-oriented framework in which the process of developing a Bornholm Pig took place.

DC considers Bornholm Pork to be a product, which can continue its development. DC constantly follows up on new research on enhancing the taste of pork and is engaged in internal discussions regarding different elements that might contribute to a better taste or better eating experiences for consumers, for instance using of new sorts of fodder or new methods of maturing the meat. However, for a company the scale and scope of DC, such efforts and considerations are integrated in an overall framework emphasising efficiency and price factors.

To sum up, the customer-driven innovation project of developing Bornholm pork meat products followed three basic phases. The first was to meet the request from the customer of a specialty pork product by formulating a basic product idea, i.e. the qualities distinguishing the product from other pork products on the Danish market. In the second phase the precise product and production concept was specified including the economic consequences for the involved actors, i.e. farmers, the meat processing industry and supermarkets. In the final and third phase the involved actors prepared for and implemented the needed changes in their organizations including the marketing systems. The innovation project was given direction mainly via a close dialogue between the two actors of DC and COOP but crucial knowledge inputs were provided by actors all along the supply chain of farmers, farm suppliers, agricultural consultants, processing industries, industry research institutions, and retail. In an overall perspective the case study has illustrated the high degree of vertical and horizontal integration characterizing the conventional Danish agro-food system and the efficiency in terms of examining, spreading and exploiting different types of knowledge between actors inside this system, providing economic and institutional frameworks for accomplishment of successful, large-scale innovation of products and technologies within a relatively short time limit.

2.4.5 Gender issues

As the description above emphasizes, this is another case dominated by males in the central innovative processes, but aided by females, who at different stages directly or indirectly feed the process. Knowledge types which are produced by females are primarily analytical (research) and symbolic (marketing).

2.5 Findings and conclusions from the FKDs

In this paragraph we will sum up the findings of the three FKDs by relating them to the matrix of three knowledge categories, analytical, synthetic and symbolic knowledge, and three phases, exploration, examination and exploitation. However, before we relate our empirical findings to the conceptual framework we will explain how we define the concepts and discuss the problems we have perceived in using them.

The three knowledge categories and the three knowledge phases are defined only with brief and not very detailed formulations in EURODITE working reports and documents such as the Appendix 5 to the EURODITE WP6 reporting template. This might lead to different interpretations and use of the knowledge types by the individual EURODITE research teams in their analyses which in turn might complicate a comprehensive synthetic analysis across the diverse case studies. We understand the three knowledge categories as epistemologically defined, i.e. defined not by what the knowledge concerns but by how and for what purpose the knowledge is developed. In the words of Asheim et al. (2007):

“The analytical knowledge base comprises (predominantly scientific) knowledge that is geared to understand features of the (natural) world. The synthetic knowledge base refers to the (predominantly engineering) knowledge involved in the design and construction of solutions to human problems which is often instrumental, context specific and practice related. The symbolic knowledge base deals with the creation of cultural meaning through transmission in an affecting sensuous medium.”

There is good reasoning in distinguishing between these three types of knowledge and knowledge dynamics. In particular, the inclusion of the symbolic type of knowledge alongside the more traditional types of analytical (scientific) and synthetic (engineering) knowledge seems highly relevant as it allows for analyses of phenomena and dynamics that are often neglected in economic and social research such as the significance of design, brands, and normative values of products and productions. However, despite the intellectually attractive categorical differences between the three types of knowledge, real-world knowledge and knowledge dynamics often seem to cross the categories and extremely difficult to place in one of the three types. For instance, our case studies indicate that symbolic knowledge dynamics often encompass elements that indeed are not formal research but have many of the ‘analytical’ characteristics of research such as systematic methods for collection information and codifying knowledge. This is in particular the case when professional ‘symbolic experts’ such as marketing consultants are involved. As the Food Ambassador, employed by the Local Action Group on Bornholm to brand and enhance the visibility of Bornholm food producers outside the island said¹²:

“If you want to market and brand something, to make visibility events, feed the media with good stories and so on, you need to know exactly what you are dealing with. What is the product? Who are the customers? What are the market conditions? Which communication channel will be best?”

¹² The work of the Food Ambassador is described in detail in the TKD report on Bornholm food.

So before I made any efforts to market Bornholm food I started collecting facts in a highly analytical and systematic manner, for instance reading research analyses. And all the way through my work I many times went back and looked at these analyses in order to find the right direction of my ideas.” (Georg Julin, Bornholm Food Ambassador, interview March 4, 2008).

A similar integration of analytical and symbolic knowledge dynamics characterizes the knowledge inputs of marketing and branding consultants in our three FKDs. The ‘meanings’ they created was made by combining analytical knowledge and symbolic/artistic/creative knowledge. A part of this problem of categorizing can be solved if you are able to break down the process into its small individual steps, but firstly, this violate a central characteristic of the knowledge dynamic, and secondly, it does not help in the requested overall categorizing of the knowledge in one of the three types.

In our categorization, shown below, we have chosen the ‘easy way’ of categorizing all knowledge dynamics targeted creation of ‘cultural meaning’, i.e. knowledge that cannot be fully judged on the basis of “is it true?” or “does it work?”, as symbolic knowledge although they often encompass analytical, investigative elements and/or elements of synthetic problem solving. This includes, for instance, the knowledge inputs of design students and communication consultants to FKD2. It also includes the knowledge dynamics of the owners of the two small firms in FKD1 and FKD2 related to identification and maturing of their new business ideas. In practical terms these dynamics primarily involved provision of (for the business owners) new synthetic knowledge, however, the structuring target for knowledge development was the identification of “a meaning for me”.

We also have experienced problems in categorizing the studied knowledge dynamics regarding the three phases of exploration, examination and exploitation - as well as the alternatively suggested phases of creation, absorption, diffusion and application. The main problem in using these phase concepts is that they – as far as we can see - are useful mainly for studies of isolated sequences of knowledge dynamics of individual firms and persons through which a certain piece of knowledge is provided, transformed and used, and not for studies of the full biographies of knowledge, i.e. the total historical path of several sequences of firms’ knowledge dynamics. The fundamental linearity, starting in generation of new knowledge that is examined (or diffused and absorbed) and then finally used that is built into the conceptualizations, further enlarge this problem. The conceptualizations are not very appropriate for analyses on how isolated sequences of exploration-examination-exploitation are related to subsequent or previous knowledge dynamics in the firm or to knowledge dynamics of other actors. In other words, they are not very useful for studying loop, feedback and integrative mechanisms neither at firm level nor at the level of the larger knowledge system in which the firm is part. This is a problem because the goal of the FKD case studies is biographies of knowledge and not just studies of isolated sequences of knowledge transformation.

When filling in the matrices we have dealt with this problem by numbering the individual - more or less - subsequent steps in the biographies, sometimes steps made by firm-external actors, to indicate how the biographies progress via ‘jumps’ horizontally between different knowledge types, vertically between different knowledge phases, and to some degree organizationally between different actors.

FKD 1: Lehnsgaard Rapeseed Cooking Oil

	Analytical	Synthetic	Symbolic
Exploration (Search and research)	1. <i>Chemistry of biorefinery processes</i>	2. <i>Development of production technology for rapeseed oil</i>	7. Identification of firm brand values
Examination (Trialling, testing, standard setting, benchmarking)		3. <i>Testing/adaptation of production technology for rapeseed oil</i>	
Exploitation (Commercialising)		4. <i>Commercialization efforts of Bioraf & others</i> 5. Appropriating and implementing technology (learning-by-doing) 6. Establishing local supplier network 9. Establishing marketing and distribution channels 11. Developing marketing networks	8. Elaboration of marketing materials and designs 10. Branding on national scale (media/events)

1. EU research/Activities of Bioraf & other firms

2. Activities of Lehnsgaard

FKD 2: Lille Gadegaard Vineyard

	Analytical	Synthetic	Symbolic
Exploration (Search and research)		2. Search for product/technology knowledge	1. Maturing of idea for new business 5. Identification of value-basis of business 6. Consultancy analyses on visitor experiences, aesthetic/architectural designs etc.
Examination (Trialling, testing, standard setting, benchmarking)		3. Development of products by trial-and-error, learning-by-doing & taste panel	
Exploitation (Commercialising)		4. Development of production and sale (commercialisation)	7. Development of vineyard experiences and facilities (commercialization) 8. Communication/ branding in national medias 9. Enhancing coherence of business concept

FKD 3: Danish Crown Bornholm Pork Meat

	Analytical	Synthetic	Symbolic
Exploration (Search and research)			1. Customer's identification of consumer demand 2. Naming of product idea/defining targeted product qualities (branding values)
Examination (Trialling, testing, standard setting, benchmarking)		4. Trialling and testing by farmers & consultant of practical/economic implications of requested production preferences 5. Elaboration of production concept	6. Marketing quality control of production concept (customer) 7. Blind tasting of product prototype
Exploitation (Commercialising)	3 (but related to 4, 5, 9 & 10). Use of existing meat industry research results (pig races, taste, economy, logistics)	9. Elaboration of production manual 10. Preparation of production systems	8. Development of marketing material 11. Preparing sales staff for product launching

A few concluding comments to the matrices should be made:

The matrices document how the knowledge biographies shift from phases with exploration, examination and exploitation dynamics, however not necessarily in the mentioned linear direction. In an overall view exploitation (commercialization) dynamics dominate. This reflects the specific market conditions prevailing in a traditional mature sector like the food industry. Phases of examination seem highly important in the FKD3 biography about the innovation activities of a large company while the concept seems less relevant for the micro-firms studied in FKD1 and FKD2. The limited relevance of examination dynamics especially in the FKD1 biography to some extent mirrors our choice of categorisation as well as the above described problems of categorising individual sequences of the total knowledge biography. For instance, Lehnsgaard's implementation of the technology for cooking oil production was not just a straightforward push-the-button exploitation but involved learning-by-doing. This however, does not change the fact that it basically was a process of exploiting knowledge, embedded in technological equipment.

Absorption and contextualization seem more appropriate than examination in describing the dynamics through which external knowledge is transformed and adapted to local conditions and markets in the two micro-firms, especially regarding symbolic knowledge. Indeed, these firms do not just jump from provision/exploration of external knowledge - for instance about the 'Experience Economy' - directly into an imitative kind of exploitation. However they do not as an isolated activity after provision/generation of knowledge and before commercial use of knowledge perform a process of examination. Rather the processes of providing, absorbing, adapting, and using of knowledge seem to be deeply integrated and best captured by the concept of contextualisation. Already the initial search

process for ‘new’ knowledge is done in a perspective of contextualisation, influenced by specific entrepreneurial motivations, needs and conditions.

In terms of knowledge types, synthetic engineering knowledge and symbolic design and branding knowledge dominate the biographies. The significance of synthetic engineering knowledge reflects that the cases occur in industries with manufacturing activities. The significance of symbolic knowledge might be connected with the fact that the three FKDs concern development of specialised productions of high-profile products dedicated to certain consumer segments. This underlines the need for more targeted and more professional marketing as well as more dedicated efforts to embed certain ‘cultural meanings’ in products.

Nevertheless, also analytical research-based knowledge plays an important role in both FKD1 and FKD3, although the research activities in FKD1 are not carried out by the firm in focus but by other actors in pre-commercial development phases and although the research activities in the FKD3 are not exploration but exploitation dynamics. The significance of formal research activities is atypical for the knowledge dynamics characterising the emergence of a regional platform for ‘Bornholm food’ in which the three FKDs are elements. Also the third firm case study, FKD2, is heavily influenced by sorts of knowledge inputs provided by use of analytical approaches, however not in the form of formal research activities but in the form of consultancy services related to symbolic knowledge.

The FKD1 on the development and marketing of rapeseed cooking oil is an example of successful integration of, on the one hand, analytical exploration and examination knowledge dynamics of formal R&D systems related to development of products and technologies, and on the other hand, exploitation knowledge dynamics of firms related to commercializing and market development. The larger knowledge biography in which Lehnsgaard plays only the final role of commercialization and contextualizing of mobile, technical knowledge is exemplary in terms of illustrating the integration, complementarities and independent contribution of analytical (chemical university science), synthetic (process engineering R&D) and symbolic (marketing and storytelling) knowledge dynamics. The symbolic knowledge dynamics of Lehnsgaard have their own eligibility, significance and value-adding role, independent from the initial scientific and engineering phases of developing the product and technology.

SECTION 3 CONCLUSIONS AND COMPARISONS

3.1 Conclusions about micro-level knowledge dynamics

The three firms chosen for firm-level studies were deliberately selected because they represent three different business models and business strategies employed in and contributing to the recent years’ efforts of developing and commercialising ‘Bornholm food’. The territorial knowledge dynamics related to these efforts are analysed in detail in the TKD study. In an international perspective, the

three business strategies seem to be typical contemporary responses on changes in food and drinks markets, following diverse strategies of specialisation and dedication in meeting growing demands for high-profile products with a clear identity such as a regional or local origin (Hinrichs 2000; Illbery & Maye 2006; Kneafsey 2003; Testa & Massa 2008).

The FKD1 represents a small-scale manufacturing model of niche production of specialised products, distributed on national markets via wholesale and retailers, and using the regional origin of production in marketing. In this business model, knowledge dynamics focus on differentiation of the product from competing products through marketing and branding of the product and place of production in cooperation with other regional producers of Bornholm food (since the firm cannot define 'regional food' by itself). Other important knowledge dynamics are related to establishment of distribution channels via wholesalers and retailers who set very tough demands on delivery conditions and thus on production planning and logistics.

The FKD2 represents a sector-crossing business model based on direct sale to visiting customers on the site of production and adding of value to the physical products by creating customer experiences, and thus on activities marketed as a sort of regional tourism attraction. In this business model crucial knowledge dynamics are about identifying an appropriate physical, aesthetic, and narrative presentation of the firm for the visitors in the form of products, architecture, stories, experiences, services etc. In the FKD2 biography this to a large extent has involved contextualisation of the concept of 'experience economy' to the regional (tourism) market conditions.

The FKD3 represents quite a different model of 'regional food', not like the two others small-scale in nature and not driven by Bornholm actors. The FKD3 concerns the innovation of a specialised regional food product as part of the highly standardised product portfolio of a large multinational company. In this business model, the range for specialisation is strictly limited by efficiency and price factors. Knowledge dynamics are tuned to identify solutions that balance the wish for marketing and branding effects of high-profile products with a systemic need for cost efficiency.

Another reason for selecting exactly these firms for FKD case studies was to be able to investigate knowledge dynamics in the 'alternative food model' respectively the 'conventional food model' as these are opposed in numerous research analyses (Watts et al. 2005; Renting et al. 2003; Parrott et al. 2002; Fonte 2002; Marsden et al. 2000; Morgan & Murdoch 2000; Manniche 2007). The firms in focus of FKD1 and FKD2 are small locally owned firms, representing the alternative model and heavily integrated in the process of developing a Bornholm food platform, while the multinational firm studied in FKD3, Europe's largest meat processing company with 25.000 employees, represents the conventional model and does not define itself as part of a Bornholm food production and marketing platform.

The empirical studies have documented big differences in the micro-level knowledge dynamics between the models of 'alternative food' and 'conventional food'. FKD1 and FKD2 are illustrative example of innovation processes of 'alternative' micro firms driven by entrepreneurial motivations of realising personal, including private family and quality of life-oriented goals, rather than purely profit-oriented and corporate strategic objectives, and accomplished in ways that, compared to inno-

vations of large companies, are characterised by serendipity and little planning. Although both small firms have used professional consultancy services in their development efforts, these efforts were performed through practical approaches of asking “does this work?” rather than theoretical approaches of asking “what might be the best to do?” In the case of Lille Gadegaard (FKD2) this personal characteristic of the entrepreneur is not only an important (maybe disadvantageous) factor for the way the innovation process is organised. As is the case also in the FKD1 about Lehnsgaard, in businesses that add value to their products through storytelling, the personal characteristic of the owner, even the very person in flesh and blood, is a crucial part of the ‘story’ that is told and sold. To a certain limit and of course not applicable for larger companies, an unstructured and inefficient behaviour of an entrepreneur might be a competitive advantage rather than a disadvantage if these characteristics are properly integrated in the storytelling about the business. This element was a main part of the FKD2.

Oppositely, the FKD3 mirrors the efficiency of the Danish conventional agro-food system in terms of accomplishing large-scale projects of innovating new products and technologies within relatively short time horizons. The strong institutional frameworks of this system, characterized by a high degree of vertical and horizontal integration of supply chains from soil to table as well as well-established national institutions for research, counseling and knowledge diffusion, reassure an efficient development, diffusion and exploitation of generic standardization knowledge among its actors. Strikingly, with very few exceptions the FKD3 involves only actors belonging to the already established national supply chain of well-known trusted partners, sharing similar efficiency oriented goals for production.

However, the efficiency, price and scale factors characterizing this system are not very helpful for business entrepreneurs with more radical wishes regarding specialized product qualities. This is one of the reasons as to why small-scale, quality oriented ambitions of agricultural and industrial entrepreneurs in Denmark have been phrased ‘alternative’. Instead of gaining from strong, historically rooted, national institutions and knowledge chains, the firms behind FKD1 and FKD2 have gained from being linked to emerging regional networks and rural policy actors, sharing of mutual ‘alternative’, small-scale values.

3.2 Conclusions in relation to the WP5 main parameters

3.2.1 Generation/use

As already touched upon in paragraph 2.1.4, use of existing knowledge for commercialisation purposes is more important than generation of new knowledge. This reflects the maturity of product cycles and technological systems in the studied sector which in turn is mirrored in a limited importance of further educations. Only very few among the persons in the firms who initiated, organized and participated in the studied knowledge dynamics have an academic degree. Most have some sort of vocational education and a professional background marked by manual or sales related working tasks. On the other hand, the external consultants and firm-internal staff, giving knowledge inputs to

the innovation processes on demand, are characterised by higher levels of education and specialised professional competences.

As documented in the FKD3 about Danish Crown, the large-scale innovation of a new specialised production, involving the whole supply chain from farmers to supermarkets, was carried out without launching of R&D activities specifically targeted generation of new knowledge needed to accomplish the innovation. The demanded pieces of knowledge existed already in a codified form in the attached research system and just had to be collected and diffused to the relevant actors. Neither the FKD2 about Lille Gadegaard did involve generation of fundamentally new knowledge but was dominated by use of knowledge.

The exception from this picture is the EU funded research activities on biorefinery chemistry and whole crop refraction technologies, carried out by a network of European universities and large companies and resulting in the cooking oil product and technology that was commercialised by Lehnsgaard (FKD1). But these activities did not involve Lehnsgaard and only incidentally became part of the regional process of establishing new productions of Bornholm food (the TKD).

Having said this it should be stressed that a distinction between generation and use of knowledge does not fully capture the types of knowledge and kinds of learning processes that characterise the studied firms, and mainly the two small Bornholm firms. To capture the essence of the observed knowledge and learning dynamics of these particular firms, which in this respect are highly typical for way new productions of Bornholm food have been established, we need something in between generation and use of knowledge. And as said before contextualisation seems to be a more precise notion than examination. The dynamics of providing, absorbing, adapting, and using of knowledge seem to be deeply integrated and best captured by the concept of contextualisation. Already the initial search process for 'new' knowledge is done in a perspective of contextualisation, influenced by specific entrepreneurial motivations, needs and conditions.

3.2.2 Mobility and anchoring

The three knowledge biographies exemplify the significance of mobile knowledge as well as of contextualisation and anchoring of this knowledge in an increasingly global economy. The case studies have revealed two dimensions of knowledge mobility: a dimension of knowledge linkages and knowledge flows in geographical space, and a dimension of interaction between sectors that were not before related to the same degree. The emerging experience economy seems to be illustrative for both dimensions as well as for the three FKDs.

Starting with the sector dimension of mobility, the relevance of the concept experience economy is not restricted to the classical experience based service sectors like tourism and entertainment but is increasingly applied in a variety of sectors including food. In a Southern European context, vineyards, agro-tourism and other small-scale rural food businesses based on direct sale and on tourists as customers are relatively old fields of activities with long historic traditions. This is not the case in a Danish context. The two small firms studied in FKD1 and FKD2 have been among the pioneers in

the creation of Bornholm culinary heritage that crosses the borders of tourism and food and that builds on interaction with regional traditions for arts & crafts businesses and knowledge as well. For instance, the experiences and business model of Lille Gadegaard vineyard (FKD2) were developed through crucial knowledge inputs from arts & crafts students and consultants. And both of the small firms gain from and contribute to the marketing and branding of gastronomic tourism performed by the regional tourism industry.

Similarly clear sector-crossing elements are not involved in the FKD3, and yet, the innovation project was carried out through close interaction between actors all along the food supply chain from farmers to supermarkets. Particularly for the two central actors, the producer and the customer, the innovation project involved new types of cooperation and cross-organisation structures, facilitating knowledge flows between the processing industry and the retail sector. And while the innovation activities of the two small firms basically were supply-driven and only in its later phases related to the concept of ‘experience economy’, the innovation of the large company was demand-driven and at least to some extent had a point of departure in an acknowledgement by the retail sector of the growing importance of experiences for consumers’ shopping.

Regarding the spatial dimension of increased knowledge mobility, the FKD1 and FKD2 studies illustrate the transfer and practical contextualisation of the abstract experience economy concept, invented and developed by social science researchers and international consultancy firms in metropolitan areas. Through the intermediating roles of regional KIBSs and through regional interaction of related experience based sectors, an understanding of the concept of experience economy and its practical implications for diverse business functions has anchored in the two small firms – as well as in other regional firms and among regional governance actors, as described in the TKD study.

A high degree of spatial mobility of knowledge also characterizes the fundamental initial inspiration of the small Bornholm food producers in culinary heritage traditions and food production and consumption cultures in other countries. Due to lack of authentic regional food traditions the Bornholm firms have eclectically tapped into international gastronomic traditions of Southern European countries, entrepreneurial activities in rural areas of Nordic counties as well as in the gastronomic style of ‘New Nordic Food’, recently launched and promoted by the Nordic Council of Ministers (<http://www.norden.org/>). For instance, both of the studied small firms were included in a TV-production targeted presentation of regional food and drinks from the Nordic countries, and explicitly promoting the concept of New Nordic Food.

3.2.3 Proximity vs. distance knowledge interactions

The firm-level case studies have indicated that proximity is crucial for development of tacit knowledge and less important for codified knowledge dynamics. As most clearly documented in the FKD2 about Lille Gadegaard vineyard, geographical distance seems not to constitute an inaccessible barrier for exchange and transfer of codified synthetic type of knowledge on products and production technologies. Without major problems this sort of knowledge can be provided via geographically wide-ranging professional sources and networks, for instance the internet, competitors, suppliers, and in-

dustry organisations, or, as indicated by the FKD1 about Lehngaard cooking oil, synthetic engineering knowledge can be embodied in technological equipment the use of which does not depend on proximity to the developer/supplier. However, as documented in the cases of the vineyard and the Danish Crown pork meat, if more profound, specialised and tacit types of synthetic product and technology expertise are needed, face-to-face meetings and hands-on experiences are needed.

The picture is similar when it comes to symbolic design, marketing, communication, and branding knowledge of crucial importance for creation of value-adding experiences and storytelling dimensions of products. In this field certain elementary, codified stocks of knowledge, for instance regarding generic marketing and communication principles or certain elements of culinary heritage, indeed can be transferred in space. But diffusion and development of tacit symbolic knowledge elements, for instance the crucially important part of adapting and contextualising the concept of ‘Experience Economy’ to local conditions, depend on spatial proximity between actors in a localised system - although this system may be open for distant interaction and learning as well. The Bornholm ‘innovation system’ for symbolic knowledge is sector-crossing and involves not only food producers but also actors of related sectors such as tourism, restaurants, and arts & crafts, who commonly market and brand their products with a ‘regional identity’. Furthermore, the symbolic knowledge milieu encompasses a public knowledge institution in the form of the Glass and Ceramics School¹³ as well as two trade associations for about 100 arts & crafts firms and a number of consultancy firms with expertise in graphical design, communication, experience economy businesses, etc.

3.3 Conclusions in relation to WP6 hypotheses

Most of the 14 listed EURODITE hypotheses seem relevant and in line with the empirical findings from our case studies. However, considering the given space of a few pages they are too many, too diversified and too complex to be commented as a whole. Thus, we shall only put forward some few overall comments.

As emphasized in hypothesis 1, firms combine knowledge from intra- and extra-regional sources. In all FKD case studies both intra-regional and extra-regional sources and dynamics of knowledge have been important. The case studies indicate that the three firms have provided important inputs from region-specific sources (governance systems, interaction with related sectors), sector-specific sources (specialized product/technology networks) as well as time-specific sources related to overall development trends in the sector (knowledge on value-based business models and experiences).

Due to the differences of food categories and the peripheral development conditions of Bornholm food producers, sector-specific knowledge (products/technologies) only to a limited degree are present in the region. However basic, *codified* knowledge elements without major problems are insourced from distant actors and networks while the regional scale primarily plays a role for development of *tacit* knowledge, e.g. contextualization of mobile symbolic knowledge. This confirms the hypothesis 5 saying that inter-firm interactions involving a high level of tacit knowledge tend to be localised while long range interactions involve more formal knowledge.

¹³ The Glass and Ceramics School played a direct role for the knowledge dynamics in FKD2.

According to hypothesis 3, firms select knowledge for its relevance to perceived strategic goals. However, for micro-firms in which the owner plays a central role, the strategic goal for the business is not always the explicit and structuring principle for knowledge provision. Often in-sourcing of knowledge relates to immediate, acute needs, follows unplanned paths and depends on external actors and sources that incidentally appear. This is indeed the case of the small firm studied in FKD1 and for the initial development phases in the firm studied in FKD2 before the business idea was given its final form. The firm studies also show that KIBSs can play a crucial role by assisting small firms in identifying their strategic objective and targeting their knowledge development efforts to reach the objectives. The two case studies on small firms show the often decisive intermediating role of KIBS and confirm the hypothesis 4 that KIBSs act as important network spanners, here mainly regarding downstream networks in the direction of customers.

Governance and policy including financial incentives heavily influence the three FKDs (hypothesis 8). The two small firms have gained (financially as well as in broader discursive ways) from being part of broader regional efforts to develop small-scale food productions and culinary heritage that were initiated, coordinated and financially promoted by regional rural development actors, not least the so-called Local Action Group for EU rural development programs. The large meat processing company as well as the pig farmers in FKD3 gains from considerable subsidies via the EU agricultural policies. In general, these financial incentives favor the conventional large-scale agro-food model due to their orientation towards production volumes and efficiency factors.

The growing knowledge of consumers is an increasingly important factor in the development of new products (hypothesis 13). The three FKDs are embedded in and driven by overall contemporary trends in societies and cultures such as changes of family structures and working conditions, aging of populations, individualization of identity formation, increased standard of living, etc. These trends are articulated on consumer markets for food and drinks in the form of growing demands for products with a clear identity such as a specific place of production. Media play a critical, intermediating role here. A strong and ever increasing media focus on food, cooking, eating, health and food safety issues during the last decade or so has certainly been crucial for creating and enhancing a general awareness and knowledge among Danish consumers about new food categories (like foreign exotic sorts of fruits), new food qualities (like 'local', 'organic' and 'fair-trade' food) as well as about actual products and brands representing such distinct qualities. Without the media's role as discursive trendsetter and practical knowledge communicator, the demands for 'regional food' from Bornholm probably would not have been expressed on the markets to the same degree.

3.4 Conclusions about abstract categories of knowledge

See paragraph 2.4.

3.5 Policy conclusions related to regional knowledge dynamics

As mentioned above policy and governance systems have affected all three FKDs, though in different ways. Danish Crown and the pig farmers involved in FKD3 does not consider themselves as

parts of the newly developed business cluster for alternative Bornholm food (see the TKD), however they have benefitted from general EU policies via agricultural subsidies as well as from being parts of national vertically and horizontally integrated supply chains, knowledge systems and governance institutions for ‘conventional’ food production.

On the other side, the two small Bornholm firms have been deeply rooted in policy discourses regarding ‘alternative’ food production models and rural diversification, set and persistently kept on the agenda by regional policy actors in order to meet a number of problems related to the development of conventional agro-food activities such as declining employment in rural areas and village communities. One of the platforms for this discourse is the European network association Regional Culinary Heritage which both the small firms are members of.

Another platform for the discourse of alternative food and rural diversification, accompanied with financial means, is rural policies of EU, not least the so-called LEADER program. The issue of rural economic diversification has attained increasing centrality in EU agricultural and rural policies since the beginning of the 1990’ies. Lately, from the budget period 2007-13 one of the three pillars in the Common Agricultural Policies (CAP) has been provided an overall territorial dimension as well local bottom-up governance principles, developed via the LEADER program and based on Local Action Groups (LAGs). This development at the EU level has been reinforced by policies at Bornholm level, including administration of EU structural funds in which promotion of regional small-scale productions of food and drinks has become a central priority. For instance, co-financing of the food promotion activities of the Bornholm LAG has been integrated in municipality budgeting. The strategies and initiatives of the Bornholm LAG have successfully encouraged sector-crossing cooperation between food and arts & crafts businesses and have focused on collective networking and place-branding activities rather than on support to individual firms and technological issues (cf. the TKD report). As documented in the FKD1 and FKD2, both Lehnsgaard and Lille Gadegaard have benefitted from regional networking, marketing and branding initiatives of the Bornholm LAG and of the association Regional Culinary Heritage.

As documented in the FKD3 study, the attempts of a large region-external company to gain from the brand of quality food and culinary heritage from Bornholm, established through long and hard entrepreneurial and policy promotion efforts, was not welcomed by all regional actors. Although in this particular case of Bornholm pork meat of Danish Crown regional actors might have exaggerated the potential risks and overlooked the potential gains, the risk of damages of the Bornholm food brand is real, however difficult to avoid. Certification is one of ways of dealing with such problems (Parrott et al. 2002; Ilbery et al. 2005; Ilbery & Kneafsey 2000). The newly established association for the retail oriented producers, Gourmet Bornholm, of which Lehnsgaard studied in FKD1 is member, considers setting up a certification scheme for its members. However, due to the differences in products, the deficient regional supply basis of some producers and the lack of authentic recipes and traditions to use as an exclusive list of recognition, this will be a difficult task without juridical guarantee for keeping actors with dubious motivations out of the markets. Yet, as part of efforts to secure certain standards and to continuously develop the qualities of their products, a certification scheme and a common marketing logo is a reasonable strategy for the Gourmet Bornholm firms.

As documented by the firm case studies as well as numerous research analyses (to mention only a few, Watts et al. 2005; Renting et al. 2003; Parrott et al. 2002; Fonte 2002; Marsden et al. 2000; Morgan & Murdoch 2000; Green & Foster 2005; Goodman 2002), the differences in knowledge dynamics, institutional frameworks, policy systems, basic set of values and development objectives, characterizing on the one hand 'conventional' agro-food systems and on the other hand 'alternative' food production networks are striking and seem to belong to – in the terminology of Storper & Salais 1997 - two different 'Worlds of Production', difficult to integrate and promote simultaneously in policy schemes.

Nonetheless, a question in focus of increasing research interest is to what extent and in which ways alternative food networks actually are alternative and not just complementary to conventional food networks (see for instance Sonnino & Marsden 2006; Watts et al. 2005; Goodman 2002). The empirical data has provided insight that might have a say in this debate. The FKDs indicate that representatives of the two food models indeed differ in many respects however, they do not constitute two totally separate systems. For instance, the supply basis of Lehnsgaard (and of many other 'alternative' Bornholm producers) is basically 'conventionally' grown produces, and 'alternative' niche products such as the rapeseed oil of Lehnsgaard are increasingly distributed and marketed via conventional retailers (supermarkets).

A similar picture can be drawn regarding the knowledge networks and the knowledge dynamics in which producers take part. Conventional producers such as Danish Crown heavily rely on cumulative product-specific knowledge dynamics while alternative producers such as Lehnsgaard and Lille Gadegaard rely on composite cross-sector knowledge dynamics, and the type of actors, networks and milieus contributing to these knowledge dynamics indeed are varying. However, the case studies have revealed interfaces for knowledge flows between the models. One example is Danish Crown's active interest in learning from small alternative producers as part of its innovation project. Another example is that knowledge on marketing, storytelling and branding basically is common, generic and applicable in both models, though obviously contextualised and exploited very differently¹⁴. The existence of such interfaces for knowledge flows might indicate openings for a higher degree of interaction and integration of the two 'camps' in common policy initiatives that could be beneficial for actors in both 'camps'.

SECTION 4 GENERAL CONCLUSIONS

4.1 Conclusions of knowledge case studies (FKDs) based on the empirical findings

The innovations in focus for the three FKDs - efforts to define and commercially exploit 'regional' food - are not exclusively Bornholm phenomena but are typical examples of contemporary trends in the food sector in many countries. However, unlike in countries with stronger local food cultures the Bornholm attempts do not tap back into old, regional food traditions by replicating certain authentic

¹⁴ More of the interviewed private marketing consultants with professional experiences related to marketing have confirmed this, including Frank Eriksen, consultant for Lehnsgaard, and Stig Westermann, consultant for Lehnsgaard.

local products or recipes. Rather they connect to the concept of the emerging ‘experience economy’ and to new international cooking concepts of ‘fusion cuisine’, they eclectically select categories of products the origin of which are not necessarily regional and provide them a territorial dimension and interpretation by framing them into a new, contemporary context of the region or the place of production. This implies a transfer of region-external, mobile knowledge which, however, has to be combined with local/regional agricultural, manufacturing and consumer market knowledge. Such composite, anchoring and contextualising knowledge dynamics, the interplay between interregional and intraregional firm level knowledge dynamics are central for the two small producers.

Opposed to this is the large multinational company’s way of defining and exploiting regional food. This innovation project is characterised by cumulative knowledge dynamics, well-established product-specific supply chains from farmers to supermarket chains, vertically and horizontally integrated national institutions including industry research and advisory systems that codify, store, and diffuse knowledge to relevant users in the supply chain. There are obvious limitations for how long such an efficiency and standardisation oriented agro-economic system can go towards specialisation. Nonetheless, the customer request for a specialised product provoked the need also in this innovation process for certain composite knowledge dynamics. For instance, the knowledge dynamics involved search for knowledge among small-scale ‘alternative’ producers outside the usual supply chain as well as for new ways of organising innovation and external relations with customer and suppliers.

Another common characteristic of the three FGDs is the importance of symbolic type of knowledge. Not primarily the artistic/creative type of knowledge about aesthetic and design dimensions of products, emphasized in EURODITE conceptual papers but knowledge on communication in broader terms, the ability to identify normative values as a fundament for branding, to embed these values in products and production and express them to customers and stakeholders through a coherent set of communication channels. The FGD1 and FGD2 interestingly indicate that in small firms a part of this symbolic knowledge can involve the owner’s awareness and deliberate use of characteristics related to his/her personality, such as the voice and way of speaking, the look and appearance in general.

Finally, a central characteristic of the firm case studies is the multi-contextual character of knowledge dynamics. The cases illustrate the interaction and complementarities of dynamics occurring in different development contexts. The commercialization dynamics of the firms is timely embedded in and gains from dynamics in the contexts of Society/Culture (contemporary social and cultural trends intermediated by medias and articulated on consumer markets), Science/Education (research on ‘experience economy’, R&D on technology for cooking oil), Governance (new policy discourses and support schemes including regionally coordinated branding), and Market/Network (interaction with KIBS and networking with other food producers on Bornholm).

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Combinatorial Knowledge Dynamics: On the Usefulness of the Differentiated Knowledge Bases Model

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Combinatorial Knowledge Dynamics: On the Usefulness of the Differentiated Knowledge Bases Model

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ABSTRACT *On the basis of existing literature and newly collected empirical evidence this article discusses the theoretical, empirical, research methodological and policy implications of a recently introduced knowledge taxonomy, the so-called Differentiated Knowledge Bases model (Asheim et al., 2011), which distinguishes between three epistemologically different approaches that are summarized in the notions of analytical (theoretically understanding), synthetic (instrumentally solving problems) and symbolic (culturally creating meanings). The article suggests that these differentiated knowledge bases, though ideal-typical constructs, seem applicable to micro-level, intra- or inter-organizational modes and communities of learning involved in firm innovation but that firms and meso- and macro-level social systems (sectors, clusters, regions, etc.) rarely rely on one single knowledge base but coordinate its actions in more learning modes and communities. The potentials for innovation research of this particular knowledge taxonomy are mainly connected with its integrative and wide perspective on the identification of the types of knowledge, modes of learning and institutional contexts that are relevant for firm innovation and regional economic development and that exceed the sectoral divides and production bias often characterizing innovation research. For innovation policy, this integrative perspective may provide new opportunities for encouraging the development, diffusion and use of economically valuable knowledge of different kinds and from varying societal spheres in ways that truly break with one-size-fits-all policies.*

Introduction

A recently introduced taxonomy for classifying and analysing knowledge and knowledge dynamics in the economy is the “differentiated knowledge bases” model, elaborated by Björn Asheim and several of his colleagues (Asheim & Gertler, 2005; Asheim & Coenen, 2006; Asheim *et al.*, 2007a, 2011). The taxonomy distinguishes between three epistemologically different types of economically useful knowledge, synthetic (engineer-

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ing/instrumental), analytical (scientific/theoretical) and symbolic (artistic/creative), and accordingly is here referred to as the SAS taxonomy. In recent years, the taxonomy has been adopted in a growing number of innovation studies, mainly focusing on a variety of localized production systems such as regional innovation systems and clusters (Asheim & Coenen, 2005; Vang, 2005; Coenen *et al.*, 2006; Asheim, 2007; Asheim *et al.*, 2007a, 2007b; Moodysson *et al.*, 2008; Asheim & Hansen, 2009; Martin & Moodysson, 2011; Sotarauta *et al.*, 2010). The EURODITE project¹ also adopted the taxonomy as one of the conceptual tools in the empirical case studies of innovation processes at firm, sector and territorial levels. These EURODITE case studies represent what may be the most comprehensive research material hitherto explicitly using the SAS taxonomy.

Due to the growing use of the taxonomy, there is a need for a more comprehensive discussion and evaluation of its validity and value-added for research and public policy, a challenge taken up in this article. One of the important questions regarding the applicability of the SAS taxonomy concerns the empirical status of its categories: are they ideal-type constructs that cannot be observed in real-world settings or are they actually applicable descriptions of the knowledge characteristics of certain real social systems such as firms, sectors, regions, etc.? The SAS research literature is generally characterized by ambiguity on this matter since most contributions on the one hand *theoretically* emphasize the ideal nature of the knowledge bases and state that most organizations and social systems rely on combinations of them but, on the other hand, *empirically* apply only one or maybe two of the knowledge bases in investigating knowledge characteristics of entire sectors, clusters or regional innovation systems and thereby tend to imply that the knowledge bases individually can be ascribed to certain sectoral and/or regional realities.

Resolving this dissonance between the theoretical definition and the empirical application of the taxonomy is the fundamental motivation of the article. However, the ambitions go a little further and the article offers new insights with regard to the following questions: how should we basically understand the categories of the differentiated knowledge base model? (next section); what and who do they empirically describe? (third section); what are the methodological implications of this for the innovation research? (fourth section); and how should we apply the taxonomy in policy-making? (fifth section). Conclusions are made in final section.

The Theoretical Substance and Value-Added of the SAS Taxonomy

The definitional descriptions of the SAS knowledge bases appear rather fragmented in the literature and only a few studies include and define all three knowledge bases coherently (Asheim *et al.*, 2007a, 2011; Cooke *et al.*, 2007). The distinctive feature of the SAS taxonomy is its “epistemological” definition, that is, rather than defining certain topical objects for knowledge generation, the knowledge bases are defined by the approaches to how, and principles of reasoning through which, knowledge is developed and by the criterion for evaluating the value and usefulness of this knowledge. The SAS taxonomy defines three modes of learning and approaches to generation and application of knowledge relevant for innovation and economic development: “theoretically understanding”, “instrumentally solving problems” and “culturally creating meanings”. Hence, using the terminology of Cook and Brown (1999), the taxonomy refers to differing types of “knowing”, defined as action based on an “epistemology of practice”, rather than to

differing types of “knowledge”, defined as something people possess and based on an “epistemology of possession”. For this reason, the designation of the three categories as knowledge bases may be misleading by provoking associations to varying substantial grounds, domains or stocks of knowledge rather than to different ways of generating, adapting and using economically relevant knowledge. The alternative notion of “learning modes” could be suggested; however, compared to the notion of knowledge bases, it is disadvantaged (at least semantically) by paying attention only to the character of the process of learning and not also to the character of the knowledge resulting from this learning. Hence, the notion of knowledge bases incorporates the two integrated dimensions of a specific way of learning and a corresponding type of knowledge.

More specifically, the characteristics of the three knowledge bases can be summarized as follows (Asheim *et al.*, 2011). “Analytical” knowledge generation is geared to theoretically understanding and explaining features of the natural and social world, and constitutes the traditional core attribute of universities, research institutions and R&D departments of companies. Generation of analytical knowledge involves cognitive, rational processes and application of scientific principles, methods and formal models, and outcomes are often documented in scientific papers, reports, files, patents, educational lessons, etc. Thus, the knowledge resulting from analytical knowledge processing is to a large extent codified, mobile and transferable across space but as documented in the literature on scientific cognition (Knorr-Cetina, 1999), to interpret, understand and work with codified knowledge a certain element of tacit knowledge and shared beliefs and values is needed as well.

In contrast, the purpose of “synthetic” knowledge creation is not to theoretically understand and explain the world but to instrumentally construct context-specific, practical solutions to specific human problems. Synthetic knowledge generation typically has the form of novel combinations of existing knowledge rather than creation of new knowledge and draws mainly on firm-internal learning by doing or learning by interaction in the context of markets and networks often involving customers, suppliers, institutions for applied research, etc. Thus synthetic knowledge is to a large extent tacit and practice-related but usually also has a codified element that allows for mobility across geographical space and sector borders. It should be stressed that the technical forms of engineering, usually emphasized in the SAS literature when defining the synthetic knowledge base, should be complemented with processes and skills connected with “social engineering”, human resource management, organizational change, etc.

Finally, “symbolic” knowledge processes deal with the creation and communication of cultural meanings, symbols, ethics and aesthetics. The usefulness of symbolic knowledge is evaluated not on the basis of scientific evidence or instrumental functionality but on the basis of socio-culturally embedded perceptions of “meaning”. Symbolic knowledge dynamics take the form of open-ended, creative and artistic thinking, performance and interaction that go beyond conformity and often combine or re-interpret established conventions in new ways. Like in analytical and synthetic knowledge dynamics, interaction and “buzzing” within professional networks plays an important role for creation and diffusion of symbolic knowledge, often involving expertise within art, design, marketing and communication, as well as temporary, project-based forms of work organization (Vang, 2005; Gertler, 2008; Martin & Moodysson, 2011). However, compared to the two other knowledge bases, cross-fertilization across professional and sector borders, informal interaction with end-consumers and buzzing in non-commercial, civic, daily-life contextual settings (street cultures, public events, etc.) play a bigger role in symbolic knowledge

dynamics (Asheim *et al.*, 2007a; Manniche & Testa, 2010). Accordingly, symbolic knowledge is mainly (but not exclusively) tacit, closely linked to specific socio-cultural contexts and difficult to transfer directly in geographical space. To illustrate the codified/tacit combination involved in symbolic knowledge, advertising for a certain product (successfully) strongly relies on tacit, context-specific understanding of the cultures, values and preferences of targeted customers, however codified knowledge certainly is helpful as well, for instance, information about topics that are considered humoristic or banned in the specific cultural setting, and “best practices” regarding the use of certain colours, forms, symbols and words.

Although the significance of synthetic, analytical and symbolic reasoning, principles and evaluation criteria varies across specific business domains such as research, production, marketing, etc., it is important to stress that the knowledge bases theoretically are not directly linked to specific knowledge domains or institutions *per se*. For instance, knowledge dynamics can be defined as “analytical” not because they occur in a university or the R&D department of a company but only if they follow (more or less strictly) scientific principles; similarly, knowledge is not per definition “symbolic” just because it originates from the marketing department of a firm but can be classified so if it is created and used through “symbolic” socio-cultural forms of practice and interaction.

Analytical knowledge is close to the category of “know-why”, defined in Jensen *et al.* (2007) as particularly important for the “Science and Technology Innovation” mode of innovation, while synthetic knowledge resembles the “know-how” categories, important for the contrasting “Doing, Using and Interacting” mode of innovation. The third type of symbolic knowledge and its related socio-culturally contextualized forms of knowledge dynamics is quite different from the scientific and engineering dynamics traditionally looked at in innovation studies. It has similarities mainly regarding social skills with the “know-who” category of Jensen *et al.* (2007) but is supplemented with artistic, aesthetic and communicative knowledge elements.

The inclusion of the symbolic knowledge base as a third and, in principle, equally important category of knowledge formation alongside the analytical and synthetic knowledge bases is a major theoretical value-added of the SAS conceptual framework. The territorial innovation research is rich in case studies of the creation and use of analytical/scientific and synthetic/engineering knowledge, while studies of the economic role of the symbolic/creative category of knowing are certainly less frequent. The empirical findings of the EURODATE case studies of firm-level innovation—of which one will be presented in detail below—suggest that symbolic knowledge dynamics play an important role throughout the economy and not just in distinct sectors such as the creative and cultural industries like media and movie production. This mirrors a number of overall change processes in modern economies including “culturization” (Power & Scott, 2004; Crevoisier & Jeannerat, 2009), “integration of producers and consumers” (Goodman, 2002; Grabher *et al.*, 2008; Humphreys & Grayson, 2008; Jeannerat & Kebir, 2010) and the emergent “Experience Economy” (Pine & Gilmore, 1999). In order to respond to such trends, knowledge about consumers and cultures, about how to embed distinct values and meanings in business organizations and product portfolios and about how to communicate such values and meanings has become important. The conceptual inclusion of the symbolic, socio-cultural type of knowing and mode of learning provides opportunities for studying knowledge interactions across the traditional divide between the production and consumption sides of economic systems; for instance, how consumers and consumption

resources such as product knowledge increasingly are engaged in value-creating activities of private enterprises.

Taken as a coherent conceptual tool, a main theoretical value-added of the SAS taxonomy is connected with the possibilities of transcending the traditional dichotomy between codified and tacit knowledge as well as the common distinction in innovation research between “high-tech” and “low-tech” activities and sectors (Asheim *et al.*, 2011). From the SAS perspective, codified knowledge is not just codified but codified in a particular (synthetic, analytic or symbolic) way, and likewise regarding tacit knowledge. Due to this sensitivity for epistemologically different types of knowledge and approaches to knowledge creation, the SAS taxonomy may hold potential for research within organizational learning about concepts such as “community-of-practice” (Brown & Duguid, 1991; Amin & Cohendet, 2004; Amin & Roberts, 2008; Nootboom, 2008) and “epistemic community” (Knorr-Cetina, 1999; Bogenrieder & Nootboom, 2004). This research has provided important epistemological insight, for instance, regarding the continuous interaction and dynamic transformations of codified and tacit knowledge, the organizational balancing of exploration and exploitation of knowledge,² the role for knowledge creation of cognitive distance and the configurations of varying types of learning communities. The distinction between the differing epistemological approaches of “theoretically understanding”, “instrumentally solving problems” and “culturally creating meanings” provides an additional dimension to this already extensive conceptual landscape. However, the differentiated knowledge bases maybe also outline a new perspective for studying of the knowledge configurations and governance principles characterizing different types of learning communities. Performing and practicing of the knowledge bases require access to and nurturing of different knowledge sources, labour and networks, and entails different management challenges; for instance, related to the decision of when to organize exploration of knowledge and when an organization should proceed to commercial knowledge exploitation, and in which directions new collaborative networks and learning communities should be looked for.

Despite this theoretical value-added of the SAS taxonomy, it hardly constitutes a complete and comprehensive conceptual framework for studying innovation. Due to its epistemological definition the taxonomy pays attention to the dynamical and social interactive dimension of knowledge but it lacks a conceptualization of the steps and governance mechanisms through which organizations generate, adapt and finally utilize knowledge through interaction within and across differing knowledge bases. In other words, a crucial coordinating, managerial dimension of the processing of knowledge is left out of analysis by the SAS taxonomy. We shall return to this issue in Section 4 which deals with methodological implications.

The main features of the differentiated knowledge bases are summarized in Table 1.

The Empirical Applicability of the SAS Knowledge Bases

The differentiated knowledge base model (together with other theoretical constructs) was applied in the EURODITE project and in the empirical case studies of innovation at firm, sector and regional levels. These studies have provided evidence regarding the empirical status of the SAS knowledge bases, that is, which sorts and scale of social systems that the ideal-type knowledge bases may describe.

Table 1. Main features of the SAS knowledge bases model (adapted by the author from Asheim *et al.* (2011), Gertler (2008), Asheim and Hansen (2009) and Manniche and Testa (2010))

	Synthetic	Analytical	Symbolic
Purpose of knowledge creation	Designing or constructing instrumental solutions to specific human problems	Theoretically understanding natural or social systems, confirming or rejecting dominant scientific laws or defining new ones	Creating socio-cultural meanings and interpretations of artefacts and their use
Approaches to reasoning	Inductive processes commencing with observation of specific instances and problem-solving needs	Deductive processes based on formal, abstract models, generalization and codification	Creative processes based on open-ended, divergent thinking, going beyond conformity and conventions, and usually involving personalized commitment of participants
Typical target of innovation	Change of functional attributes of products, processes or organizations	Improvement of cognitive/theoretical models for products, processes or organizations	Change of aesthetic, semiotic, value-laden features of products, processes or organizations
Typical learning method	Learning by doing and by interacting with customers and suppliers. Face-to-face interaction in communities of practice	Learning by searching and researching Interaction in epistemic communities	Learning by interacting with consumers and by buzzing within professional creative communities
Type of knowledge created	Mainly tacit, context-specific practical knowledge but important codified component	Mainly codified, highly abstract and universal knowledge	Strongly tacit, context-specific, semiotic content
Institutional context of learning/knowledge sourcing	Market and supply-chain networks Firm R&D	Science and education systems Firm R&D	Firm sources Consumer/connoisseur cultures Creative business service Policy discourses
Geographical context of learning/knowledge sourcing	Mainly regional and national	Mainly global	Mainly local/regional but importance of global cultural trends
Typical management challenge	How to avoid lock-ins in out-dated technological paradigms?	When do we need further understanding of a topic and when can we proceed to practical test and application?	How to capture subjective values of organizational stakeholders and consumers and how to align the business accordingly?

More than 50 “innovation biography” case studies of firms located in 22 European regions and representing the sectors of food, automotive, biotechnology, ICT, knowledge-intensive business services, new media and tourism were produced by mapping the “what, who, where and when” dimensions of the knowledge processes of the innovation of new products, new technologies, new organizational infrastructures, etc. As part of the methodology guidelines (Butzin *et al.*, 2010), each innovation biography was divided by the research teams into a number of “knowledge interactions” through which important bricks of knowledge, needed for accomplishing the innovation as a whole, were provided by the innovating firm and its eventual collaborative partners.³ This could be, for schematic illustration, breaking up the innovation of a new product into the tasks of specifying the technical demands to the targeted product, organizing research about specific problems and solutions, setting up organizational plans for implementing the new production and elaborating of documentation and marketing materials.

Each of these “knowledge interactions” were classified according to, among other things, topic in focus for development, types of participants, importance for accomplishing the innovation as a whole, which knowledge base(s) they involved and in which context or institutional environment they took place, that is, if the interactions were firm-internal or occurred within the institutional frameworks of: “markets/networks”, for example, collaboration with suppliers and customers; “science/education”, for example, interaction with universities, research centres, etc.; “public policy/governance”, for example, support from regional development agencies, EU or national policy schemes; or, lastly, within the very broad and open context of “society/culture”, for example, by means of media coverage, participation in public events, etc. The networks of actors carrying out these knowledge interactions in many respects resemble those intra- and inter-organizational “learning groups” (Bogenrieder & Nootboom, 2004)⁴ that actively contributed to the realization of the studied innovation biographies.

Due to the geographical, institutional and disciplinary distribution of the more than 30 research partners involved in these innovation biographies, the requested disaggregation of the innovation into “knowledge interactions” and the corresponding identification of participants, knowledge bases, contexts, relevance and other characteristics of these interactions may have been done on the basis of slightly different interpretations of the complex EUROTITE conceptual framework. Accordingly, the precise statistical figures resulting from this data set, presented in Tables 2–4, might be questioned. Nonetheless, the overall tendencies seem clear and statistically significant. As Strambach (2010) and Strambach and Klement (2012) conclude on the basis of the same data set, at the level of analysis of individual knowledge interactions (Table 2), that is, the important steps of the studied innovations, the knowledge dynamics in the vast majority (ca. 80%) of cases involved only one knowledge base while only few interactions involved

Table 2. “Knowledge interactions” of EUROTITE innovation biographies by knowledge bases involved

	Analytical	Synthetic	Symbolic	Mix	Total
%	11.2	30.9	36.3	21.6	100

Source: Larsson (2010).

Table 3. “Knowledge interactions” of EURODITE innovation biographies by knowledge bases and contexts involved

Context	Knowledge base				Total
	Analytical	Synthetic	Symbolic	Mix	
Firm-internal	4.2	20.6	30.0	21.3	22.3
Markets/networks	12.5	50.3	26.2	34.6	33.9
Education/science	80.6	16.6	6.4	30.1	23.0
Governance/policy	2.8	11.1	24.9	9.6	14.8
Society/culture	0.0	1.0	9.0	0.0	3.6
Multi-context	0.0	0.5	3.4	4.4	2.3
Total	100.0	100.0	100.0	100.0	100.0

Source: Larsson (2010).

Table 4. EURODITE innovation biographies by the number of knowledge bases involved

	No. of cases
One knowledge base	2
Two knowledge bases	29
Three knowledge bases	21
Total	52

Source: Larsson (2010).

combinations of them. Adding to the evidence presented by Strambach and Klement in this special issue, there was a clear correlation between, on the one hand, the specific SAS knowledge base of the knowledge interactions and, on the other hand, the specific types of actors and contexts that were involved, and this correlation was in line with the theoretical definition of the SAS knowledge bases as described above. For example, it can be seen from the data in Table 3 that interactions aimed at development of analytical knowledge primarily involved actors (besides of the innovating firm) representing the context of science and education such as universities and research centres; interactions developing synthetic knowledge mainly occurred in market contexts involving actors such as customers and suppliers or were firm-internal interactions, while symbolic knowledge interactions were more multifaceted regarding types of participating actors. For instance, symbolic knowledge interactions often involved external governance and policy actors as well as society/culture actors such as media and citizen/cultural organizations but also often were organized as firm-internal processes related to identification of branding values, elaboration of marketing strategies, etc. The importance of firm-internal sources for symbolic knowledge dynamics confirms the conclusions of the empirical study by Vang (2005) of competition and creative-symbolic knowledge dynamics within the Danish newspaper industry. Thus, to some extent the knowledge bases seem to relate to and are sustained by varying institutional settings.

These findings indicate that the SAS knowledge bases are not just ideal-typical theoretical constructs without any real-world empirical relevance but actually form three

knowledge development approaches that, although rarely observable in distilled form, temporally, organizationally and/or institutionally typically are separated and rarely *directly* integrated.

However, while a focus on one particular knowledge base is typical for sub-sequences (knowledge interactions) of innovation, combinations of knowledge bases were the typical picture of the EURODITE case studies at the level of analysis of entire innovation biographies (Table 4). Almost all the innovation biographies involved knowledge interactions drawing on two or all three of the SAS knowledge bases. When we add to this that the contribution of synthetic, analytical and symbolic knowledge interactions to the realization of the studied innovations were evaluated as equally important by the involved research teams, it clearly points in the direction, in line with Crevoisier and Jeannerat's (2009) analysis, that firms typically rely on combinatorial knowledge bases and that innovations are realized through integrating separated but interconnected interactions within the realm of different knowledge bases, learning communities and contexts.

To illustrate the practical content of such combinatorial knowledge dynamics, we now examine one of the innovation biographies studied and documented via the EURODITE project (Manniche & Larsen, 2009). The case study concerns the innovation of a specialized pork product of Europe's largest meat-processing company with about 25,000 employees, Danish Crown (DC). DC generally represents the standardized, volume- and price-oriented "industrial food model", that usually is considered to rely on technological engineering, synthetic knowledge (Asheim & Coenen, 2005; Asheim, 2007; Manniche, 2007). Nevertheless, the case study draws a much more diversified picture of the knowledge dynamics employed in such production models and documents the critical role of symbolic knowledge approaches, not only in the final marketing phases but also for initially defining subsequent scientific (analytical) and technological (synthetic) knowledge dynamics. The innovation process of DC consisted in a complex row of interrelated but organizationally, temporarily or geographically separated "knowledge interactions" involving all three SAS knowledge bases as well as differing intra- and inter-organizational learning groups and contexts. However, for illustrative reasons, the innovation biography are here broken down into only three main parts. Table 5 shows the flow of the totally 11 knowledge interactions identified in the study.

The case study of DC is an example of customer-driven innovation. The process was initiated at the request of one of DC's biggest customers on Danish consumer markets, the supermarket group COOP, of a specialty pork product to be distributed on a nationwide scale. This demand initiated a phase of discussions among meat portfolio and marketing managers of DC and COOP about which distinct quality should distinguish the product from DC's standard pork products and from competing pork products on the market. Several possible product qualities of potential attraction for Danish consumers such as "organic", "excellent taste", "safe and healthy", "regional identity" and "animal friendly" were discussed as targets for the innovation process. These discussions involved a—for DC—new organizational set-up that draws on consultations of "alternative" small-scale food producers outside of DC's usual supply chain in order to provide knowledge about high-premium, dedicated consumer markets and productions. These explorative, open-ended, creative and symbolic knowledge dynamics of defining the specific qualities and values to embed in the new product resulted in the decision of targeting the innovation efforts on, firstly, the taste aspect and, secondly, on the high-profile, culinary brand of a

Table 5. The flow of knowledge interactions in DC's innovation of Bornholm pork meat

Knowledge base		
Synthetic	Analytical	Symbolic
4. Trialling and testing by farmers and consultant of practical/economic implications of requested production preferences	3. (but related to 4, 5, 9 and 10) Review of existing meat industry research (pig breeds, taste, economy and logistics)	1. Customer's identification of consumer demand
5. Elaboration of production concept		2. Defining targeted product qualities (branding values)
9. Elaboration of production manual for farmers		6. Blind tasting of product prototype
10. Adaptation of farming and processing systems		7. Marketing quality control of production concept (by customer)
11. Preparing/educating sales staff for product launching		8. Elaboration of marketing material

Source: Manniche and Larsen (2009).

particular Danish region, Bornholm, that subsequently was selected as the place of production for the new specialty pork.

The second main phase of the innovation biography relied mainly on analytical knowledge dynamics and basically consisted in providing the scientific–theoretical evidence for a new production concept that might result in pork products characterized by better taste. This mainly involved a reviewing (knowledge exploitation) of existing national and international research literature and data bases about which factors might have an impact on the taste of the pork; for instance, regarding breeds, fodder, slaughtering and transportation systems. This analytical research review was carried out through consultations of the Danish Meat Research Institute (DMRI) with whom DC has close collaboration and cooperative ownership relations to. The result was the identification of a number of factors to focus on such as the breed of the pigs, the farming methods and the optimal slaughtering weight.

In the third phase of synthetic knowledge dynamics, these theoretically important factors were translated into an economically feasible production concept. This phase drew on the collective, codified, as well as tacit, production-technology knowledge of actors all along DC's vertically highly integrated supply chain including pig farmers, agricultural consultants, research institutes, manufacturing processors and distributors/retailers. Throughout the phase of specifying the production concept, research-based knowledge from DMRI was exploited by DC staff; for instance, in translating specific wishes of COOP and DC regarding possible aspects of the product concept into realistic economic production figures. This could be calculations of expected cost and efficiency consequences related to questions such as how much space the pigs should have, and what the transportation costs of different farming and processing methods might be. Accordingly, the DMRI research knowledge exploited in this phase primarily concerned the optimization of efficiency aspects of production, processing and distribution, which

are critical for innovation in standardized, price-competing production models but often overlooked in innovation studies. Due to the easily accessible, highly codified and detailed character of existing meat industry research, these sorts of calculations were relatively straightforward.

Finally, before the decision of implementing the elaborated product concept in real production and marketing systems, it went through a strict evaluation by the quality control unit of the retailing customer COOP to investigate whether the individual elements of the production concept complied with the overall set of values and policies, targeted in branding and marketing, for instance, regarding animal welfare, and to make sure that the concept as a whole could hold for the wanted storytelling about a high-quality product.

In sum, the three categories of the SAS taxonomy indeed should be considered ideal types of knowledge and learning which rarely exist in pure form in reality. Nevertheless, the categories seem suitable for describing empirically observed differences in the types of knowledge, actors and contexts which—in differing ways and moments—are involved in real innovation processes. Regarding the scale of the social systems that possibly could be in some degree of accordance with the prescriptions of the individual knowledge bases, the presented empirical data suggest that the categories actually seem to describe attributes of micro-level, organizational or inter-organizational learning communities, contributing to innovation. The data also indicate that firms—and thus even less multi-actor social systems such as sectors, clusters and regional innovation systems—rarely rely on knowledge interactions within one single knowledge base but rather coordinate and integrate separated but interrelated interactions in several learning communities and contexts, as captured in the Brown and Duguid (1991) notion of “Organizations as Communities-of-Communities” (pp. 53–55).

Methodological Implications for Research

That firms innovate through the integration and combination of varying knowledge bases is among the main findings and conclusions of the EURODITE project (Crevoisier & Jeannerat, 2009; Halkier *et al.*, 2010). The widespread combinatorial knowledge dynamics suggest that innovation processes at the firm, cluster or region level cannot be fully described by applying only one of the SAS knowledge bases and that the taxonomy in innovation studies mainly should be used as a tool for identifying the roles, interactions and connectedness of different types of knowledge and learning.

Notwithstanding the analytical potential of the SAS taxonomy for innovation studies, using it in empirical research also poses certain methodological challenges related to the somehow fuzzy definition of the categories and the practical obstacles of determining which SAS category real-world knowledge activities represent. To be able to do that consistently, a high level of empirical detail is mandatory, since, as described above, the knowledge bases are not directly linked to specific knowledge domains or institutions *per se* but follow from certain epistemological approaches to knowledge creation and use. In research practice, this means that in-depth methodologies are needed in order to say if certain activities are analytical, synthetic or symbolic—or combinations thereof. This decreases the applicability of the SAS taxonomy in large-scale comparative studies of total populations of businesses; for instance, at the sector or regional level. Furthermore, when used in larger research projects with several research teams as in the EURODITE

project, the complex and rather scholarly definition of the three knowledge bases implies a need for thorough, initial discussions of how to understand and use them.

Furthermore, despite the analytical advantages of the SAS taxonomy for identifying the role and interconnections between different knowledge types and learning modes, it hardly constitutes a comprehensive conceptual framework for innovation studies. As said before, a crucial coordinating, managerial dimension of how organizations perform its development of useful knowledge is not conceptualized by the differentiated knowledge bases model due to its epistemological perspective. To some extent, this blind spot of the SAS taxonomy might be compensated for by adding the analytical distinction of knowledge exploration and exploitation, originating from the organizational management literature (March, 1991; Gupta *et al.*, 2006) and defined as varying interconnected knowledge strategies or functions rather than as temporally divided phases of knowledge development that mechanistically follow each other. In fact, this is done in several SAS research contributions (Coenen *et al.*, 2006; Modysson *et al.*, 2008) and was also done in the EURO-DITE project. Here, however, the exploration–exploitation distinction an intermediate step of examination was added to emphasize the importance of functions of testing, trialling, scoping, diffusion, contextualizing and adaptation of knowledge in-between generation and use of knowledge.

Combining the epistemological SAS perspective of different but interrelated knowledge types and learning modes with the organizational management perspective of different strategies and functions in the development of knowledge may hold potential for innovation studies. Applying the SAS taxonomy in innovation studies without an accompanying conceptualization of the organizational processing of knowledge might hold the risk of overemphasizing the role of knowledge exploration and overlook the role of knowledge examination and exploitation. Indeed, a strict and schematic matrix with a horizontal dimension of three different knowledge bases and a vertical dimension of three generic steps of knowledge processing would violate the basic SAS idea of certain qualitative differences regarding ways of learning. But combining the two perspectives in a less schematic and rigid manner, allowing for nonlinear processes and continuous feed-back loops and jumps up- and downstream the knowledge development supply chain, as well as between different learning modes, may work as an overall framework for understanding the complexity of intra- and inter-organizational knowledge dynamics involved in innovation processes. For instance, such an analytical framework might improve the opportunities for identifying how different types of knowledge dynamics are actually combined and interconnected in firm innovations. As illustrated in Table 5, which shows the flows within and across different knowledge bases of the 11 knowledge interactions identified in the presented study about pork innovation, the focus of knowledge development changed several times in the course of the innovation. The firm accomplished the innovation by organizing and coordinating its actions in differing learning groups/communities relying on varying knowledge development approaches. The learning groups involved got knowledge inputs from previous knowledge interactions and provided knowledge outputs causing succeeding interactions, and very often these succeeding steps in the organizational innovation process entailed a jump not only between the SAS knowledge bases but also (for reasons of simplicity not indicated in Table 5) between the knowledge development strategies of exploration (searching and researching), examination (trailing and contextualizing) and exploitation (commercializing and using) of knowledge. In other words, the organizational need for not only generating new knowledge but also for

“pushing” and processing this knowledge towards commercial utilization may be an important factor behind the combinatorial knowledge bases of firms.

Another way of applying the SAS knowledge taxonomy in studies of firm innovation is, as suggested by Manniche and Testa (2010), to combine it with the convention theory construct of Storper and Salais (1997), “Worlds of Production” (WOPs), as a schematic way of defining the fundamental “action frameworks” for the knowledge creation and innovation of firms. Storper and Salais (1997) outline four “action frameworks” of firms by combining two fundamental dimensions of products, “technology” that is organized on the basis of conventions of either standardization or specialization, and “market” that can be either generic or dedicated. For example, the two worlds for dedicated products (“The Market World” and “The Inter-personal World”) seem to represent fields of business activities in which symbolic knowledge dynamics related to provision of knowledge about specific consumer segments and consumption situations are particularly important, while operating in the world for specialized generic products (“The World of Intellectual Resources”) supposedly entails following scientific rules and learning processes that provide generic, codified knowledge, that is, dominance of analytical knowledge. Hence, the WOP construct offers an appropriate alternative to statistical classifications of economic activities like industries and sectors in defining in which specific fields of the economy the individual SAS categories may prevail. In general, convention theory⁵ about the interplay between economic and sociological perspectives of economic actions seems to fit well together with the SAS idea of different epistemological approaches, characterized by varying conventions of the nature and purpose of knowledge. However, since the specific conventions, defining the technology/market action frameworks in Storper and Salais’s WOPs, vary from organization to organization, this particular convention theory construct seems useful mainly for comparisons and in-depth studies of intra-organizational knowledge dynamics and less applicable for studies of inter-organizational learning and innovation. Still, much more empirical and theoretical studies are needed to tell whether and in which ways convention theory and the SAS taxonomy should be analytically intertwined.

Finally, in terms of using the SAS taxonomy for statistically identifying and quantifying regional knowledge profiles and infrastructures, it seems not particularly sensible to use the SAS taxonomy for identifying possible corporate and institutional representatives of the differentiated knowledge bases. A more promising way forward is the provided by Asheim and Hansen (2009) who define labour representatives, that is, the distinct professional, occupational and educational groups of persons that inhabit analytical, synthetic, respectively, symbolic learning communities. More specifically they disaggregate and quantify the labour groupings included in Florida’s (2002) definition of an innovative “Creative Class” into analytical, synthetic and symbolic labour segments by use of Swedish occupational and educational statistics.⁶ This does not result in a perfect match between the required epistemic groupings and the available statistical classifications since the working tasks of people employed as “researchers” are not necessarily exclusively “analytical”, the tasks of “mechanical engineers” are not always synthetic, and the occupational category of “graphical designers” may cover more varied competencies than symbolic ones. Nonetheless, despite this problem, such ways of using the SAS taxonomy might be suitable for studying the place-specific significance of and correlation between differing competence structures, job categories, labour markets, and related research, innovation and educational systems.

Implications for Innovation Policy

Among the main arguments for introducing and advancing the SAS taxonomy is the need to adapt the specific measures and organization of policies for innovation and economic development to the knowledge specificities of the targeted economic and institutional system and thereby avoiding one-size-fits-all policy approaches (Asheim & Coenen, 2006; Asheim *et al.*, 2007a, 2011). As argued in these research contributions, policies for promoting innovation and knowledge creation in a specific localized cluster or innovation system should as far as possible take into account the specific knowledge configuration characterizing and providing the distinct competitiveness of this system. Since the ways and means of developing, diffusing and utilizing knowledge vary greatly in scientific, engineering and socio-cultural learning modes and institutional settings, regional innovation policies should pay attention to whether the dominant knowledge basis is synthetic, analytical or symbolic.

However, besides the epistemological and methodological difficulties of describing entire meso- and macro-level social systems as dependent on individual SAS knowledge bases, the bare classification of the knowledge base of a given economic system should not make policy actors jump directly to the conclusion that innovation policies should be oriented exclusively towards improvement within this particular knowledge base. For example, as pointed out by Crevoisier and Jeannerat (2009), production and innovation systems might experience negative “lock-ins” due to a too strong focus on one knowledge base. Moreover, a given production system may have a strong competitive position within analytical, science-driven fields but may also lack exploitation links to synthetic or symbolic knowledge actors and communities which maybe instead should be the focus of policy initiatives.

As in innovation research, the SAS taxonomy holds potential for policies for regional economic development and innovation mainly as an integrative tool for understanding how the varying actors and dynamics of (more or less) entire knowledge infrastructures from strictly scientific knowledge generation to the socio-cultural knowledge of consumers actually interact and connect. As described above, the knowledge bases are ideal-type constructs that primarily relate to activities of micro-level learning groups and communities while firms and meso- and macro-level systems such as clusters, innovation systems and regions rely on combinatorial knowledge bases. From a policy perspective, this emphasizes the need to secure not only efficient learning environments for the development of analytical, synthetic and symbolic knowledge individually but also, and not least, efficient transfers and interaction of knowledge across the epistemological and institutional borders that sustain such learning environments. Using the SAS taxonomy as a coherent analytical tool, providing an overall perspective of the possible links and barriers between varying modes and institutional contexts of learning could increase policy-makers’ awareness of the palette of the instruments available to encourage the creation, diffusion and use of economically valuable knowledge. This includes new sorts of initiatives that integrate science, engineering and cultural perspectives, as well as the production and consumption sides of economic development.

Examples of such integrative policy initiatives include the policy initiatives targeting cultural/creative industries that have been launched in many countries and regions in recent years, such as the national and regional policy schemes for film production in Scandia/Sweden, which were studied in the EURODITE project (Dahlström *et al.*,

2010). An integrative perspective on the development of scientific, engineering and artistic-creative knowledge, cultural and economic development goals, as well as the production and consumption sides of economies is also observable in the emerging urban/metropolitan policy, planning and branding approaches inspired by Richard Florida's (2002) work on the "Creative Class". This focused on attracting creative labour and enterprises by supporting cultural and social "quality of life" aspects rather than traditional economic production factor conditions (Therkildsen *et al.*, 2009).

Conclusions

This article has discussed the theoretical, empirical, methodological and policy implications of the differentiated SAS knowledge base taxonomy. Theoretically, the SAS knowledge bases outline three epistemologically different ideal-typical approaches to knowledge generation which in different ways contribute to firm innovations and which can be summarized in the notions of "theoretically understanding", "instrumentally solving problems" and "culturally creating meanings". The conceptual inclusion of symbolic knowledge as an—in principle—equally important knowledge category alongside the analytical/scientific and synthetic/engineering knowledge types traditionally looked at in innovation research is a major theoretical advantage of the SAS taxonomy. It opens opportunities for studying types of non-technological, socio-cultural innovations driven by a number of ongoing overall trends in modern economies and allows for integrative perspectives on the production and the consumption sides of innovation. A further theoretical value-added of the SAS taxonomy is the possibility of transcending the traditional dichotomy between codified and tacit knowledge, as well as the common distinction in innovation research between "high-tech" and "low-tech" knowledge activities and sectors.

Empirically, data from EURODITE case studies suggests, firstly, that the three SAS knowledge bases seem applicable for describing the micro-level (intra- or inter-organizational) learning modes and communities involved in realization of firm innovation processes and, secondly, that firms and multi-actor social systems such as sectors, clusters and regional innovation systems rarely rely on interactions within one single knowledge base but rather coordinate its actions in several separated but interrelated learning modes, communities and contexts.

These conclusions regarding the theoretical and empirical dimensions of the SAS taxonomy have wide-reaching methodological consequences for how it should be applied in research. When used for studying of industrial innovation, the categories of the taxonomy should be applied not separately but altogether as a conceptual tool for identifying the roles and interconnectedness of differing scientific/theoretical, engineering/instrumental and artistic/cultural types of knowledge and modes of learning. Moreover, to compensate for the SAS taxonomy's analytical blind spot regarding the management dimension of knowledge development in organizations, connected with its epistemological/learning perspective, it is suggested that it should be complemented with the coordination perspective provided by the interrelated strategies of exploration, examination and exploitation of knowledge.

In relation to policies for regional innovation and economic development, the SAS taxonomy mainly holds potentials as a coherent analytical tool and an overall integrative perspective for identifying and evaluating the knowledge attributes and infrastructures of

particular economic systems. From this perspective, the goal should be to secure not only efficient environments for scientific, engineering and socio-cultural generation of knowledge, but also to establish efficient mechanisms for transfer and interaction of knowledge across the epistemological borders defining such types of knowledge. As the SAS knowledge bases refer to micro-level (organizational and inter-organizational) social systems, they should not be translated directly into distinct macro-level organizations, institutions and systems, which are easier for policy-makers to target. However, an integrative and inclusive perspective on the variety of scientific, instrumental and socio-cultural types of knowledge and modes of learning that contribute to innovation might provide new and promising policy opportunities for encouraging the development, diffusion and use of knowledge in ways that truly break with one-size-fits-all policies and that exceed the sectoral approaches and production bias characterizing a great deal of current innovation and economic development policy.

Notes

1. The EURODITE project, Regional Trajectories to the Knowledge Economy: A Dynamic Model, was supported by the EU Sixth Framework Program, Priority 7: Citizens and Governance in a Knowledge Based Society, Proposal/Contract no.: 006187, Integrated Project (2005–2010).
2. For a debate on organizations' need and strategies for balancing of exploration and exploitation of knowledge (or "ambidexterity" as this phenomenon is referred to), see, for example, Tushman and O'Reilly (1996), Lavie and Rosenkopf (2006), Lavie *et al.* (2010) and Raisch *et al.* (2009).
3. The retro-perspective of this methodology obviously might result in a certain bias in researchers' selection of "important" steps in the innovation. The "knowledge interactions" selected for investigation in the case studies were not all of the actual steps of the innovating firms but only those that were evaluated as important after the accomplishment of the innovations.
4. Bogenrichter and Nooteboom's generic notion "learning group" is deliberately chosen as the overall heading here instead of more specific notions such as "community of practice", "epistemic community" and "professional community" which have different and complementary knowledge and learning connotations, for instance regarding the significance of exploration versus exploitation of knowledge. See Nooteboom (2008) for a comparative analysis of varying learning community concepts. To what extent the differentiated knowledge bases matches the varying categories of learning communities, described in the literature, is not investigated here but remains an interesting research question.
5. See, for example, Aspers (2004) for an introduction to convention theory not least the French Convention school around Laurent Thevénot, Robert Salais and others. See also Aspers (2009) for an interesting analysis of the role of knowledge, valuation and conventions of buyers and sellers on "standard" and "status" markets.
6. Although a restrictive strategy of classifying specific statistical occupations as belonging to one of the SAS knowledge bases is generally advantageous, Asheim and Hansen (2009) perhaps are too restrictive in their exercise. For instance, the occupations selected as drawing primarily on a symbolic knowledge base exclusively contains the group of "Writers and creative or performing artists". Following the prescriptions of the SAS knowledge bases in the literature, other large groups of labour eligible for selection as "symbolic occupations" are journalists, radio and TV producers, graphic designers, advertisement consultants, tourist guides, etc.

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Research Paper

Knowledge Bases in Worlds of Production: The Case of the Food Industry

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ABSTRACT This paper aims to contribute to research on the knowledge dimension of industrial innovation and competitive advantage by combining two conceptual constructs that are applied in growing but separate bodies of research. One, the so-called “SAS model”, regards *knowledge bases* of firms and distinguishes between Synthetic, Analytical and Symbolic knowledge. The second, the “Worlds of Production” construct, classifies firms according to differences in technologies and markets and outlines four possible action frameworks within which companies operate and innovate. Combining these conceptualizations seems to enrich analyses within both perspectives and provide a useful framework for studies on knowledge dynamics in different economic contexts. Empirical evidence regarding knowledge dynamics of two “alternative food” producers is presented, indicating that symbolic knowledge which in current literature is mainly delimited and described within cultural industries, may also be relevant for other industries such as the alternative food sub-sector.

KEY WORDS: Knowledge bases, symbolic knowledge, synthetic knowledge, Worlds of Production, food industry, alternative food

Behind every cheese there is a pasture of a different green under a different sky ... there are different flocks, with their stablings and their transhumances; there are secret processes handed down over the centuries. (Calvino, 1985: 73)

1. Introduction

The knowledge-based view of the firm recognizes that heterogeneous knowledge types and knowledge management capabilities are the main determinants of performance differences among firms (e.g. Nonaka, 1994). In recent years, many taxonomies of knowledge have been suggested and applied (for an extensive list, see Kakabadse *et al.*, 2003). In this paper, we adopt the knowledge taxonomy developed by Asheim and his colleagues, in several papers and books (e.g. Asheim and Mariussen, 2003; Coenen *et al.*, 2003;

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Hansen *et al.*, 2005). They identify three knowledge bases: Synthetic, Analytical and Symbolic (the so-called SAS model).

The analytical knowledge base comprises (predominantly scientific) knowledge that is geared to understanding and explaining features of the (natural) world. The synthetic knowledge base refers to the (predominantly engineering) knowledge involved in the design and construction of solutions to human problems which is often instrumental, context specific and practice related. The symbolic knowledge base deals with the creation of cultural meaning through transmission in an affecting sensuous medium. (Asheim *et al.*, 2007b: 660–661)

Most empirical studies on industrial innovation have focused on science-driven (analytical) knowledge dynamics in emerging industries such as biotech and ICT or engineering-driven (synthetic) knowledge dynamics related to the development of technologies and products in more traditional industries; on the contrary, empirical innovation studies related to the creation of symbolic and cultural meanings are certainly less frequent. The importance of symbolic knowledge might be connected with contemporary trends towards the so-called “experience economy” (Pine and Gilmore, 1999). As noted by Lash and Urry (1994), competition increasingly shifts from the “use-value” of tangible products to the “sign-value” of intangible brands. Besides their functional assets, tangible products are increasingly given cultural, social and political dimensions; meanings; and interpretations. These trends in markets, driven by economic, social and cultural change, incite new forms of production and business models in mature manufacturing industries whereby critical added value is created through services, experiences and stories attached to the products and not through the physical manufacturing process. This trend has accentuated the importance of symbolic knowledge, namely, how companies can embed distinct values and meanings in their business organization and product portfolio and how they can appropriately communicate such values and meanings to consumers.

The food industry is an excellent example of such macro-economic trends. Within this industry a sub-sector simply called “alternative food” has emerged, that is, food emphasizing a variety of product qualities such as “local/regional”, “specialty”, “fair-trade”, “artisanal” and “organic”. Emphasizing such “alternative” product qualities, as opposed to the standard qualities of price and efficiency, has implications for the types of knowledge that producers search for and then apply in the phases of production, distribution, marketing and customer relations. Producing goods that people truly want, as opposed to commodities that people merely need, calls for symbolic knowledge and skills in defining possible socio-cultural meanings to embed in these products, in addition to functional assets such as “nutrition”. The alternative food sub-sector may be considered one of those cultural innovation subsystems introduced by Asheim and Mariussen (2003). In this sense, the aesthetic and sensorial aspects of products, as well as the deeper understanding of consumers’ culture, are pivotal, thus making symbolic knowledge dominant. Nonetheless, the food industry described in SAS contributions is considered to be dominated by synthetic knowledge (Asheim, 2007), by analytic knowledge in relation to specific sub-sectors such as “functional food” (Asheim and Coenen, 2005) or by a mix of analytic and synthetic knowledge (Coenen *et al.*, 2006) whereas the role of symbolic knowledge is not emphasized. Indeed, Hansen *et al.* (2005) and Asheim *et al.* (2007b) tend to limit the prevalence of symbolic knowledge to so-called creative industries (also referred to as infotainment or cultural industries, such as film, theatre, publishing and advertising).

This ambiguity regarding the food industry knowledge base indicates that we need a classification system of economic activities that goes beyond sector boundaries to define the economy areas in which the three SAS knowledge categories prevail. For this purpose we suggest introducing the Worlds of Production (WOP) construct of Storper and Salais (1997), which has in fact been extensively adopted in research on the alternative food sub-sector (Murdoch and Miele, 1999; Marsden *et al.*, 2000; Vittersø *et al.*, 2005; Morgan *et al.*, 2006; Amilien *et al.*, 2007). Storper and Salais (1997) identify four WOPs on the basis of two dimensions. The first dimension distinguishes whether the product is “standardized” or “specialized”. The second dimension makes a distinction between “generic” and “dedicated” products. This conceptualization—as well as the literature about alternative food rooted in it—does not devote special attention to knowledge dynamics; indeed, it refers to the traditional taxonomy of knowledge, distinguishing between codified and non-codified knowledge forms. “Standardized” production is claimed to be characterized by widely available codified knowledge and production techniques and “specialized” production processes are claimed to be embedded in distinct sets of production practices rooted in difficult-to-codify tacit knowledge.

Consequently, a combination of the SAS and the WOP constructs would enrich analyses within both perspectives. A distinction between WOPs (rather than industries and sectors) might be useful to explore the roles of the three SAS knowledge bases in different production and innovation contexts. Similarly, a distinction between synthetic, analytical and symbolic knowledge bases seems finer-grained than the taxonomy of codified and tacit knowledge for analysing knowledge dynamics in different innovation contexts. Due to the lack of empirical analyses regarding the significance of symbolic knowledge in the food industry—as well as in other sectors—we will focus particularly on this kind of knowledge. By combining the SAS and WOP constructs into a coherent conceptual framework, we study the innovation processes and knowledge dynamics of two alternative food producers, providing empirical evidence on the significance of symbolic knowledge as well as of different mixes of symbolic and synthetic knowledge prevailing within the alternative food sub-sector. This paper is organized as follows: Section 2 presents the theoretical background; Section 3 describes the investigation framework; Section 4 presents the methodology; Section 5 outlines the empirical setting; Section 6 provides and discusses the empirical findings; and Section 7 draws some conclusions.

2. Theoretical Framework

2.1 The SAS Model

This paper provides a brief description of the SAS model given that more comprehensive reviews are available elsewhere (Asheim and Gertler, 2005; Hansen *et al.*, 2005; Asheim *et al.*, 2007a, b; Moodysson *et al.*, 2008). As previously mentioned, three different kinds of knowledge bases are identified: synthetic (engineering-based), analytical (science-based) and symbolic (artistic/creativity-based). These knowledge bases are characterized by different mixes of tacit and codified knowledge, different learning modes, approaches to reasoning, etc. According to the SAS approach, the innovation process and competitive advantage of firms differ substantially in sectors whose innovation activities require different knowledge bases. It is worth noting that this threefold distinction refers to ideal-types and most industries in practice draw upon all three types of knowledge

bases, only varying their relative importance. As an example, Moodysson *et al.* (2008) argue that the creation of both analytic and synthetic knowledge appears in most industries, with different intensities, in different phases of product/process development. Table 1 summarizes the main features of each knowledge base. The table summing up the empirical evidence in Section 6 will be organized around the topics mentioned in each row.

2.2 The WOP Construct

According to Storper and Salais (1997), the coordination of any particular economic activity depends on socially defined conventions, that is, a negotiated and agreed set of reference points and mutual expectations among the involved persons (a buyer and a seller, a manager and a group of employees, etc.) constituting an “action framework” or the “rationalities of behaviour”. Storper and Salais (1997) outline four bundles of conventions, WOPs that derive from the combination of two principal dimensions. In one dimension (the technology and production process dimension), products are either “standardized” or “specialized” and in the other dimension (the market dimension), products are either “generic” or “dedicated” (see Figure 1). The qualities of “standardized” products are defined by (general or local) industrial standards that can be achieved by use of widely diffused technologies. Thus, competition tends to centre on price factors and production to be organized according to economy of scale principles. In contrast, “specialized” products rely on restricted forms of know-how and technologies, applied in the realization of certain tangible product qualities that differentiate them from prevailing industrial standards. Accordingly, competition in markets for specialized products tends to focus on quality rather than price and production to be organized according to economy of scope/variety principles. Generic products target a multitude of (similar) demands and not the specific demands of individual customers. The qualities of generic products are well known to customers, that is, the information needed for sale and purchase is contained in the product itself, which allows for sale on anonymous mass markets. By contrast, dedicated products target the demands of specific (groups of) customers. The qualities of dedicated products are often defined through interpersonal dialogue based on face-to-face contacts or mediated by communication technologies between producer (or a trusted representative such as agent or distributor) and customer. This facilitates knowledge exchange, trust building and establishment of common expectations. Hence, dedicated products are not suitable for sale via anonymous distribution channels but need an element of interpersonal producer–customer contact. Examples from the food sector are provided in Morgan *et al.* (2006): Coca-Cola and McDonald’s are situated in the Industrial World, producers of genetically modified soya (together with the majority of “functional” food producers) in the World of Intellectual Resources, cook–chill producers in the Market World and speciality food producers such as those promoted by Slow Food¹ in the Interpersonal World.

Salais and Storper (1992; Storper and Salais, 1997) also outline a set of sub-conceptualizations to characterize the differences between the WOPs such as “evaluation of

¹The Slow Food Association was founded in Italy in 1986 as a non-profit association. Today, it has become a reference point for alternative food systems both within Italy and globally.

Table 1. Main features of the three knowledge bases (adapted by the authors from Asheim *et al.*, 2007b; Gertler, 2008; Asheim and Hansen, 2009)

	Synthetic	Analytical	Symbolic
Purpose of knowledge creation/innovation	Designing or constructing something to attain functional goals	Understanding (natural) systems, confirming or rejecting dominant scientific (cause-effects) laws or defining new ones	Creating meanings, desire, aesthetic, symbols and intangible features
Approaches to reasoning	Addition or alteration of tangible attributes of products or processes Inductive processes induced by specific problem-solving needs and commenced with observation of specific instances	Addition or alteration of tangible attributes of products or processes Deductive processes based on formal models and commenced with generalizations	Addition or alteration of intangible attributes of products Creative processes commenced by open-ended divergent thinking, going beyond conformity
Learning modes	Learning by doing, by imitation, by using, by interacting with customers and suppliers. University-industry links in the field of applied engineering R&D	Basic research and learning by interacting within and between research units, both inter and intra firm	Individual learning and learning by interacting within and beyond specific professional communities of practice. Learning by means of cross-fertilization
Knowledge sources (local vs. global)	Mainly local	Mainly global	Local/global. Relational proximity more important than geographical proximity
Codified vs. tacit dimension of knowledge	Partially codified knowledge. Strong tacit component, context-specific, know-how	Codified knowledge, highly abstract and universal, know-why	Mainly tacit knowledge, context-specific

		Producer Technology	
		Specialized	Standardized
Producer Market	Dedicated	The Interpersonal World	The Market World
	Generic	The World of Intellectual Resources	The Industrial World

Figure 1. The four WOPs of Storper and Salais (1997)

quality”, “forms of uncertainty” and “basis of competition”. However, during the years since the elaboration of the first version of the model in the early 1990s (Salais and Storper, 1992) economic, technological and socio-cultural developments seem to have changed the macro-conditions on most markets and somehow affected the “rationalities of behaviour” in the production worlds, for instance, regarding the significance for competition on price vs. quality factors and the fundamental choice between economy of scale vs. economy of variety. Using the food sector as an illustration, trends such as “quality turn” (Miele, 1999; Goodman, 2003; Marsden, 2004) and “nichification” of food markets (Morgan *et al.*, 2006) have introduced the need to differentiate product portfolios even in the Industrial World but have not removed the overall attention to scale, price and efficiency factors. Large conventional food companies which have successfully consolidated their position in the Industrial World increasingly seek to develop more specialized products and enter dedicated high-quality consumer markets simultaneously with overall economy-of-scale strategies of standardization, mergers and acquisitions (European Monitoring Centre on Change [EMCC], 2006).

Yet, the core of the WOP model, that is, the two fundamental business dimensions of standardized/specialized technologies and generic/dedicated markets, in combination seem to define an appropriate framework for classification of different innovation contexts in which varying knowledge dynamics prevail. In the following section, we further describe the combined SAS–WOP model that we intend to use as a conceptual framework for empirical studies of contemporary innovation processes and knowledge dynamics in the food industry.

3. Investigation Framework

It is our assumption that the four WOPs introduced above imply different knowledge bases and knowledge dynamics, and that, secondly, the SAS model may be a useful taxonomy for investigating such differences.

Due to the lack of contributions about the role of symbolic knowledge in traditional sectors such as the food industry, we focus solely on the WOPs where we assume that symbolic knowledge is important. In order to identify such WOPs we rely on the following assumptions:

- (1) Symbolic knowledge is more relevant in the market dimension than in the technology dimension.
- (2) If mass-distribution systems are not applicable, then gaining access to the market requires communication, branding, storytelling, design, customer services and communication and thus a massive draw on symbolic knowledge.

Due to these assumptions, “dedicated” WOPs seem to be best suited for studies on symbolic knowledge. Companies in the “dedicated” WOPs:

- Can operate in the Market World and use standardized technologies in production of products whose tangible qualities do not differ substantially from industrial standards. However, they are enriched with dedicated qualities or services for instance related to the packaging or modes of distribution and sale making them attractive to selected customer segments. In order to create such qualities producers depend on interaction with customers to acquire a deeper understanding of their demands.
- Can operate in the Interpersonal World by using specialized technologies for providing their products tangible competitive qualities in addition to the before mentioned types of dedicated qualities and services related to packaging, sale, distribution, etc.

Furthermore, in addition to the assumption that symbolic knowledge is important especially in dedicated WOPs, we also suppose that most kinds of economic activities, in particular in manufacturing sectors, rely on instrumental, production-oriented (i.e. synthetic), knowledge as well. Location in the “specialized” half of the WOP diagram requires knowledge on how to realize the qualities that define products as “specialized”. This means drawing on a large amount of synthetic knowledge about technologies and production methods, developed via interaction in localized networks of expertise (supply chain partners, research centres, universities, etc.). In the other half of “standardized” economy-of-scale production, synthetic knowledge is crucial for meeting the need for continuous productivity increases.² Hence, we suggest that dedicated WOPs rely on a combination of synthetic and symbolic knowledge.

Two cases were identified to provide empirical examples as testimony to the importance of symbolic knowledge, as well as to the importance of its integration with synthetic knowledge. Company ONE is located in the specialized–dedicated quadrant whereas company TWO is in the standard–dedicated quadrant (see Figure 2). As will be further described, both cases have products that are dedicated to specific clients’ demands, however, in ONE products are made according to specialized local and ancient procedures and in TWO products are made by use of widely diffused, standard technologies.

4. Methodology

To reach the goal of the present paper, data collected as part of two broader research projects (see, for example, Massa and Testa, 2008, 2009a, b; Massa *et al.*, 2008;

² In standardized food production, other tasks for which synthetic knowledge is critical are handling of food safety, traceability of raw materials, environmental effects, etc. (EMCC, 2006).

		Producer Technology	
		Specialized	Standardized
Producer Market	Dedicated	Company ONE	Company TWO
	Generic		

Figure 2. The companies as placed in WOPs of Storper and Salais (1997)

Manniche and Larsen, 2009; Manniche *et al.*, 2009) were used and further analysed.³ Both research projects adopted a qualitative approach which some authors (e.g. Blackler, 1995) consider the most appropriate in order to deeply investigate knowledge-related issues and allow researchers to understand contextual specificities. In-depth case studies were conducted (Yin, 2003) through semi-structured interviews with entrepreneurs, founders and/or other key informants both inside and outside (e.g. consultants) the companies. All interviews were carried out by the research team and detailed notes were taken. Subsequently, full write-ups were done on each company in the form of a detailed case study. In this phase, interviewees were given the opportunity to add comments on case study drafts in order to guarantee validity. Secondary data were collected in accordance with the literature on social science research methods, advocating the use of different sources of data and methods to validate one another (Jick, 1979). In particular, data extracted from the firms' websites and from other publications (such as annual reports, newspapers, articles, master's theses, etc.) were used to complete the portrayal of the units under study. The two original projects involved different teams of researchers conducting interviews at the investigated firms. Rather than being a weakness, this fact may contribute to minimizing biases in the study. In fact, according to some scholars (Eisenhardt, 1989) the convergence of observations from multiple investigators enhances confidence in the findings and may even augment the creative potential of a study because complementary insights increase the richness of data. It is worth noting that, even though the two projects had an independent point of departure, they gained from a continuous dialogue between the two research teams.

³Data on ONE was collected as part of the project "Advanced Models for Knowledge Management in Small and Medium Enterprises", supported by the Italian Ministry for Education, University and Research (2005–2008). Data on TWO was collected as part of "Regional Trajectories to the Knowledge Economy: A Dynamic Model (EURODITE)", supported by the EU Sixth Framework Program, Priority 7: Citizens and Governance in a Knowledge Based Society, Proposal/Contract No. 006187, Integrated Project (2005–10). Homepage: [www.http://www.eurodite.bham.ac.uk/](http://www.eurodite.bham.ac.uk/)

Furthermore, both projects are rooted in the knowledge-based view of firms and share the same broad goal, that is, understanding knowledge types and dynamics.

5. Empirical Setting

In this section we give a brief description of the two firms selected, as well as of the regional settings in which they operate.

ONE produces high-quality butter and cheeses sold by means of selected large retailers and specialty shops as well as direct sales. The founder started up ONE in 1975 after leaving his activity in the field of electronics and moved by his affection to the local territory and its ancient farming tradition. ONE is closely linked to the Slow Food Association with whom it shares the same attitude towards safeguarding local cuisines, traditional products, vegetable and animal species at risk of extinction. The entrepreneur is actively involved in promoting a new model of agriculture, which is healthier and less intensive. The entrepreneur's philosophy celebrates the relationship between humanity and nature, emphasizing the company's special attention to milk's absolute quality and by applying traditional methods with due respect for "ancestral rhythms". The company's cheeses, some of which have received international awards for their high quality and uniqueness, have names in the local dialect recalling the place of origin, the maturation process, the kind of milk, etc. Thirty per cent of total production is exported.

Company TWO was previously run as a farm but today is operated as a vineyard. In 1995, stated in Table 2 as the year of foundation, the owner decided to change his farm activities from strawberry growing to strawberry wine production. Today, TWO produces a diverse range of alcoholic drinks including wines from berries (strawberry, blackcurrants and redcurrants), red wine from grapes and distilled alcoholic products such as wine liquor and, as of 2009, whisky. However, the firm's competitive factor is not related to the products' tangible qualities or production technologies, which are to be considered standard. TWO is neither a traditional farm nor a manufacturing firm but a vineyard of which an important part of its added value stems from experiences, storytelling and services, which are attached to products and provided to visiting customers. Ninety per cent of total sales of TWO's wine products stem from direct sales at the vineyard site; the remaining 10 per cent is distributed via specialty shops. Table 2 summarizes the basic profiles of ONE and TWO.

Although the focus in this paper is not on the geographical aspects of knowledge dynamics, a few words should be spent on the significance of regional contexts. The significance of geographical and regional institutions for knowledge dynamics is usually

Table 2. Basic profiles of ONE and TWO

Company	ONE	TWO
Foundation year	1975	1995
Annual sales (euros)	15 million	0.33 million
Employees	65	6
Main products	Butter and cheeses	Berry wines, grape wine, liquors, whisky
Main markets	National 70% and international 30%	Direct sale to tourists 90%, rest of Denmark 10%

an integrated aspect in SAS studies as they generally focus on knowledge bases of regional clusters (Asheim and Coenen, 2005; Moodysson *et al.*, 2008). ONE is located in North West Italy and TWO on the Danish island of Bornholm in the Baltic Sea. Both regions have a distinct reputation in alternative food, although the small-scale artisan food tradition is long-standing and historically rooted in the former case and more recently built up in the latter.

As noted by some scholars (Marsden, 2004; Holloway *et al.*, 2007) “alternative” means different things in different contexts. In Italy, as in other South European countries, alternative food networks mostly build on activities of local quality production with long-lasting traditions. There is the assumption that the context of production (culture, tradition, production process, terrain, climate, local knowledge system) strongly shapes the quality of the product itself, as it is captured by the French concept of “terroir”. In contrast, in Denmark and other North European countries, alternative food networks are usually based on quality definitions other than the geographical specificity of products, such as environmental sustainability (i.e. organic) or animal welfare, and on innovative forms of marketing and distribution (Parrott *et al.*, 2002).

Accordingly, the two companies described here are both deeply embedded in the region in which they are located, though in different manners. ONE is located in a region with long-standing culinary traditions that form a strong regional knowledge base for the company to develop food products with authentic regional identity as well as existing fundamentals for marketing and storytelling. TWO is located in a region lacking such historical traditions that can be commercially exploited by food producers. However, since the beginning of the 1990s and alongside a dramatic decline in large-scale industrial processing of standardized food on the island, a new sub-sector of small-scale, artisanal producers of food and drinks has emerged. TWO is among these new producers who are facilitated by distinct traditions within tourism and arts and crafts as well as regional policy support schemes. It has been part of regional efforts to define and establish a Bornholm culinary heritage. As described below, the ideas of TWO for concrete products on which to establish production did not connect to old regional food traditions of authentic products or recipes. Instead, the producer selected categories of products which are not of regional origin and provided them a geographical dimension and interpretation by framing them in new, contemporary storytelling about the region and place of production.

In short, the different location conditions of the two companies are embedded in the products, are elements of the storytelling and impact the knowledge dynamics of the firms.

6. Findings and Discussion

In this section, we present and discuss the findings of our case studies regarding key characteristics of knowledge bases and dynamics in the dedicated WOPs. The empirical evidence is grouped according to the two dimensions of the WOP construct (technology and market), emphasizing the main features of the dominant knowledge bases. Findings are summed up in Table 3.

6.1 Dominant Knowledge Base and Dynamics in the Technology Dimension

The history of ONE is strictly connected to the territory and is founded on the knowledge and know-how of local communities. The entrepreneur rediscovered ancient local cheese

recipes and started producing typical cheeses that had almost disappeared due to both local population loss and industrial standardization. Entrepreneur ONE restored old production facilities and relied on the historical memory of local people as well as on the skills of prestigious local cheese makers. As entrepreneur ONE reports:

Before starting my venture, I often invited the “grandmothers” of the village to my would-be-laboratory: oven, pots, milk, curd and all the necessary for making cheese. I took a note of every step in the production processes, timing and techniques. Several times, the “experts” themselves did not know the reasons for their complex processing: they had learned it that way, as it was handed down by their own mothers. So I decided to experiment all that knowledge with the help of the best local cheese masters.

ONE's products remained unchanged in traditional composition and the main aspects of the production processes. As an example, each individual pat of butter is imprinted manually with the traditional wooden moulds of flowers, cows, etc. and then manually packaged. The cheese forms in cellars are regularly turned, scrutinized, caressed and massaged by master cheese makers. Dozens of different types of wood are used for planks and their varying origins and acidities trigger particular biochemical processes that have a precise influence on cheese flavour. It should be noted that even if ONE's products remain unchanged in traditional composition, they are brought to consumers in a new way. This includes quality certifications, labelling, new conservation methods, packaging and tracking. Innovations of this sort have more than trivial implications on the production processes, as already testified in the literature (e.g. Esposti, 2005). Furthermore, the scaling-up of production itself while maintaining attention to retaining food characteristics also implies a certain level of innovation.

Due to his commitment in rediscovering and saving old production procedures and products, entrepreneur ONE earned the name of “cheese archaeologist”. Such a commitment towards circumventing the homogenizing legacy of conventional food production is also testified by his direct and passionate involvement in local producer cooperatives. These cooperatives draw together local producers to share expertise, endogenous knowledge and behavioural codes. As an example, through a herdsman cooperative located at high altitude in an area renowned for the production of mountain cheese, entrepreneur ONE rediscovered the production of blue-veined cheeses which are tasty expressions of alpine cheese making that had almost disappeared. ONE nourishes links with all the local potential knowledge sources aiming at transforming locally embedded knowledge and values into more accessible forms. ONE's facilities host a Master's Programme organized by the local University of Gastronomic Sciences every spring. This university attracts specialized food competencies in the local area, thus playing an important role in learning activities.

As mentioned before, TWO is a vineyard producing a range of different alcoholic drinks including grape wine. The process of developing the knowledge basis for production of wine was rather long since wine production on Bornholm was a pioneering task that had no local precedents and only very few wine producers in the whole of Denmark to gain practical experiences from. The forms of learning and interaction which allowed the development of synthetic knowledge about grape growing and wine production clearly reflect the geographically determined condition of loneliness on behalf of the entrepreneur in his search for and development of relevant knowledge. As opposed

Table 3. Knowledge bases and dynamics in the technology and market dimensions of ONE and TWO

	ONE		TWO	
WOP quadrant	Interpersonal	Interpersonal (specialized—dedicated)	Market (standardized—dedicated)	Market
Dimension	Technology	Market	Technology	Market
Dominant knowledge base	Synthetic	Synthetic	Synthetic	Synthetic
Purpose of knowledge creation/innovation	Addition of quality certifications, checks, labelling, packaging and tracking Alteration of conservation methods	Addition of symbolic and emotional values to respond to the growing concerns about environmental issues, degradation of local food cultures, animal welfare, safety, fair trade and working conditions	Differentiation of product portfolio to maintain customers' curiosity and fully exploit production facilities	Addition and improvement of storytelling and service aspects to respond to growing demands for experiences
Approaches to reasoning	Inductive reasoning commenced by observation of the grandmothers of the village	Creative approach of unconventional entrepreneur, new to the industry and uncommitted to dominant industrial paradigms	Inductive reasoning commenced by observation of wine producers abroad	Creative approach of inventive entrepreneur
Learning modes	Learning-by-doing and imitating Learning by interacting	Learning by interacting	Issue/problem-oriented searching and appropriation of codified knowledge Learning-by-doing and trial-and-error	Learning by interacting
Knowledge sources (local vs. global)	Local population, cheese makers and cooperatives International events and specialized fairs hosted in the local area	Slow Food Association (international). University of Gastronomic Science (international)	Wine producers (international) Internet searches (international)	Local communication consultants Local Glass & Ceramic School
		Customers (national and international)		Regional/inter-regional networking (Culinary Heritage, tourism) Local customers

Table 3. Continued

	ONE	TWO
Codified vs. tacit dimension of knowledge	<p>Strong tacit component. "The experts themselves did not know the reasons of their complex processing"</p> <p>Strong tacit component related to a local consumption context as well as to values of Slow Food community</p>	<p>Strong codified component, however, enriched with necessary tacit component</p> <p>Strong tacit component related to a Bornholm tourism market/consumption context</p>

to the entrepreneur behind ONE, relevant product and technology knowledge had to be searched out well beyond the region of production. As there are no other wine products originating from Bornholm on the market, the wines of TWO might indeed be considered specialty products. Nonetheless, as appears from the description below, the applied production technologies are to be considered standard and do not provide the products tangible qualities (beside the geographical origin) that make them competitive on generic markets for wine. As an example, due to cost reasons the company started using standard plastic tanks for wine fermentation and only recently invested in “second-hand” metal production equipment.

The entrepreneur was originally a strawberry farmer who decided to change the activities of his farm due to disadvantageous market conditions in 1995. Over five to six years, he was engaged in developing wine using his strawberry produce as well as wines from other sorts of berries, such as sparkling blackcurrant and redcurrant wines. The berry wines resulting from these experimental development efforts were ready for sale in 2001, when a farm shop was opened. The entrepreneur was inspired to produce grape wine in addition to berry wines by a number of holiday visits to wine producers in France and Germany in the late 1990s and the EU's preparation to formally recognize Denmark and other formerly non-recognized countries for the commercial production of grape wine. Considering the specific climatic conditions in Denmark as well as the distance to professional expertise, starting to grow grapes for commercial wine production, even by use of standard technologies widely used in wine production all over the world, was not straightforward but a pioneering task. On one hand, knowledge and experiences from traditional wine producing countries proved to be crucial and on the other hand this required minor but important adaptation to local conditions in order to be applicable.

The entrepreneur accomplished the provisioning of basic knowledge about grape growing and wine production by combining two methods. One was repeated holidays to visit wine producers abroad including collegial talks and walks in fields and wineries with wine producers. Through this contact, the entrepreneur was mainly provided with practical, useful and tacit knowledge; however, he was also able to make numerous personal observations which were facilitated by his generic agricultural knowledge (the entrepreneur calls this “visual learning”) regarding growing and production methods, etc. The other method used was searching for codified knowledge on growing grapes and wine production, mainly on Internet sites of mostly German wine producers, as the entrepreneur lacked skills in other foreign languages. He also applied the method of “visual learning” and “reverse engineering” in his Internet searches from pictures of production equipment, working processes, design and organization of buildings, etc. He applied the provided knowledge in trial-and-error experiments on the farm in order to adapt it to the region-specific conditions for growing grapes in order to build up the tacit dimension of knowledge for (standardized) wine production.

As suggested in Section 3, the technology dimension in the two firms appears to rely on synthetic knowledge. Nevertheless, while in the case of ONE, synthetic knowledge sources are rooted in local traditions, in the case of TWO the relevant synthetic knowledge sources are not local, as TWO is the only local wine producer. This last piece of evidence is particularly interesting because it seems to contradict what is usually claimed in the literature (e.g. Asheim and Coenen, 2005; Moodysson *et al.*, 2008), that is, knowledge sources for synthetic knowledge are predominantly local. Such a difference between the two cases can be explained by taking into consideration the WOP construct.

In fact, TWO belongs to the Market World where production is standard and not configured to the provision of high-quality products. In this case, as underlined in Section 2.2, the qualities of products are defined by industrial standards that can be achieved by use of widely diffused and not necessarily local technologies. On the contrary, ONE belongs to the Interpersonal World where the configuration of production is specialized. In this case, product qualities rely on restricted forms of know-how and technologies where the tacit component widely exceeds the codified component of knowledge, thus making local knowledge sources more relevant.

6.2 Dominant Knowledge Base and Dynamics in the Market Dimension

ONE's products derive from traditional recipes but are reinterpreted to meet modern taste, following in-depth studies on aesthetic, sensory and experiential aspects of food. Such studies are often outsourced to alimentary experts of the University of Gastronomic Sciences and Slow Food Association. It is interesting to note that entrepreneur ONE was an outsider to the food industry when he started up his company, as he came from experiences in the electronics field. This aspect could have helped him face the business without preconceptions, challenge existing conventions and approach the industry primarily as an enthusiastic consumer and a lover of local territory and tradition. These aspects may contribute to making him one of those "unconventional individuals" so influential in business success (see Steiner, 1995). That is to say, one who is more open minded to alternative viewpoints and uncommitted to dominant paradigms (in this case, the paradigm of conventional food production, becoming so strong in the 1970s when the company was started up). Before other producers in the same milieu, entrepreneur ONE became aware of changing social and cultural trends and more recently of growing customer ethics needs, mainly by means of his strong interaction with the Slow Food Association. As an example, the entrepreneur recently launched a project aimed at safeguarding an ancient Armenian cheese that is produced in mountain areas (above 1500 m in altitude). Behind such a project, there are the broad goals of bringing shepherds out of extreme isolation, improving cheese-making conditions to obtain hygienic authorization and allow them to sell the cheese on national and international markets, giving them dignity and creating an appropriate economic return. Entrepreneur ONE is also actively involved in several consortia of producers aimed at guaranteeing the survival of traditional local Italian foods, such as Piemonte Gourmet.⁴

Entrepreneur ONE interprets the needs of consumers who are increasingly aware of food product qualities as well as of issues related to production processes and globalization of supply chains. He proposes a system of symbolic, cultural and emotional values that respond to growing concerns about the environmental impact of production and distribution, degradation of local food cultures, animal welfare, safety, fair trade and working conditions. Such a system of values is built using both knowledge deriving from the professional community with which ONE interacts and knowledge residing in consumers by means of personal interactions that allow aspects of a tacit nature to

⁴Piemonte Gourmet (<http://www.piemontegourmet.com>) is an association that brings together producers of high-quality gastronomic products in the Italian region of Piedmont.

emerge, such as feelings and perceptions of satisfaction/dissatisfaction with products and services. Some ONE products are sold directly at the inn, shop and restaurant opened in a recently renewed cheese hamlet, thus allowing direct contact with consumers. Furthermore, ONE devotes a lot of effort to educating consumers by increasing their knowledge about typical and traditional foods. ONE organizes courses, conferences, events and guided tours to observe the production phases of the cheese, be in touch with nature, taste local products and see cows, goats and sheep in a relaxing rural environment. Additionally, entrepreneur ONE writes about local food and traditional production systems in well-known national and international journals and speaks in local community informal meetings and specialized or village fairs, emphasizing the exquisiteness of local raw materials and the authenticity of recipes. Such storytelling ability resonates in his words:

The secret of my successful butter resides in the alpine meadows, at high altitude, with few weeds and a lot of lactiferous herbs and many brightly-coloured flowers and an intense scent: myosotes, ranunculuses, martagons, daisies, gentians ... The different creams, once mixed together, multiply scents and fragrances creating a butter that presents a rich and harmonious bouquet. A delight!

It is clear that entrepreneur ONE does not sell a product but tells a story, an approach that is gaining increasing importance in the “experience economy” (e.g. Godin, 2005). Within this framework, the disappointment of entrepreneur ONE towards the poor living standards of animals in conventional farms as they are “forced to live all their life in two square meters, hardly seeing the pastures and the sun” can be easily interpreted. Here, symbolic knowledge plays an important role in defining possible values and meanings to embed in a product (in the last example, animal welfare). It is symbolic knowledge that turned enterprise ONE into a success. In fact, in the beginning its products were not well appreciated on the market, which was prone to growing conventional/industrial logic and not able to read what was really inside those butters and cheeses. Only after many trials (and the temptation to turn the business into a standardized production), ONE developed the right competences and knowledge to communicate the value of its products.

Like ONE, TWO does not merely sell tangible products but adds value to products through storytelling and creation of customer experiences. Ninety per cent of sales stems from direct purchases on the vineyard by visiting customers, primarily consisting of tourists. In this sense, TWO is a sort of tourist attraction that, accordingly, markets itself through diverse communication systems targeting visitors on Bornholm. For instance, it uses TV advertisements on the ferry bringing most visitors to the island.⁵ Such “sector boundary shifting” is a widespread phenomenon in the alternative food sub-sector (van der Ploeg and Renting, 2004).

Like ONE, TWO gains from linking its activities to an “alternative” network association and thereby of being branded as part of broader social efforts to develop culinary heritage

⁵ In general, TWO has gained invaluable marketing effects on consumer markets through a number of national TV news stories, interviews and a portrait story included in a TV series on “New Nordic Food”, supported by the Nordic Council of Ministers and broadcasted nationally and internationally.

and diversify rural economies. TWO has been a member of the interregional European association, Regional Culinary Heritage,⁶ since its establishment in 1996.

The business model of a vineyard based on direct sales and creation of customer experiences, however, was not developed for implementation when the entrepreneur started producing wine. It resulted from a development process in which inputs of symbolic knowledge from local professional consultants played a crucial role. During the initial phase of developing wine products, entrepreneur TWO started talks with a consultant. The consultant had professional experience in the business environment in Copenhagen within the field of “value-based” business development and communication, that is, how to define and implement a set of basic normative values in an organization and communicate these values to customers to improve the public profile. Through this consulting, they identified a number of values on which to develop the vineyard and importantly on which storytelling about the products, production and farm could be told. In short, the set of symbolic business values of TWO consisted in a combination of “the innovative and honest entrepreneur who left his conventional farming”, the “old, authentic Bornholm farm” and the “original types of new Bornholm wine products”. Constantly innovating products and services from one year to the next to create curiosity among customers and urge them to return and experience these innovations became an over-reaching important value, and was identified as one of the main pillars of TWO. By continuously differentiating the product portfolio TWO might also gain certain productivity effects related to enhanced exploitation of land, buildings, equipment, etc.

The before mentioned private consultant was also a part-time employee as a teacher at the Glass and Ceramics School on Bornholm. This school is a national three-year further education institution with 90 students from all of Denmark. It provides practical training in the crafts of glass blowing and ceramics as well as theoretical elements regarding industrial design, business organization and marketing. As a teacher of these business-oriented topics, the consultant organized an educational project for 20 students, aiming at carrying out an analysis of TWO’s business concept and making suggestions for a comprehensive plan of the design and organization of its functions, experience dimensions and visitor facilities. Among the results of the student project was a written design manual for an “experience-based vineyard”, including the design and use of different farm buildings. The overall conclusion of the project was that the entrepreneur as a person was the critical and competitive element in the business concept of TWO rather than its wine products as such. This conclusion made the entrepreneur change his approach in developing his business which initially had focused on production of wines to be distributed via retailers. It made him realize that some of his personal characteristics, such as his constant, multifaceted product development projects, his practical, non-academic and entrepreneurial approach of “learning-by-doing”, his Bornholm dialect and lively way of communicating and telling stories to customers, should be emphasized and exploited rather than hidden away as irrelevant and unprofessional aspects of the vineyard.

⁶ Regional Culinary Heritage is an association that encourages increased production and use of regional food as a way to develop small-scale business life and tourism in the European member regions that of June 2009 counts 23 regions from Denmark, Sweden, Norway, Germany, Poland, Lithuania, Latvia and Spain (<http://www.culinary-heritage.com/>).

In his guided tours on the vineyard, entrepreneur TWO uses the conclusion of the student project, pointing to the importance of his personality rather than technical and sensory aspects of his wines. According to his experiences, making visitors laugh enhances their purchasing in the shop and detailed information on technical production aspects are not requested very often by customers. Thus, he emphasizes humour and giving visitors a funny experience rather than technical production details. As an example, in his field with wine stocks he has placed election campaign posters of the leader of a Danish right-wing political party and as part of telling about the main seasonal tasks and troubles of growing grapes he tells in a cheerful way that these “scare crows” help keep birds away from his grapes when they stop on Bornholm in September on their way to the South for the winter. His performance on his guided tours is praised by visitors when they give comments and feedback in his guest book. Interestingly, in productions like the one of company TWO where added value is connected to storytelling delivered in immediate conjunction with the sale and consumption rather than with tangible product qualities, allowing for consumption distant from the place of purchasing, even wine from years of a less good harvest and relatively low quality can be exploited commercially. In the guided taste sessions on the vineyard, the entrepreneur also successfully uses such types of wine telling his customers: “Now, here you can taste how the wine becomes in years with bad weather!”

As suggested in Section 3, the case studies confirm that symbolic knowledge appears to be dominant in the market dimension of firms operating in dedicated WOPs. In fact, both in ONE and TWO, the qualities of products are defined by embedding socio-cultural values and meanings in products and by targeting special demands of customer groups by offering a wide range of product-related services. The symbolic knowledge needed to provide such product qualities are developed through interpersonal contacts between the producer and customers, as well as through interaction in broader networks of actors sharing similar values. In the case of TWO, the network that the entrepreneur accesses to develop his symbolic knowledge base even crosses the border of the food sector. As noted by Asheim *et al.* (2007a), knowledge often flows across industries. While their cases provide evidence about linkages between synthetic knowledge bases of the food industry and analytic knowledge bases of biotechnology industries in the production of functional food, our cases provide evidence of interlinks between synthetic knowledge bases of the food industry and symbolic knowledge bases of culture industries, confirming food as a cultural artefact (Morgan *et al.*, 2006).

The empirical findings which are summarized in Table 3 indicate that different knowledge bases and dynamics may coexist in the same sector, when considering different business dimensions. More precisely, classification using the WOP model allows us to provide a more fine-grained picture of such phenomena. In the technology/production dimension both of the firms investigated rely heavily on a synthetic knowledge base. However, whereas in the Interpersonal World the complexity of specialized production processes requires “specialized” synthetic knowledge, with a strong tacit and context-specific component, in the Market World standardized production processes may rely on search, appropriation and adaptation of largely codified synthetic knowledge. Concerning the market dimension of the WOP construct, the case studies confirm the importance of symbolic knowledge for firms operating in dedicated WOPs. In both of the firms investigated, products are not only produced according to functional reasons and principles, including considerations related to price and efficiency factors, but to a large extent according to

symbolic values and meanings embedded in the products. While the firm belonging to the Interpersonal World seems to combine synthetic and symbolic knowledge in a balanced way, synthetic knowledge seems to be subordinate to symbolic knowledge in the firm in the Market World.

Finally, and as already underlined in Section 3, it cannot be overlooked that the knowledge dynamics of the two companies are also influenced by the different location/territorial contexts. As an example, ONE primarily gains from presence in the local area of profound stocks of synthetic knowledge and TWO mainly takes advantage of local symbolic knowledge developed through traditions for tourism and arts and crafts. Despite the relevance of this point, it will not be further deepened in this paper due to space limitations.

7. Conclusions

This paper aims to provide an empirical and conceptual contribution to the literature. On the empirical side, the lack of evidence in innovation research related to the creation of symbolic and cultural meanings and the role of symbolic knowledge for innovation in the economy in general and in the food industry in particular was addressed through empirical case studies of two producers of alternative food, representing dedicated WOPs where symbolic knowledge is supposed to be critical. The case studies highlight that developing and producing food is not only a question of improving production aspects, but also of generating new symbols and meanings to embed in products. Consuming cheese or wine can be conceived as a travel experience in a specific region or as a form of commitment to a specific environmental, social and cultural connotation. The case studies presented allow for the conclusion that symbolic knowledge, which in current literature is mainly limited to and described within infotainment and cultural industries (the industries that are generally considered as creative industries), is also relevant within traditional industries and economic sub-sectors such as alternative food. However, this may not be completely surprising as Donald and Blay-Palmer (2006) introduced the term “creative-food” in reference to alternative food.

On the conceptual side, we have suggested a combination of the SAS and WOP constructs as a framework for defining varying innovation contexts and for studying knowledge dynamics inside such contexts. Specifically, the conceptual suggestions presented in Section 3 regarding the possible fitting of the symbolic and synthetic knowledge categories into the WOP construct were empirically investigated and confirmed in the empirical case studies. The integration of the SAS and WOP constructs seems to enrich analyses within both perspectives and provide a useful conceptual framework for investigating and interpreting knowledge dynamics in different economic contexts. From the perspective of SAS analyses, the WOP construct provides two fundamental dimensions of business activity (technology and market) to which the SAS knowledge categories seem to relate in differing ways and combinations and, additionally, are very suitable for understanding contemporary innovation processes in the food industry. Furthermore, if combined with the WOP construct, the SAS model can be used to go beyond industry-level considerations that are often adopted by authors within the field (e.g. Asheim and Coenen, 2006). From the WOP perspective, using also the SAS model would increase the understanding of the complexity of contemporary production worlds by adding a strong knowledge focus to those foci already considered by researchers (e.g. economic, cultural, sociological, political/institutional, etc.).

The conceptual framework suggested here certainly can cater for broader validity by adding more empirical evidence on knowledge dynamics in dedicated WOPs as well as considerations about all four WOPs. As an example, a possible relation between the SAS and WOP constructs, which is in line with the thinking of Storper and Salais and has been pointed to in other food studies as well (Murdoch *et al.*, 2000) is that being in the specialized–generic World of Intellectual Resources supposedly entails following (scientific) rules and learning processes that provide generic, codified knowledge, that is, dominance of analytical knowledge. Using the food industry for illustration, the fact that a paramount part of R&D spending in the food industry relates to the largest conventional players with standardized products distributed via supermarkets (Confédération des Industries Agro-Alimentaires de l'Ue [CIAA], 2006; EMCC, 2006) suggests that analytical knowledge might also play a significant role in the Industrial World. To complement the conceptual suggestions regarding the role of symbolic and synthetic knowledge in dedicated WOPs, it could be interesting to investigate whether the significance of analytical, codified, scientific knowledge could be further expanded by relating it to production of “generic” products in general, that is, expanding its role into the standardized–generic Industrial World.

It is our intention to develop further research both to gain generalizability, extend the combined SAS–WOP model and confirm the significance of symbolic knowledge in the contemporary food context. Combining the SAS and WOP constructs might also open interesting possibilities for cross-disciplinary research across fields such as economy, business and organizational studies, marketing, sociology and geography.

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Experience Staging and Symbolic Knowledge: the Case of Bornholm Culinary Products

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**Special Issue on "The experience turn in development and planning"
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(eds. Anne Lorentzen and Hugues Jeannerat)

Abstract:

The ongoing changes in Western food markets and the emergence of 'alternative' agri-food production-consumption systems have been conceptualized in numerous ways but very rarely in terms of an 'experience turn'. This article applies the perspective offered by the concept of the experience economy and empirically analyses the development and marketing of culinary products from the Danish island of Bornholm as production-side activities in a larger 'Territorial Staging System' (Jeannerat and Crevoisier, 2010) which at consumption-side primarily relates to urban consumers. A second analytical focus is on the knowledge aspects of experience-based economic activities. The knowledge aspects of the coordinated staging activities of Bornholm firms, business networks, and governance actors are studied by use of the Differentiated Knowledge Basis taxonomy (Asheim, 2007) which includes a category of socio-cultural 'symbolic' knowledge, complementary to the technological and scientific types of knowledge important for developing functional assets of products. The data and analyses suggest that the experience economy perspective can enrich the research on alternative food production systems by directing attention to the crucial role of strategic, coordinated staging of experiences that reach the consumers in- and outside the region. Secondly the article shows that the innovation and staging of experience offerings and authenticity-based products relies on symbolic knowledge dynamics in creating and communicating commercially relevant cultural values and meanings and that the sources of such knowledge dynamics are not only local but to a large extent extra-regional and multi-scalar. These findings are indications of new opportunities, barriers and external linkages for rural areas.

Keywords: Experience Staging, Symbolic Knowledge, Alternative Food, Rural Development, Culinary Heritage

1. Introduction

This article explores the implications of the experience economy for rural businesses and economies by use of an empirical case study about the knowledge dynamics and systems involved in the innovation and marketing of culinary products from the Danish island of Bornholm. Such activities can be defined as belonging to the "secondary experience sector" (Sundbo, 2009; Bille, 2012) in which experiences are add-ons to goods and services or marketing tools, in contrast to the "primary experience sector", such as theatre and movie production, where experiences are the primary product.

Since the early 1990s a new, flourishing culinary niche sector of small firms based on dedicated, high-quality foods, beverages and confectionary products has emerged on Bornholm, by which the island has gained a leading position on Danish consumer markets for 'regional foods'. The incorporation of experience elements in the products has been a critical success factor as many of the producers individually operate on the basis of business models resembling Pine and Gilmore's (1999) idea of 'business as a stage', relying on various experience offerings and direct sales to the many tourists who visit Bornholm during summers. Moreover, the development of the Bornholm culinary sector has been facilitated by collective marketing and place-branding initiatives by regional producer networks and policy actors aiming at conceptualizing and staging authentic Bornholm culinary experiences.

The emergence of this regional food niche is only one example of more general changes in contemporary food markets in Western countries, often phrased as a 'quality turn' (Harvey et al., 2004), i.e. the emergence of a variety of new food markets based on quality dimensions such as animal welfare, traceability, safety, organic production, fair-trade, and territorial origin, perceived as 'alternative' to the price and efficiency qualities typically emphasized by mainstream industrial food producers.

These changes in food production and distribution systems have been studied extensively by researchers within diversified academic disciplines such as agri-food economics, rural sociology and human geography. Central debates within these comprehensive fields of research are motivated by a radical critique of the conventional, increasingly globalised food provision systems dominated by large multinational processing industries and retailers, continuous up-scaling and technological rationalization, and increasingly connected to safety and health problems for consumers as well as employment decline and a degeneration of culinary heritage in rural areas. From the standpoint of this critique, main debates have centred around the question whether and in which ways the emerging new food economy entails a genuine paradigmatic change towards 'post-productivism' (Evans et al., 2002; Goodman, 2004), and a re-territorialisation of the food economy with new opportunities for endogenous sustainable rural development as summarized in the phrase 'the new rural development paradigm' (Murdoch, 2000). In most cases the

analytical focus is on the material and social conditions and enabling aspects of new food provision systems such as 'alternative agri-food networks' (Renting et al., 2003; Watts et al., 2005), 'short food supply chains' (Marsden et al., 2000), and territorially embedded marketing, certification and distribution systems (Hinrichs, 2000; Ilbery et al., 2005; Parrott et al., 2002).

Another characteristic of the recent years' agri-food research is the explicit interest in integrative production-consumption perspectives which are crucial within research on the experience economy. Convention theory approaches have been applied in numerous agri-food studies (Murdoch and Miele, 1999; Amelien et al., 2007; Stræde, 2008; Manniche and Testa, 2010) in order to understand how interacting producers, consumers and other stakeholders construct and sustain the specific 'quality convention' (whether related to taste, place, health, environment, price or other aspects) that is aimed at in product innovation, marketing and purchasing, and that defines a fundamental condition for operating successfully on the market. Also aspects directly related to the experience dimensions of food, such as 'commodification' of local cultures and culinary resources, have been studied (Perkins 2006; Ray, 1998; Tellstrom et al. 2005). Nonetheless, the ongoing, possibly paradigmatic changes of agri-food systems have very rarely been conceptualized in terms of an 'experience turn' and studied by use of the experience economy and the related concept of staging as a theoretical framework. We suggest that introducing the concepts of the experience economy and experience staging, provides an overall explanatory framework in which the deliberate efforts of developing and exploiting cultural, narrative add-ons to food products are not just marginal, dubious marketing activities but lie at the very heart of value-creation in the new food economy. Hence, it is a main aim of this article to provide new insights on alternative agri-food provision systems by empirically exploring the development and marketing of Bornholm culinary products through the analytical lens of the concept of 'staging of experiences'.

A second analytical focus in this article has been put on the knowledge aspects of experience-based economic activities. While knowledge aspects of the experience economy have been largely neglected by research, knowledge aspects in the food sector have been studied in several contributions (Morgan and Murdoch, 2000; Fonte, 2008; Coenen et al., 2006; Asheim and Coenen, 2005; Asheim, 2007). Despite differences in the labelling of knowledge categories, these contributions collectively underline the importance of two particular types of knowledge; on the one hand, scientific, research-based, codified knowledge, and on the other hand, technical, instrumental, tacit knowledge. Fonte (2008) and others also include a category of 'local knowledge' which is not always well-defined but seems to encapsulate a sort of tacit, layman knowledge about the specificities of a place (history, land, culture, traditions etc.)

The empirical case study about Bornholm food used in the analysis of this article was originally collected as part of the case work in the EU research project *EURODITEⁱ*,

which analysed the varying knowledge dynamics and actors involved in innovation within selected manufacturing and service industries. The Bornholm study documented that the innovation of physical products and production methods indeed relied on the traditionally emphasized types of instrumental and research-based knowledge and learning. However, the study also showed the significance of the creation of experiential elements and the coordinated branding efforts at firm and regional level which relied on quite different cultural, artistic-creative, and communicative types of knowledge. In this article we suggest designating and analysing these forms of knowledge as 'symbolic', as suggested by scholars within industrial innovation research (Asheim, 2007; Asheim et al., 2011). It is the second aim of this article to empirically explore the 'symbolic' knowledge dynamics that seem critical for experience staging and how this knowledge relates to other forms of knowledge.

The paper has four main sections. Section 2 outlines the theoretical framework and the analytical methodology applied in our empirical analysis. This includes a discussion on how 'experience staging' may be conceptualized when talking about production systems of regional food and a presentation of the Differentiated Knowledge Bases model as a possible tool for studying the knowledge involved in staging experiences. In section 3 we briefly describe the empirical setting and contextual background of the Bornholm case study, and in section 4 we present the findings of the empirical analysis of the staging of Bornholm culinary products and the related knowledge dynamics. In the final section (5) we conclude and discuss the theoretical, methodological and rural development implications of the analysis.

2. Theoretical framework

2.1. How to understand and analyse the experience economy?

As noted by Bille (2012) there are different approaches to the concept of 'the experience economy'. The understanding of the experience economy in this article is in line with Pine and Gilmore's (1999 and 2007) business-oriented perspective, whereby the 'experience turn' refers not to high growth rates in certain statistically definable 'experience industries', but to the success of a particular business model, based on the creation and staging of experience offerings and the ability to interact with and engage consumers in a personal way for which a premium price can be asked.

One of the defining features of the experience economic business model is the significant role of end-consumers for the processes of value creation. As experiences are intrinsic to the consumers, they are realized not by producers but by consumers through engaging themselves in the act of consuming or using the commercial product (Therkildsen et al., 2009; Lorentzen, 2009). Thus, experience-based

businesses commercially rely on closer relationships with consumers than those characterizing traditional manufacturing and distribution systems, in which the two spheres of production and consumption are disconnected in time and space (Grabher et al., 2008; Malmberg and Power, 2005).

The degree of producer-consumer interaction and the active involvement of consumers in the conceptualisation of experience products, however, can vary radically. According to Boswijk et al. (2007), Pine and Gilmore's staging business strategy, constitutes the first generation of the experience economy in which "stories are told (by the company, to the customer), attention is sought (the customer's, by the company), experiences are directed (by the company, for the customer), and so on" (p. 6), and new generations of the experience economy are emerging based on a higher degree of co-creation between producers and consumers. The Bornholm case seems to exemplify the first generation of the experience economy, where producer-consumer interaction is mainly indirect and not systematically organised and exploited by the producers. This probably reflects the historical timing of this particular case in the years around the century shift where the concept of the experience economy was introduced and feasible platforms for producer-consumer interaction around food qualities were novel in Denmark.

With the aim of conceptualizing the integrative relations between the production and consumption sides of experience markets, and to describe dynamic, territorially and culturally embedded economic systems for creation, commercialization, validation and consumption of experiences, Jeannerat and Crevoisier (2010) have tentatively introduced the concept of Territorial Staging Systems (TSS). The TSS is centred on the 'stage', i.e. a producer-consumer interface, on which two fundamental dynamics meet and interact: 'stage setting' by producers and 'experiential engagement' by consumers. On the production-side of the system, 'production resources' such as the natural, historical and culinary assets of a specific location, are mobilized, transformed into products and brought to the market through stage setting. On the consumption-side, consumption resources such as knowledge, income and social capital are transformed into experiential engagement that holds economic potentials commercially exploitable by producers. Experiences are realized in the meeting of these processes on the stage.

The territories of production and consumption are connected by the bridging activities of stage setting and experiential engagement. However they do not necessarily overlap in physical, geographical space since the stage can be a physical place of co-presence of producers and consumers (for instance the facilities of a producer) as well as a virtual place for distant, mediated interaction and transaction. This dimension of the TSS is connected with the concept that experiences can be either 'attendance-based' or 'distributed' (Lorentzen, 2009). In many respects this distinction corresponds to the two main business models prevailing among Bornholm food producers based on, respectively, attendance-based and distributed experiences.

The TSS model indeed provides a useful perspective for integrative studies of producer staging and consumer engagement activities. Due to its systemic character, the model analytically integrates the activities of, in principle all types of private and public actors and allows for analyses exceeding the micro-level of one individual firm and one group of dedicated customers. However, in order to improve the model's abilities in identifying the main actors and activities in the system, we suggest supplementing it with an analytical distinction between varying 'action contexts'. This will be elaborated on below.

2.2 How to understand and analyse knowledge dynamics?

A theoretical tool used in the case study on Bornholm food for categorising and analysing the generation, diffusion and use of knowledge, is the Differentiated Knowledge Bases taxonomy, which outlines three knowledge bases: Synthetic, Analytical and Symbolic (Asheim, 2007; Asheim et al., 2007; Asheim et al., 2011). The distinctive feature of this taxonomy is its epistemological definition, i.e. rather than defining certain topical objects for knowledge generation, the categories of knowledge are defined by the approaches to and principles of reasoning through which knowledge is developed, and by the criterion for evaluating the value and usefulness of this knowledge.

In short, creation of analytical knowledge is targeted provision of scientific explanations and codified evidence; synthetic knowledge creation aims at finding practical-instrumental solutions to specified human problems; while symbolic knowledge dynamics are structured around the goal of creating and communicating particular socio-cultural meanings, for instance through storytelling and branding. In the Bornholm case, the analytical-scientific and in particular the synthetic-engineering knowledge bases were crucial for the innovation of tangible aspects of products and technologies (Manniche et. al., 2009; Manniche and Larsen, 2009) while the symbolic knowledge category seems well-suited to describe the knowledge dynamics connected with the innovation and staging of culinary experiences.

More specifically, symbolic knowledge develops via open-ended creative, artistic and communicative thinking and interaction that goes beyond conformity and often combines or re-interprets established conventions in new ways. Like in analytical and synthetic learning processes, creation and use of symbolic knowledge takes place via interaction within intra- or inter-organizational learning communities, but compared to the two other knowledge bases, cross-fertilization between different professional communities as well as interaction and 'buzzing' in mundane settings such as public, cultural events, play a bigger role for the symbolic knowledge base (Asheim et al., 2007; Manniche and Testa, 2010).

Despite increasing attention in industrial innovation research to non-technological, socio-cultural forms of innovation and knowledge, for instance in 'creative' and 'cultural' industries (Scott and Power, 2004; Grabher, 2001; Grabher et al., 2008), a clear empirical bias still exists towards studies on science and technology-driven innovation processes. While the role of analytical and synthetic knowledge types is emphasized and studied intensively in the innovation research, sometimes using other designations, there are still only few studies on industrial innovation which explicitly explore the generation and use of symbolic knowledge (e.g. Martin and Moodysson, 2011; Manniche and Testa, 2010).

2.3. Analytical methodology

To sum up this section, we suggest analysing the creation and marketing of Bornholm culinary experiences as part of a larger national and to some extent even international 'territorial staging system' in which local resources are mobilised and staged for the purpose of engaging (urban Danish) consumers in the purchasing and consumption of food. We also analyse the types of knowledge and forms of learning which are critical for the functioning of the experience staging system, by use of the epistemologically defined category of 'symbolic knowledge'.

Due to the bias of our empirical data, the empirical analysis has its focus on activities and knowledge processes on the production-side. Here, we define three varying action contexts of special importance for resource mobilisation and experience staging: these are the firm, network and public policy contexts. The firm context refers to the market activities of individual firms for developing and staging experiences through internal development processes and interaction with suppliers and customers; the network context refers to collaborative interactions of formally or informally organised groups of firms in striving to achieve common development goals; and the public policy context refers to the specific role of public sector actors and initiatives aiming at influencing the production and/or consumption system in distinct directions. Thus, the empirical analysis describes the mobilisation of resources, the experience staging activities, and the symbolic knowledge dimensions of these three contexts.

The distinction of varying, institutionally sustained action contexts was included as part of the conceptual and methodological framework for the EURODITE case studies, comprehensively described in Crevoisier et al. (2008). The EURODITE conceptual framework included an additional context of 'science/education'. As science-generated knowledge and scientific institutions did not play an important role in the staging of Bornholm culinary products, this particular context has been left out here. However it might be relevant to include science/education in analyses of other experience staging systems.

The empirical data presented below stem from 26 tape-recorded semi-structured interviews with owners and employees of Bornholm food producers and restaurants, distributors and retailers, private consultants, media representatives, public sector actors within regional and rural development, conducted during the period February 2008 to May 2009. Additional written information such as marketing materials, reports and newspaper articles have been collected. The data was originally collected as part of the EURODITE project which utilized a 'innovation biography' methodology (Crevoisier et al., 2007), aiming at identifying the 'what, who, where and when' dimensions of the critical knowledge dynamics involved in firm-level innovations and of the 'territorial knowledge dynamics' involved in major, collective innovations in the studied regions. The EURODITE working package reports Manniche et al. (2009) and Manniche and Larsen (2009) contain details about the methodology and data collection in the Bornholm case study.

3. Empirical setting

Bornholm has 41.400 inhabitants (2012) and is situated in the Baltic Sea, 135 km from the nearest Danish coast. The island is characterized by peripheral socioeconomic conditions such as dominance of low-tech economic sectors and micro-firms, weak institutional systems for research and education, comparably low levels of education and income, and depopulation. However, Bornholm is also a major tourism destination attracting approximately 700.000 tourists annually from Denmark, other Scandinavian countries and Germany.

At the beginning of the 1990s, serious structural crisis and employment decline hit the food sector on Bornholm as well as the rest of Denmark. The food sector at the time consisted predominantly of fishery and agriculture and a number of large-scale manufacturing plants processing local fish and agricultural supplies into standardized, semi-fabricated products, which were exported off the island for further processing elsewhere.

The new niche culinary sector which has developed on Bornholm, consists of 40-50 firms, employs approximately 400 workers and produces in the vicinity of 110-125 different products, ranging from poultry products and cooking oils, to specialty beer, cheeses and other dairy products as well as a wide range of ice cream, chocolates and confectionary products (Manniche et al., 2009). Among the firms are approximately 10 smoke house restaurants that offer the traditional regional smoked herring dishes, and a number of gourmet restaurants.

Despite differences between product types, technologies and business models, the firms commonly use the Bornholm origin of production in their marketing as a factor causing or adding to the quality of products and they depend on the place-brand of Bornholm, which has been built through longstanding tourism traditions. The close

inter-connection between a local place-brand and a local culinary culture, which is so evident in for example Southern Europe, is novel in a Scandinavian context. Except for smoked herring, none of the new local food products have a genuine regional heritage background, and as such, the Bornholm culinary culture can be said to be invented.

This development has been concomitant with the introduction on national and Scandinavian markets of the 'New Nordic Food' concept (Meyer, 2007) which has re-invented Nordic culinary traditions by adapting and incorporating many of the terroir and culinary quality principles from Southern Europe in a Nordic context, i.e. using traditional local raw materials but inventing new recipes and food preparation methods.

It is possible to trace a distinct development from 1995, when Danish media cook, Claus Meyer raged against the lack of Danish food culture and blamed 'The food industrial complex' (Harder 1995) for bringing out the worst in the Danish consumer by producing non-descript foods that were indistinguishable from one region to the next, creating consumers without knowledge about quality and unable to demand quality food. Ten years later, the Michelin-guide nominated Noma, a Copenhagen restaurant, as the best in the world, and renowned chef, Rasmus Kofoed, has won medals 2009-11 at the Bocuse d'Or Europe. Furthermore, during the last 10-15 years, several regions in Denmark have witnessed similar quality food developments and have established small-scale productions of regional, organic or other premium-priced, high-quality foods.

Thus, Danish food production and consumption has been completely re-invented and today holds a new position within national cultural self-perception. Knowledge about the broader social and cultural meaning of food and the role it plays in our everyday lives has engaged Danish consumers in defining new modes of food purchasing, preparation and consumption. In conjunction to this, a practice-related, instrumental product knowledge process has taken place, whereby cooks and food-writers have taught the public at large how to use and prepare meals and how to use 'forgotten' local raw materials. This was not a national policy project, but is part of a discursive and cultural development on Danish/Scandinavian food markets.

4. Empirical analysis on staging Bornholm culinary products

In order to analyse how knowledge processes, and here specifically symbolic knowledge processes, have shaped the staging of experiences, our empirical analysis is structured around three central contexts: processes within firms; processes within the networks context, i.e. in interaction between firms and, finally, within policy and governance contexts, where public and private actors interact. Within each context we have analysed which resources have been mobilized; identified the central actors or

agents; described the experience stage upon which producer and consumer interact and; finally, have attempted to isolate and describe the particular symbolic knowledge processes which have fed the development of regional food products and an invented regional culinary culture on Bornholm.

4.1. The firm context

Within the firms in the regional food niche sector, the primary local resources which have been mobilized and utilised for culinary experiences are the resources of the individual business entrepreneurs themselves. This includes their production facilities, agricultural lands and buildings, investment capital, personal and professional networks within a range of sectors and interest groups (agriculture, tourism, arts and crafts, organic food knowledge networks etc.) and educational backgrounds, but also more intangible resources such as idealism, personal ambition levels, and innovative drive.

At the core of each firm is a personal motivating force which drives the owner. One example is the rapeseed germ oil producer, who was driven by a wish to develop from being a bulk-producing farmer to becoming a cooking oil producer. This development required investment in a cold-press mill and exploitation of the rapeseed supplies from his fields and from those of a network of local rapeseed producers. A second example is the vineyard owner, a previous pig farmer, who wished to etch out a living from his farm without having to mass-produce slaughtering pigs, which led first to strawberry production then fruit wine production and, with the EU acceptance of Denmark as a wine-producing nation in 2000, to be among the frontrunners of wine producers in Denmark. A third example is the owner of a local ice cream shop, who was originally a research biologist but who wanted a more entrepreneurial and independent work style and invested in an Italian ice-cream-machine, went to Italy in order to learn how to use it and then based his production on purely organic ingredients, many of which are local. At the starting point none were motivated by any concrete knowledge about 'experience economic' opportunities. Rather, as summarized in the quotation below, many business owners, besides their interest in creating a source of income, were inflamed by an element of 'alternative' idealism based on a radical critique of the conventional agri-food model, similar to the one often manifested within rural sociology research (cf. above).

"It was the hope of the idealist entrepreneurs to create diversity: to show more love in the handling of foodstuffs and to create hope regarding the development of rural areas. We are up against the onward march of mainstream agriculture, with large multinational food industries in front. We see still fewer actors in farming and food manufacturing, and the remaining become larger and larger. These are reactions against this boring world." Jørgen Hammer, chairman of the board of the Bornholm Local Action Group, interview March 24 2009.

The staging of experiences at the firm level offered by Bornholm food producers varies and is closely connected to the specific business model of the individual firm. The firms which rely on experience offerings primarily catering to local tourism-related markets have integrated certain attendance-based experience elements to their products and production processes and stage the experiences through physical co-presence and interaction with customers. The level of interaction varies from very low to staged co-production with direct, personal producer-customer interaction. The attendance-based culinary experiences range from eating smoked fish in historic smoke house settings to food production firms offering direct access to production facilities with guided tours and interactive events. Examples abound: the local vineyard offers guided tours led by the owner and farmer, where guests are offered an opportunity to see one of the first vineyards and winemaking facilities in Denmark, taste different vintages whilst being told about crop conditions and the learning-by-doing process, which characterises the development of the vineyard. Another example is the hard candy maker, giving guests access to view the entire production process and taste the candy while still hot. A final example is the brewery, where the commercial production system has been moved to an industrial facility, but the owner has kept the original brewery equipment in the restaurant where guests can taste the brew masters' weekly experiments whilst hearing a tale about his trade and the brew.

Compared to the firms with attendance-based experiences, the firms who rely on distribution of food and drinks products to customers outside the island focus their marketing on qualities that are embedded in the physical products which can be communicated to distant consumers (be it taste, nutritional value, environmental aspects, geographical origin etc.) Thus, staging of distributed culinary experiences to some extent depends on determined refinement of tangible product or production qualities. Nevertheless, these firms also incorporate experiences into the products through traditional marketing instruments such as brochures and packaging as well as more concerted storytelling and branding activities through web-pages, participation in food and tourism fairs, public cultural events and media coverage, for instance the national TV program "The taste of Denmark". The following quotation from the marketing materials of the before-mentioned cooking oil producer is typical of the storytelling of the 'exporting' firms and stresses a combination of certain tangible product qualities (in this case nutritional advantages compared to other cooking oils), the geographical origin of the product, and the entrepreneur behind the business:

"Lehnsgaard Rapeseed Germ Oil is a Bornholm product through and through. This cold-pressed oil contains no additives whatsoever. The man responsible for these nutritious golden droplets – recommended and praised by Guide Michelin, housewives, dieticians and heart associations – is Hans Hansen." (Regional Madkultur Bornholm, 2011)

The symbolic knowledge processes within the firms, which have provided a central knowledge input to their mobilisation of local resources and staging of culinary products has been supported by a handful of small business consultancy firms who came into contact with local food entrepreneurs through diverse EU, national and regional support schemes targeted business development via provision of consultancy services. The consultants were relatively new residents on Bornholm, a majority were from Copenhagen firms within the PR, marketing and communication sector.

The consultancy firms have played a remarkable catalytic and intermediating role in the development of experience elements and have provided economically valuable staging knowledge. The resources they brought into the firms are manifold, including up-to-date branding concepts from the heart of the Copenhagen business consultancy industry, identification of marketing potentials in the individual firms from an urban perspective, a basic understanding of the demands of urban consumers, as well as concrete communication knowledge within graphic design, marketing, PR and storytelling, branding and strategic experience management and design.

The consultants engaged local food producers in symbolic knowledge processes, re-defining production from traditional manufacturing activities to story creation about the producers themselves, their products and their firms. The consultants have worked separately for individual firms, but at the collective level, a conceptual understanding has spread amongst the local food producers about the economic value of running experience and value-based businesses.

Thus, the face-to-face meetings between idealist entrepreneurial firm owners with professional, streamlined and design-disciplined marketers have forged staging partnerships that have contributed to the development of experience offerings successful on tourist markets.

"The wine producer used to be a pig farmer. I noticed the wine producer is good at talking and making a show, but not good at direct sales work. I told him: "You are good at marketing yourself and your farm, you don't sell wine but your story: 'From swine to wine'. But you could increase your sales by also re-organizing the design of your shop and the guided tour on your farm" (Stig Westermann, private consultant, interview 20.8.2008)

For some of the business consultants, as the above quotation exemplifies, the concept of the experience economy was a tacit knowledge based on a feeling that consumers demanded personality and/or an astute analysis of where the marketing resources of the individual producer lay. For another consultant, the introduction of experience elements was entirely deliberate and explicit:

"One line of knowledge transfer starts in 1997 with Pine & Gilmore's book on the Experience Economy. Big international consultancy firms started using the concept in new management, marketing and communication ideas and tools, but still they were

extremely abstract and superficial...What I have tried to do here is to contextualize and translate these abstract ideas to the economic reality of Bornholm" (HC Holmstrand, private consultant, interview, 2008).

The clear-cut identification of the origin and formation of knowledge bricks which have been developed and used in the accomplishment of business innovations, signified in the quotation above, demonstrates the essence of the applied research methodology, which aims to map the space/time dimensions of 'innovation biographies' (cf. section 2.3). Moreover, this example of transfer and contextualization of external knowledge to Bornholm seems to perfectly illustrate what Crevoisier and Jeannerat (2009) mean by the concept 'territorial knowledge dynamics' and by stressing in the very title of their article the change in focus within regional studies 'from the proximity paradigm to multi-location milieus (Crevoisier and Jeannerat, 2009).

4.2. The network context

The central business network resources which have been mobilised have been the formation and development of two formal producer network associations on Bornholm: Both of these associations can be considered examples of those 'alternative agri-food networks', the social, economic, and territorial fabric of which is often studied in agri-food research (Renting et al., 2003; Watts et al., 2005). The Regional Culinary Heritage Association (RCHA) is a platform for businesses that rely on attendance-based experiences to seasonal tourists while Gourmet Bornholm is a marketing network for the distribution-based manufacturers. The formation of the RCHA in 1995 was initiated by a passionate and idealistic agricultural consultant on Bornholm and his Swedish counterpart from the region of Scania. The two consultants followed their rather vague conception, that the development of small-scale local foods could be a potential area for inter-regional interaction. Both invited a small number of local entrepreneurs, some of them farmers with new business ideas, to participate in a series of reciprocal visits between producers in both regions. Instigated by the establishment of the RCHA on Bornholm and in Scania, a Pan-European Regional Culinary Heritage Association has since developed, which in 2012 had 25 member regions, a majority of which are in Sweden and Poland.

In 2005, some of the retail-oriented producers focused on non-local markets, established the network association Gourmet Bornholm in order to start more formalized cooperation on marketing and business development.

A central production resource which has become mobilized through network activities is a mutual conceptualization - though weak and fuzzy compared to Southern European culinary heritage traditions - of what defines Bornholm 'regional food'. It is in the interest of the two Bornholm producer associations to secure high standards for products termed and marketed as 'Bornholmian'. Accordingly, both associations have

debated possible quality standards, such as EU's PDO and PGI certificates, and whether a 'Bornholm Certificate' should be developed to secure such standards. Due to the variety among members regarding product type, production technology and supply basis, neither association has been able to obtain consensus among members for a strong conceptualization in the form of a certificate. However, in the process of forming the articles and regulations for the RCHA, a number of criteria for membership have been developed and agreed upon. The stipulations state that member firms should work with products that *either* are grown or produced on Bornholm *and/or* are processed on Bornholm and primarily based on raw materials grown on Bornholm *and/or* be a food product which is a part of 'Bornholm culinary culture'.

Gourmet Bornholm is orientated toward national markets and continues to work toward developing the qualities of the products of the members. Despite not being able to agree on a joint certificate, due to differences in products, production methods and raw materials, the association professes a Bornholm culinary culture by stressing the close connection between the specific Gourmet Bornholm products, the innovative and entrepreneurial spirit of the business owners, and place qualities connected with Bornholm landscapes, climate, picturesque fishing villages, and laid-back atmosphere in their promotional materials. The products are thus collectively marketed as a complementary 'Bornholm picnic basket' of breads, meats, vegetables, drinks and confectionary products rather than as products and productions following any common standards.

Another central production resource in both formal networks is the trust built up between producers. Firm owners have met within the auspices of the two associations, discussed quality and marketing at numerous meetings, and joined each other on study tours, exhibitions and events. Such long-term interaction, forged by the discussions about what characterizes 'Bornholm foods', has instigated an understanding of each other not as primarily competitors, but as related businesses which collectively form a strategic platform for marketing Bornholm as a place of quality foods.

A third staging resource is the informal cross-sector relationships and informal network cooperation between regional food producers, arts and crafts businesses and the tourism sector on Bornholm, partly instigated by local policy schemes for rural development.

The staging activities in the network context are based on branding of a specific place, and have a significant cross-sector impetus due to the close tie-in with tourism and the general place-branding of Bornholm. The RCHA has joined forces with local arts and crafts producers in order to market Bornholm's unique hand-crafted artisanal glass, ceramics, and culinary products. For instance, food producers and arts and crafts firms started formalized cooperation already in 1993 through joint organization

of annual 'Christmas Ship' exhibitions in Copenhagen harbour every December on the ferry which sails between Bornholm and Copenhagen.

The association has also focused on sector-crossing cooperation between food and tourism represented by the umbrella organization Destination Bornholm. Destination Bornholm works to promote Bornholm tourism in general, and is striving to develop local culinary tourism experiences which can help re-invent the place-brand of Bornholm from a traditional, simpler and quainter version to a new, gourmet version which caters to urban consumers, expecting high quality food products. A series of food-tourism products have been developed such as a 'touristic culinary route' with stops at interactive food production facilities and restaurants as well as cooking events, which in turn has supported the branding of Bornholm as a destination rich in culinary culture. Food tourism experiential activities consist of personal tours on food production sites, visitor involvement in artisanal food workshops and high-end restaurants based on local raw materials where chefs introduce each ingredient and report on origin and production method.

Place branding processes like those described above can be understood as symbolic knowledge dynamics within the network context whereby food producers, fine food restaurants, tourism agents and visitors interact in complex identity and authenticity creating processes. The central symbolic knowledge resource for the collective staging of Bornholm culinary experiences is the long-standing conceptual debates about what constitutes – and what does not constitute – 'Bornholm foods'. The many discussions in the two network organisations have provided producers with the understanding that Bornholm foods are more than the sum of individual products, but form a culinary culture that (present and future) producers can tap into and exploit commercially. In 1995, when the initiative to form the RCHA was taken, it was based on a vague idea that small-scale productions of quality foods could be a way to support local economic development in a rural area. At this early stage, only a few entrepreneurs found local small-scale food production in rural Northern Europe potentially comparable to the role of local culinary heritage in Southern Europe:

"The trips organized by the Regional Culinary Heritage Association to especially Sweden and Norway were helpful. Not so much as a direct knowledge input, but more in the sense of inspiration. In the 1990s the activists on Bornholm who were involved with the development of regional foods saw Southern Europe, especially France as a model, but the Nordic partners, especially the Swedish, were helpful in making the concept of local foods and local distribution relevant and practically realisable for food producers on Bornholm". (Interview Thorkild Boisen, chairman of RCHA, February 6, 2009)

Thus, a central symbolic knowledge process informing the networked, collective creation and staging of culinary experiences has been related to the gradual understanding amongst food producers that Southern-European concepts of

geographically specialized 'terroir' food could be transferred and contextualized to a Nordic rural context and could hold potentials not only for economic development and job creation but for cultural change and regional identity formation.

4.3. The policy and governance context

In this section we analyse the symbolic knowledge processes within the policy and governance context which have taken part in the staging of food experiences. Local governmental and institutional resources have also been mobilized and activated, the primary resource being the Bornholm Local Action Group (LAG), an EU-created governance body originally related to the EU LEADER program for rural development, since 2006 part of the EU Rural Development Programme.

The first Bornholm LAG was established in 2000 and was the first local governance structure to recognize the economic potentials of regionally-based quality foods. The LAG implemented a 'lighthouse strategy' to support the development of local foods through sector-crossing development activities and marketing events in cooperation with the longstanding and esteemed traditions of the local arts and crafts sector:

"It was our hope that priorities on local food and arts & crafts and, very importantly, on cooperation between these two sectors, would create new firms and jobs in the rural districts." (Jørgen Hammer, chairman of the Bornholm LAG, interview March 24 2009)

The LAG strategy prioritised its limited financial resources on support of collective network activities for local food producers and market development, rather than product and technology development, which were eligible for support via other schemes. The Municipality of Bornholm and the Regional Growth Forum, a regional governance body promoting economic growth, have supported the quality food sector by co-financing the LAG-instigated food projects with development funds from the state and EU level. In 2006, the Regional Growth Forum set up a 'micro-cluster' structure in order to support local business development. 'Regional foods' was deemed one of six potential micro-clusters and the 'Food-Universe Bornholm' micro-cluster group is presently working on a project called 'The new-authentic Bornholm Kitchen', supporting the conceptualization of a re-invented Bornholm culinary culture.

The Bornholm LAG has in the period 2000-2006 instigated a number of staging activities through supporting the branding of Bornholm culinary products. The establishment of a Bornholm Food Ambassador function was a central initiative, and although it merely lasted 2004-05, it had a profound effect on the success of regional foods on national consumer markets. The strategy of the LAG and the Food Ambassador was to focus on the local producers who had the determination to expand their businesses to markets outside the island, the result of which divided the local food sector into local and distributed food producers. Later, the firms who were

promoted by the Food Ambassador formed the network association Gourmet Bornholm.

Supported by the status and public recognition given by his title as a regional 'Food Ambassador' and by exploiting his skills, experiences and extensive professional contacts and network relations from a long career within journalism and the media, he organized a series of initiatives and events which comprehensively made up a consistent and coordinated branding process of the Gourmet Bornholm products, but which also had invaluable spill-over marketing effects on the concept of a new Bornholm culinary culture in general. Activities included the invitation of food and travel journalists to elaborately staged events in a historical castle ruin on Bornholm, where high-quality local food was prepared in front of guests by renowned chefs and served with facts and narrative storytelling about its 'terroir' qualities. Another type of initiative involved public events in Copenhagen, an example of which is a well-covered media event where food and arts & crafts producers sailed in a small wooden boat into the inner harbours of Copenhagen, offering their wares to the many national and international tourists. Yet an example is the Royal Wedding in May 2004; a national cultural event with maximum media attention and coverage. Partly due to the professional lobby work of the food ambassador, six different Gourmet Bornholm products were selected by the royal court as part of the wedding menu. The event was a supreme mark of quality and had an enormous branding effect.

In 2003, the LAG granted financial support to the professional production of a Bornholm Lifestyle magazine in an attempt to promote a new, re-invented Bornholm identity. The magazine depicted a distinct Bornholm lifestyle and identity, wherein the new culinary culture played a central role.

"The magazine gave a picture of a Bornholm in harmony with itself and yet, ready to go new ways. Suddenly we got Bornholm heroes shining on the island, the wine producer Jesper Paulsen, the beer entrepreneur Tim Stender, the chocolate maker Kjærstrup, something we were acknowledged for. ...They showed a side of Bornholm that was trendy and yet compatible with the traditional and historical. (Jørgen Hammer, chairman of the Bornholm LAG, interview March 24, 2009).

Symbolic knowledge processes have also played an important part in the governance context of staging Bornholm food culture. In 2004, Bornholm's Business Development Centre and LAG co-financed a research analysis of the Bornholm food industry, which pointed to the fact that the new group of small and micro firms based on quality food production were responsible for about half of total food industrial employment and that their profitability corresponded to firms representing the conventional food industry. The analysis also suggested that public support to the sector should be directed towards market development and distribution systems outside Bornholm. According to an interview in March 2009 with the regional politician, Annelise Molin, this analysis was an eye-opener for the local political establishment, which had previously been indifferent to, if not disrespectful of local, 'alternative' food producers,

whose products were considered to be idealistic experiments with no serious regional growth potentials. The establishment of a culinary cluster group under the auspices of the Regional Growth Forum shows that the culinary sector has since gained public policy support as well as altered the general political discourse about regional food.

This story shows the potentially important role of analytical research-based knowledge for political decision-making. However, it also indicates that politicians and politics basically rely on symbolic knowledge dynamics in interpreting the potential political significance of diverse forms of information and in balancing economic, social and cultural interests and concerns via formulation and communication of political visions and goals. Hence it should be stressed that the policy-initiated support to Bornholm culinary productions was facilitated by the personal conviction of leading regional politicians that the development of a Bornholm culinary culture might hold important economic and social potentials and that public support should be directed towards branding activities rather than, for example, technology-based development of the sector.

In more practical terms, however, the critical knowledge source for the policy-initiated staging was the food ambassador who saw great place-branding potentials in the symbioses between regional food, tourism and arts & crafts, a view that was based on the following reasoning:

"I have experiences in leading choirs and my job as food ambassador was somehow similar: to make a harmony and a melody out of several individual voices." (Georg Julin, Food ambassador, interview March 4, 2008)

This quote in essence shows the aspect of symbolic knowledge processes which encompasses the creation of commercially relevant cultural values and meanings through bringing together actors from different knowledge spheres and economic sectors and creating common grounds for conceptual understanding. The important ambassador task of enhancing the visibility and brand of Bornholm food on national consumer markets mainly involved dynamics of contextualizing generic principles of communication and branding knowledge, adapted to the specific products, place and time – just like the private consultant quoted above, who described his role in transferring and contextualising abstract experience economy concepts from distant, urban circumstances to the rural reality of Bornholm. Also the public recognition given by the title as a food ambassador for a specific region as well as person-specific knowledge regarding social networking and exploitation of such for commercial purposes has been crucially important, for instance in lobbying for Bornholm products to be included in the crown prince wedding dinner menu.

5. Conclusion and discussion

In this article we have looked at, firstly, the development and marketing of regional culinary products from the Danish island of Bornholm through the analytical lens of Pine and Gilmore's (1999) concept of 'experience staging' but have provided the broader systemic perspective of the concept of 'Territorial Staging System' (Jeannerat and Crevoisier, 2010). Secondly, we have studied the knowledge aspects of 'producer staging' and the comprehensive staging system of Bornholm foods by use of the epistemological Differentiated Knowledge Basis taxonomy (Asheim, 2007) and in particular the category of symbolic knowledge.

The systemic perspective of the TSS model opens the possibility of more integrative production-consumption studies which are increasingly called for in research (Goodman, 2002; Crevoisier and Jeannerat, 2009; Malmberg and Power, 2005). Due to the nature of the collected empirical data, our analysis has focused one-sidedly on describing production-side actors and activities. However, it should not be overlooked that the Bornholm case occurred in a Danish context characterized by lacking traditions and supplies of culinary heritage products and that market entry, accordingly, depended not only on mobilization of resources and staging of culinary products at production-side but also on complex national and international discourses and learning processes at consumption-side, out of reach of Bornholm control and influence.

The possible territorial staging system of Bornholm culinary products should not be understood as a highly developed one with close, well-established, institutionalized producer-consumer linkages. Rather it is an infant system, with on the one hand, a rural Bornholm production-side and, on the other hand, a national consumption sphere with the gravitational centre in Copenhagen with a large urban population and trendsetting media and cultural industries. The two sides are connected through economic interaction and discursive activities but not fully integrated. Despite this, the production-side staging of culinary experiences encompasses a variety of value-creating activities that can hardly be categorized as traditional marketing activities of agri-food production systems. Rather they are more readily explained by use of the concepts of 'staging systems' and 'the experience economy'. One might suggest that numerous producer staging systems (e.g. representing other culinary regions), simultaneously and in similar ways tap into and interact with the same consumption-side resources of this territorial staging system.

Furthermore, another highly useful aspect of the systemic perspective offered by the TSS model is the analytical approach to understand not only staging activities at the level of individual firms (which is in focus for Pine and Gilmore) but activities in other contexts such as networks and public policy. This multi-context perspective has allowed an investigation of the inter-connected activities of individual food producers, network associations, the arts & crafts and tourism sectors, intermediating marketing consultants, regional politicians and public sector consultants. It is indeed difficult to entirely disentangle the staging activities across differing institutional contexts,

especially in a rural setting where the roles of involved actors are less institutionalized and often person-born. In fact, the Bornholm case study seems to suggest that rich and coordinated actions and interactions of firms, networks, governance and other actors is a critical success factor in producer staging.

We have placed special emphasis on studying the knowledge aspects of experience staging and staging systems and for this purpose we have applied the epistemological knowledge category of symbolic knowledge. The empirical case study has shown the significance of business models able to embed certain geographical, cultural, social or other values in products and to communicate these values through targeted and professional marketing, branding and stage-setting efforts that engage consumers. Accordingly, the study has documented the importance of skills, competencies, and insights within fields such as gastronomic cultures, design, marketing, communication, social networking, shopping, and consumer preferences, basically relying on socio-cultural, communicative and discursive knowledge dynamics aiming at creation of cultural meanings, conventions and interpretations about what Bornholm culinary experiences might be.

These types of knowledge and learning seem well-described by the symbolic knowledge category. The theoretical value-added of applying this categorization is connected not only to its usefulness in visualizing the role that cultural and creative types of knowledge and learning play in innovation and economic growth, but also with the provision of a perspective for studying how such knowledge connects to and interacts with other types of knowledge and learning communities.

When innovation of a traditional manufacturing sector, the food and drinks industry, is used to illustrate a hypothesized overall 'experience turn' in Western economies, it is particularly relevant to emphasize the reliance on not only symbolic types of knowledge and learning dynamics. The economic incitement for manufacturing firms to add narrative, experiential elements to their tangible products does not eliminate the importance of synthetic and analytical knowledge about functional product features and manufacturing technologies. Therefore, although the staging system of Bornholm food relies on a predominantly symbolic knowledge basis, this does not mean that the Bornholm food production system entirely and exclusively draws on symbolic knowledge dynamics. On the contrary, a main finding of the Bornholm study and of the EURODITE case studies as a whole is the growing importance of combinations of different types of knowledge (Halkier et al., 2010; Manniche (forthcoming)).

A last question to discuss regards the implications for rural development. Basically, the analyzed case outlines an interesting story about the building of new types of urban-rural relations, not founded on the traditional core-periphery dichotomy, but more balanced and favourable for the rural counterpart in terms of economic returns, social interaction, and cultural implications. The growing demands for culinary experiences expressed in the recent market success of food producers on Bornholm as

well as in other rural areas in Denmark and abroad, provide new opportunities for revitalizing traditional rural assets, entrepreneurial lifestyles and values, which maybe indicates the emergence of a 'new rural development paradigm', as debated in rural research (Murdoch, 2000). This development, however, certainly also poses challenges for rural development connected with issues such as the fundamental volatility of consumer demands for 'experiences', the lack of producer-control over the experiences value-chain, and with the growing importance of symbolic, culture- and consumption-oriented forms of knowledge which rural populations, despite cultural urbanization of rural life, might have limited access to.

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