



Tiina Ritvala

ACTORS AND INSTITUTIONS IN
THE EMERGENCE OF A NEW FIELD:
A STUDY OF THE CHOLESTEROL-LOWERING
FUNCTIONAL FOODS MARKET

HELSINKI SCHOOL OF ECONOMICS

ACTA UNIVERSITATIS OECONOMICAE HELSINGIENSIS

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Abstract

Rapid scientific and technological progress has resulted in the blurring of traditional industry boundaries and in the emergence of new product markets and broader organisational fields. Despite recent scholarly interest in field emergence, there is still little knowledge on how new fields emerge at the intersection of established industries and on the multi-local nature of the phenomenon. The purpose of this study is to increase the understanding of the interaction between actors and institutions in field emergence at the intersection of established industries and spatial scales ranging from local to global. This will be accomplished by building mainly on the literature on institutional entrepreneurship and importing conceptual ideas from social network theory and international business research. The main research question this study aims to answer is *“How do new fields emerge from the interaction between actors and institutions at the intersection of established industries and spatial scales?”*

The study explores the topic through the emergence of the cholesterol-lowering functional foods market during the last two decades. Cholesterol-lowering functional foods represent a science-based field between the food and pharmaceutical industries. The societal relevance of studying functional foods is high as their medicine-like effects challenge conventional institutions regarding regulation, norms and consumer awareness of the relationship between food and health. The primary source of data is 32 semi-structured in-depth interviews carried out in Finland and the U.S. between late 2004 and April 2007. The interviewees consist of managers of MNCs and smaller start-ups, top scientists in the field, national public health authorities and regulative authorities. Further, a limited amount of participant observation data and a collection of secondary data such as trade journals and patent data is used. Finally, a comparative data set on nanotechnology was used in two co-authored essays on field emergence.

This doctoral thesis is divided into two parts. The summary part concentrates on the theoretical and methodological foundations, while the second part consists of four essays, each exploring field emergence through different conceptual lenses. In Essay 1 we investigate the role of micro level activities induced by scientists in the emergence of a spatial cluster. The key contribution of the essay is an analytical division of the various roles played by scientists in cluster formation from the perspective of institutional change. In Essay 2, we depict how depending on their network positions, specific individuals and organisations may act as brokers that span structural holes between previously unconnected industries and disciplines, and hence trigger the emergence of new cross-industry and cross-disciplinary networks and influence the emerging institutions of a new field. The contribution of the essay is to combine social network theory and the literature on institutional entrepreneurship. In Essay 3, we discuss how institutional entrepreneurs in science-based fields mediate between globally circulating discourses and local institutions and competencies. The contribution of the essay is to investigate agency across spatial scales in order to address the central weakness of the institutional entrepreneurship approach, namely that of the concentration on geographically distinct and delimited areas. In Essay 4, I examine the cross-border transferability of the cholesterol-lowering functional foods concept. By building on neoinstitutional theory and on the recent advancement in international business research, I propose a novel concept of industry institutional distance, which is able to consider industry-specific dynamics in emerging fields.

In summary, this research deepens the existing understanding on field emergence as a multi-local phenomenon. The results of this thesis indicate the fundamental importance of individual and organisational agency in field emergence. Scientists, enabled by their network position, knowledge and legitimacy, were found to transmit knowledge and practices between disciplines, established industries, and spatial scales. Successful field emergence further necessitates the collective mobilisation of a wide group of field participants and the receptiveness of the institutional environment. The results suggest that the ability to see beyond the boundaries of disciplines and industries and to operate in different institutional environments is crucial in field emergence and in building new product markets. The thesis concludes with a model of field emergence at the intersection of industries, disciplines and spatial scales demonstrating the complexities of the emergence of a new science-based field.

Keywords: field emergence, institutional entrepreneurship, spatial scales, institutional distance, functional foods

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Helsinki, November 2007

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TABLE OF CONTENTS

PART I: The Summary

LIST OF FIGURES.....	8
LIST OF TABLES.....	9
LIST OF APPENDICES.....	9
1 INTRODUCTION.....	10
1.1 Background	10
1.2 Research Gap	12
1.3 Research Questions and Level of Analysis.....	15
1.4 Key Concepts of the Study	17
1.5 Underlying Assumptions and Limitations of the Study	19
1.5.1 Need for a Multiparadigm Approach.....	20
1.5.2 Issue of Paradigm (In)Commensurability	21
1.6 Structure of the Study	23
2 THEORETICAL ORIENTATION	24
2.1 Neoinstitutionalism in Organisation Theory.....	24
2.1.1 Defining Institutions and Institutional Logics.....	24
2.1.2 Organisational Fields and Institutional Change	27
2.1.3 Institutional Entrepreneurship	32
2.2 Social Network Position and Field Emergence.....	36
2.3 Spatial Scales and Field Emergence.....	39
2.4 Analytical Framework of the Study	44
3 INTRODUCTORY CASE DESCRIPTION.....	47
3.1 Origins and Definitions.....	49
3.2 Market Size and Firms	52
3.3 Regulative Framework of Functional Foods.....	56
3.4 Spatial Clusters in Functional Foods.....	58
4 RESEARCH DESIGN AND METHOD.....	61
4.1 The Case Study Setting.....	62
4.2 Data Collection.....	63
4.3 Data Analysis	68
4.4 Validity and Reliability.....	70

5	SUMMARIES OF THE ESSAYS.....	73
5.1	Summary of Essay 1	74
5.2	Summary of Essay 2	75
5.3	Summary of Essay 3	76
5.4	Summary of Essay 4	77
6	DISCUSSION AND CONCLUSION.....	79
6.1	Central Actors in the Emergence of a New Field.....	79
6.2	Building Bridges between Industries and Spatial Scales in Field Emergence	81
6.3	Model of Science-Based Field Emergence	86
6.4	Generalisability and Limitations of Findings.....	88
6.5	Theoretical Contributions	91
6.6	Managerial and Policy Implications	93
6.7	Avenues for Future Research.....	94
	APPENDICES FOR PART I.....	96
	REFERENCES FOR PART I.....	103

PART II: The Essays

Ritvala, T. & Kleymann, B. 2007. Scientists as Midwives to Cluster Emergence – An Interpretative Case Study of Functional Foods. *Helsinki School of Economics Working Papers W- 430. Earlier version of the paper peer-reviewed and accepted for presentation at the 2007 Annual Meeting of the Academy of Management.....*115

Ritvala, T. & Granqvist, N. 2006. Institutional Entrepreneurs and Structural Holes in New Field Emergence- Comparative Case Study of Cholesterol-lowering Functional Foods and Nanotechnology in Finland. *Helsinki School of Economics Working Papers W- 411. Earlier version of the paper peer-reviewed and presented at the 2006 Annual Meeting of the Academy of Management. Under journal review....*148

Ritvala, T. & Granqvist, N. Institutional Entrepreneurs as Mediators between Global Discourses and Local Institutions -Emergence of Functional Foods and Nanotechnology in Finland. *Non-published manuscript. Earlier version of the paper peer-reviewed and presented at the 2007 Annual Meeting of the Academy of Management. Under journal review.....*182

Ritvala, T. Industry Level Institutional Distance and the Cross-Border Transferability of a New Consumer Concept. *Non-published manuscript. Earlier version of the paper published in the Proceedings of 32nd EIBA Annual Conference 2006.....*215

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LIST OF FIGURES PART I: THE SUMMARY

FIGURE 1	Structure of the Thesis.....	23
FIGURE 2	Stages of Institutional Change.....	29
FIGURE 3	Analytical Framework of the Study.....	45
FIGURE 4	Position of Functional Foods between Four Systems.....	47
FIGURE 5	Research Approach.....	69
FIGURE 6	Positioning the Four Essays.....	73
FIGURE 7	Emergence of a Novel Hybridised Field Level Logics.....	82
FIGURE 8	Analytical Framework Revisited.....	86
FIGURE 9	Model of Science-Based Field Emergence.....	87

LIST OF FIGURES PART II: THE ESSAYS

ESSAY 1:

FIGURE 1	Spatial Cluster as a Variably Coupled System.....	127
FIGURE 2	Roles of Scientists in Early Cluster Emergence.....	139

ESSAY 2:

FIGURE 1	Field Emergence as a Process of Bridging between Structural Holes.....	156
FIGURE 1	Conceptual Framework of Field Emergence.....	176

ESSAY 3:

FIGURE 1	Institutional Entrepreneurs as the Mediators between Local Institutions and Global Influences in the Emergence of Science-based Fields.....	208
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ESSAY 4:

FIGURE 1	Analytical Framework for Industry Institutional Distance.....	221
FIGURE 2	Yearly Number of Patent Applications.....	227
FIGURE 3	Model of Semi-global Field Emergence.....	237

LIST OF TABLES PART I: THE SUMMARY

TABLE 1	Focus of the Essays.....	16
TABLE 2	Three Pillars of Institutions.....	25
TABLE 3	Amount of Interviews by Organisation Type	65

LIST OF TABLES PART II: THE ESSAYS

ESSAY 1:

TABLE 1	Summary of Data Sources in Mapping the Role of Scientists.....	130
TABLE 2	Position of Cholesterol-lowering Functional Foods between Traditional Foods and Pharmaceuticals.....	132

ESSAY 3:

TABLE 1	Chronology of the Key Events in Functional Foods and Nanotechnology.....	191
TABLE 2	Illustrations of the Interview Data on Mediating Actors, Activities and Artefacts.....	194

ESSAY 4:

TABLE 1	Summary of Data Sources.....	225
TABLE 2	Operationalisation of Industry Institutional Distance.....	235

LIST OF APPENDICES PART I: THE SUMMARY

APPENDIX 1	List of the Interviews.....	96
APPENDIX 2	Illustrative Interview Guide.....	98
APPENDIX 3	Data Sources.....	100
APPENDIX 4	Chronology of Key Milestones in Cholesterol-lowering Functional Foods.....	101
APPENDIX 5	Structures of Cholesterol and Common Phytosterols and Phytosterols.....	102

LIST OF APPENDICES PART II: THE ESSAYS

ESSAY 4:

APPENDIX 1	Plant Sterol and Plant Stanol Ingredients Approved by the European Commission.....	245
APPENDIX 2	Notifications Pursuant to Article 5 of Regulation (EC) 258/33.....	246

PART I

1 INTRODUCTION

1.1 Background

Rapid scientific and technological progress has resulted in the blurring of traditional industry boundaries and in the emergence of new product markets and broader organisational fields¹. Even though scholars have long recognised the importance of studying field emergence (Aldrich & Fiol 1994), scant attention has been paid to the origins and processes of institutional change (Lounsbury & Crumley 2007; Perkmann & Spicer 2007) resulting in the formation of new fields. In addition to shifting industry boundaries, globalisation and regional integration are redefining national borders in an unparalleled manner (Parkhe 2003). Such redrawing of boundaries necessitates better understanding of field emergence at the intersection of established industries and spatial scales. This doctoral thesis addresses this gap in the existing literature.

The study builds mainly on the neoinstitutionalist literature on institutional entrepreneurship. In contrast to the institutional tradition, which stresses the relative fixity of institutions, the institutional entrepreneurship approach stresses the interest-driven and proactive behaviour of actors in crafting new institutions (DiMaggio 1988; 1991; Beckert 1999; Lawrence & Phillips 2004; Greenwood & Suddaby 2006). However, besides overlooking the origins and processes of early field emergence, the extant literature on institutional entrepreneurship has curiously neglected scientists as institutional entrepreneurs. Further, and even more importantly, the extant studies do not sufficiently discuss how differences in spatial institutional environments enable or constrain field emergence, hence, neglecting multi-local or even global nature of the phenomenon. Indeed, institutionalist research has unnecessarily focused on single-dimensional definitions of institutional contexts, thereby implying that each organisation is embedded in a single institutional environment (Sanders & Tuschke 2007; Lounsbury 2007; Dacin et al. 2002; Kostova & Roth 2002). Given this neglect, I

¹ My conceptualisation of a (organisational) field is close to the concept of industry but includes organisations that critically influence firms' activities and performance such as competitors outside an industry and public authorities such as regulators (DiMaggio & Powell 1991[1983]), other public policy makers and health authorities. Key concepts of the study are defined in section 1.4., and further developed in Chapter 2.

capitalise on international business research in which activities that cross national boundaries are of specific interest. In particular, I extend the use of the concept of institutional distance (Kostova 1999; Kostova & Zaheer 1999; Kostova & Roth 2002) to institutional differences that hinder field emergence across spatial scales. Finally, the study draws on social network theory to investigate how network position enables actors to bridge across different types of gaps in existing structures that characterise emerging fields. The proposed multi-paradigm framework for the study contributes to a more nuanced understanding of the contexts and mechanisms central in field emergence.

In the search for more comprehensive understanding on the interaction between actors, institutions and spatial scales in field emergence, cholesterol-lowering functional foods serves as a case study. Cholesterol-lowering functional foods² represent a science-based field between the food and pharmaceutical industries. The case study is an account of how a new field emerged through the activities of pioneering scientists and organisations to translate (Czarniawska & Sevón 1996; 2005) pharmaceuticals logics into the food industry, hence shifting the boundaries between the established industries.

This study extends the discussion of institutional entrepreneurship in emerging fields (DiMaggio 1991; Garud et al. 2002; Lawrence & Phillips 2004; Maguire et al. 2004) into the context of science-based fields. It also addresses the understudied topic of how local and global forces and mediating actors interact in field emergence. In so doing, the study contributes to the existing single-locational focus of institutional entrepreneurship approach and simultaneously adds to the few accounts examining the “nonspread” of innovations (Ferlie et al. 2005). Finally, the study makes an empirical contribution by being probably the first to offer an in-depth longitudinal analysis of the global emergence of cholesterol-lowering functional foods from an institutionalist perspective. The key argument the study builds is that field emergence is a multi-local phenomenon which is fundamentally affected by the capacity of individuals and organisations to bridge between different knowledge bases, institutions and spatial scales and mobilise wide support for the field. Furthermore, the receptiveness of the surrounding

² Cholesterol-lowering functional foods are added with plant sterols and stanols that block the absorption of cholesterol in the intestine, reducing high blood cholesterol level, the major causal risk factor for heart disease which is the leading cause of death in both high and low-income countries (WHO 2007).

institutional environment for the field was found to vary considerable. Hence, rather than a single emergence path of a new field, multiple parallel and overlapping emergence paths are more likely.

This thesis consists of two parts. The first part is the summary part, while the second part consists of four essays, each looking at the emergence of the field from a different conceptual perspective. This introductory chapter is structured in the following way. First, I identify a research gap. Thereafter, I pose the research questions, define the key concepts, and discuss the underlying assumptions and limitations. I conclude this introductory chapter with a discussion of why I use multiple theoretical lenses, as well as with a description of the structure of the study.

1.2 Research Gap

Neoinstitutional Theory and Institutional Entrepreneurship Approach

Field emergence has until relatively recently been discussed scarcely within neoinstitutional theory (DiMaggio 1991; Fligstein 1997; Lawrence & Phillips 2004). The reason behind such neglect is the theory's traditional fondness for explaining homogeneity and persistence and its limited means to account for active agency and individual and organisational self-interest in non-isomorphic change (Oliver 1991; Dacin et al. 2002; Munir & Phillips 2005). Considering the theory's limited focus on agency (DiMaggio 1988), it is perhaps not so surprising that there are only a few studies of early field dynamics (Greenwood et al. 2002). Hence, rather than explaining how innovations emerge in the first place, neoinstitutional theory explains how they spread across organisations (Westney 1993). Finally, and most importantly, the extant institutionalist literature suffers from an acute lack of knowledge on the bottom-up and top-down interactions between emerging national and global fields (Scott 2001). Typically, institutional studies are limited to investigations of existing single organisational forms and locations rather than the emergence of new fields or changing field boundaries in trans-national contexts (Dacin et al. 2002).

The institutional entrepreneurship approach within neoinstitutional theory adopts a more dynamic view of change by stressing the role of active agents, i.e. institutional entrepreneurs, in institutional change (DiMaggio 1988; Garud et al. 2002; Lawrence & Phillips 2004; Maguire et al. 2004). Institutional entrepreneurs need to mobilise collective efforts of other actors in the emerging field in order to portray the new activity as familiar and trustworthy (Aldrich & Fiol 1994; Hargrave & Van de Ven 2006; Wijen & Ansari 2007). However, there is little research that examines how the position of institutional entrepreneurs in broader social networks enables such a collective mobilisation. Further, there is a need for deeper understanding on how the activities that constitute institutional entrepreneurship vary in different environments (Maguire et al. 2004), both spatial and industrial. Indeed, existing understanding on how institutional entrepreneurs operate at the intersection of different industries and local and global influences in field emergence is unsatisfactory. The neglect of how spatial differences influence social organisation of industries and markets requires organisational theorists to expand their theoretical lenses to incorporate insights from disciplines such as economic geography (Lounsbury 2007) and international business.

In sum, neoinstitutional theory has been rarely applied in complex environments with multiple institutional demands, such as at the intersection of established industries and spatial scales. To conclude, while the institutional entrepreneurship approach provides a robust framework to investigate change, a full understanding of field emergence necessitates incorporation of analytical tools that enable closer integration of spatial and network aspects central in field emergence.

Social Network Theory

Social network scholars conceptualise networks as channels, conduits, pipes or ‘plumbing’ of the market through which ‘market stuff’ such as information, goods, services, payments and favours in return are transmitted (Kogut 2000; Podolny 2001; Powell 1990). Social network investigations tend to concentrate on established fields in cross-sectional research designs, neglecting network emergence and dynamics (Meyer et al. 2005). There are a few studies, however, where field emergence has been investigated by using social network analysis methods to map structural evolution of field level networks for instance in biotechnology (e.g. Owen-Smith & Powell 2004;

Powell et al. 2005). In these studies, network emergence is discussed through the emergence of new ties and the changes of network relations over time. The social network tradition is strong in describing structural changes in the network composition and identifying the role of different actors along the emergence process. Yet, despite their strong visual power, these studies largely model the outcomes of network emergence and lack the capacity to explain the underlying processes or context of change. Indeed, since social networks per se do not have any content social relationships need to be situated within a particular institutional context (Friedland & Alford 1991). Also, typically social network investigations in emerging fields and industries tend to concentrate on single regions (e.g. Saxenian 1994; Owen-Smith & Powell 2004) or nations (e.g. Sorenson 2005), and thereby overlook cross-border ties that are central in field emergence. In summary, both neoinstitutional and social network theory tend to suffer from the neglect of cross-border ties and spatial aspects central in field emergence. Two broad streams of literature, in spatial clusters and international business have insights and analytical tools that when imported to neoinstitutional literature may advance the current understanding of field emergence as a multi-local phenomenon.

Cluster Literature

Several earlier empirical studies have convincingly shown that in science-and technology-based fields, the spatial clustering of innovative activity is crucial particularly in the early stages of new industries (Audretsch & Feldman 1996; Feldman & Audretsch 1999; Breschi & Malerba 2005). Yet, there are scarce attempts to situate cluster development theoretically within the dynamics and evolution of new fields and industries (Martin & Sunley 2005). Hence, a fuller understanding of field emergence necessitates deeper understanding on the role of spatial clusters in the emergence process. Moreover, there is still very little both theoretical and empirical understanding on how clusters emerge in the first place (Bresnahan et al.2001; Feldman et al. 2005) and how clusters are tied to more global developments (Amin & Cohendet 2005; Bathelt et al. 2004; Coenen et al. 2006; Gertler & Levitte 2005).

International Business (IB) Research

IB research concentrates on cross-border differences in operating environments and on the activities of business actors. For instance, a large and growing body of literature deals with how multinational corporations (MNCs) mediate information flows across different market regions through their subsidiary network (e.g. Almeida & Phene 2004; Minbaeva et al. 2003; Andersson & Forsgren 2000). Curiously, considering the wide stream of IB research, there are few studies that take emerging fields or industries as their context for research (for exceptions see Murtha et al. 2001; Spencer 2003). In fact, there are hardly any studies that would discuss institutional enablers or inhibitors to field emergence or possible sensemaking schemas of managers in the situations of high institutional uncertainty present in emerging fields. The concept of *institutional distance* (Kostova 1999; Kostova & Zaheer 1999; Kostova & Roth 2002), i.e. the degree of similarity between the cognitive, normative, and regulative institutions of two countries, and related institutional costs (Zaheer 2002), offers an interesting conceptualisation to be extended into the context of emerging fields and industries. However, since various dimensions of distance are very likely to affect different industries in different ways (Dow & Karunaratna 2006; Ghemawat 2001; 2003a,b; Ricart et al. 2004), the implications of institutional distance should be assessed at the industry or emerging field level.

To synthesise the research gap, a fuller understanding of field emergence necessitates more focus on the role of individual and organisational agency and the role of network position. Further there is a great need for more appreciation on how global and local influences and cross-national differences affect field emergence. Overall, the identified gap necessitates an interdisciplinary approach to investigate field emergence.

1.3 Research Questions and Level of Analysis

Against the research gap discussed above, the objective of my doctoral thesis is to *contribute to the understanding of the interaction between actors and institutions in field emergence with a special focus on such interaction at the intersection of*

established industries and spatial scales. Hence, the key overarching research question that I aim to answer may be formulated in the following manner:

How do new fields emerge from the interaction between actors and institutions at the intersection of established industries and spatial scales?

The key research question may be further-divided into two sub-questions:

- I. *Who are the central actors in the emergence of a new field?*
- II. *How do the central actors bridge between established industries and spatial scales?*

The sub-questions are addressed through four essays, each examining field emergence with different theoretical lenses. Further, each essay has a different spatial focus, yet the spatial scales are highly overlapping due to the inherent overlap between scales such as local and national and the difficulty of drawing sharp lines between scales as they are intertwined in complex ways in field emergence. On a rather general level, the two first essays have their main focus on the cluster and national levels, while supranational and global issues of field emergence are more central in the two last essays.

<i>Theoretical Basis/ Conceptual Focus</i>	<i>Spatial Focus</i>	<i>Empirical Focus</i>
Essay 1: Social network theory, cluster literature, institutional entrepreneurship/ coupling metaphor	Cluster	Functional foods
Essay 2: Institutional entrepreneurship, social network theory/ structural holes	National	Functional foods and nanotechnology
Essay 3: Institutional entrepreneurship, Scandinavian institutionalism/ macro-cultural discourse, translation	Local-global	Functional foods and nanotechnology
Essay 4: Neoinstitutional theory/ institutional distance	(Supra)national -global	Functional Foods

TABLE 1 Focus of the Essays

The empirical focus of the first and last essays is on the cholesterol-lowering functional foods field, while Essays 2 and 3 include a comparative data set on nanotechnology in order to enable comparative analysis of field emergence and, thereby, mitigate the problems associated with a single-case study design.

Level of Analysis

The phenomenon to be explained is the entire emerging field. Fields incorporate network, cultural and historical elements and, thus, provide fruitful contexts for studying institutional change processes (Leblebici et al. 1991). Scott (1994:70-71) argues that “*The application of institutional arguments to organizations occurs, in my view, most appropriately neither at the level of entire society nor at the level of the individual organization but at the level of the organizational field.*” Further, Davis and Marquis (2005) point out that a field-level approach is most suitable when studying unsettled times, when *new industries emerge and the boundaries around existing industries shift*. Institutional scholars further suggest that change processes are best examined by research designs that incorporate multiple levels of analyses (Meyer et al. 1990; Scott 2001). For instance, Friedland and Alford (1991:240) suggest that “*An adequate social theory must work at three levels of analysis - individuals competing and negotiating, organizations in conflict and coordination, and institutions in contradiction and interdependency.*” These three levels individuals, organisations, and institutions, are the key levels used in this doctoral thesis research to investigate field emergence. Next, the key concepts of the study are defined, followed by a discussion of the underlying assumptions of the study.

1.4 Key Concepts of the Study

The key relationship of interest for this study is the interaction between actors and institutions in the emergence of a new field. *Actors* are seen to encompass all types of individuals, groups of individuals or organisations who operate in the emerging field. Also the term *field participant* is used with a similar meaning. *Institutional entrepreneurs*, on the other hand, are broadly seen as *motivated individuals or organisations able to identify and act on novel insights which result in the change of existing institutions or in the emergence of new institutions* (see p. 84 for a new conceptualisation, based on the research findings). *Institutions* refer to *cognitive, normative, and regulative structures and activities that provide stability and meaning to social behaviour* (Scott 1995).

With the concept of (*organisational*) *field* I refer to a *collection of varying types of organisations, their suppliers, customers, and regulators that are formed around a common issue* (Scott 2006). The concept of field builds on the more conventional concept of industry but includes organisations that critically influence their performance such as exchange partners, competitors outside an industry, and regulators (DiMaggio 1991; Scott 2001). In this research both the terms field and industry are applied. I use the term industry when referring to established industries whose borders are relatively clear-cut such as the food and pharmaceuticals industries. I use the term field when analysing the research phenomenon of this study, i.e. an emerging collection of actors in cholesterol-lowering functional foods. Actors such as legislators, regulators, and public health authorities possess crucial roles in the emergence of this field. It is also worth noting here, that the four essays of this thesis use slightly different conceptualisations of a field, depending on the perspective taken in the essay. The definitions used are, however, highly commensurable. The concept of field is further developed in the section 2.1.2.

The research phenomenon *field emergence* is conceptualised as a *process through which cognitive field boundaries, network relations and set of institutions take shape* (see Essay 2 p.152). When a field emerges at the intersection of established industries, central to the emerging network of individuals and organisations is a common issue that provides enough 'glue' to bring and keep together a set of previously disconnected actors and institutional logics. Imitation between field participants is a central mechanism driving field emergence (Hedmo et al. 2005). A new field may be considered to have emerged when interactions within networks and fields become structured (DiMaggio & Powell 1991 [1983]) and actors identify themselves as belonging to the same field of activity (Scott 1995). *Spatial scale* refers to a nested hierarchy of bounded spaces of differing size, such as the local, national and supranational, yet it is not pre-given; scales are socially constructed through social, economic, and political processes (Leitner 1997). A scale is the geographic level of social activity (Spicer 2006). Hence, spatial scale reflects the multidimensional and dynamic nature of space in emerging fields. With the concept of *cluster* I refer to a *spatial concentration of interconnected individuals and organisations emerging around a common issue, and developing in close interaction with similar others outside the cluster* (see Essay 1 p.118).

1.5 Underlying Assumptions and Limitations of the Study

First, I assume that in the context of emerging fields, the uncertainty is so high that rather than concentrating on economic drivers it is more important to consider regulative, normative, and cognitive issues influencing economic action. This is not to say that economic rationality does not matter, but that uncertainty of ‘future states of the world’ (Pfeffer & Salancik 1978) influence actors’ decisions in a way that stresses more institutionally grounded factors. This assumption is congruent with institutional and structuration theorists who acknowledge that institutions set bounds on rationality by restricting the opportunities individuals and organisations perceive (e.g. DiMaggio 1988; Giddens 1984; Oliver 1991). Hence, local legitimacy may be as important as economic efficiency (Whittington 1992).

Second, in terms of ontology, i.e. what is the nature of reality (Denzin & Lincoln 2003), I take a modestly constructivist world view. Constructivism assumes a relativist ontology, i.e. “multiple, apprehendable, and sometimes conflicting social realities that are the products of human intellects, but that may change as their constructors become more informed and sophisticated” (Guba & Lincoln 1994). However, I take only a modestly constructivist position, meaning that I advance a moderate interpretation of the role of social factors and social negotiation in the creation of the world and new knowledge (Schwandt 2000). Further, I support the idea that society is not necessarily solely the product of those humans ‘here present’, but rather the world that we live in builds to a certain extent on the structures created earlier (Mutch et al. 2006). Thus, even though I reject a radical materialist view stressing the sole existence of physical reality, I do not subscribe to the pure idealist view emphasising that the only reality is in the human mind.

Third, rather than concentrating on the initiation or creation of single functional foods innovations *per se* (see e.g. Lehenkari 2006) the study focuses on how actors (and their innovations) relate to the emergence of the whole new organisational field. Thus, because the research phenomenon is the field emergence ‘in toto’, no attempt will be made in evaluating either effective or ineffective decisions or management practices of single firms. Moreover, consumer attitudes and acceptance of functional foods at the micro-level is not analysed in detail (see e.g. Urala 2005 and Essay 4). Further, since

field emergence is always context-specific (field, space and time), no 'grand recipes' for creating new fields are given. Finally, I consider paradigmatic boundaries conceptually permeable in 'transition zones' (Gioia & Pitre 1990), enabling the use of multiple theories and a more holistic understanding of field emergence.

1.5.1 Need for a Multiparadigm Approach

Due to the complexity of the research phenomenon and multiple levels where the phenomenon occurs, the theoretical framework for the study must be multidisciplinary. Otherwise, the rich nature of the phenomenon would not be understood. Further, I firmly believe that besides rich interpretations the selected multiparadigm approach contributes strongly to the extant literature. But having said that, I also acknowledge that this decision may somewhat compromise the theoretical coherence of the study. Hence, an explanation of why multiple theories are needed and consideration of their commensurability is required.

Powell et al. (2005) contend that the analyses of fields and networks have been oddly disconnected in the social sciences. However, it is commonly acknowledged that fields emerge from relational networks (White et al. 2004). Hence, an understanding of field emergence necessitates an understanding of social network emergence. Viewed from the perspective of institutional theory, an understanding of how institutional entrepreneurs succeed in mobilising resources and support for their ideas and issues necessitates an understanding of how they position in broader social networks. Nevertheless, social networks per se do not have any content (Friedland & Alford 1991). Hence, without any content it is impossible to explain how and why social networks are central in field emergence. This deficiency is best corrected by situating those social relationships within a particular institutional context (ibid.). Institutional theory provides a rich set of concepts and mechanisms that are applicable in such a task.

However, neoinstitutional analyses have largely ignored the cross-border organisational phenomena, the specific interest of international business (IB) (Westney 1997). IB provides a set of tools that may be used in analysing differences in host country environments and the transnational processes involved in field emergence. Even though a

turn towards institutional theory by prominent scholars is visible (e.g. Dunning 2003), IB as a discipline has not fully utilised the later developments of institutional theory. Indeed, Orr & Scott (2005) argue that a major shortcoming of extant literature is that international business scholars have not drawn more heavily on institutional theory in their empirical studies. Such cross-disciplinary metatheorising has also been called by IB scholars (Westney 1997; Geppert et al. 2006)). In the words of Eleanor Westney (1997:309,311):

“Institutional theory complements work at the more microlevel of cross-border organizational learning by directing attention to patterns within a field and how institutional agencies within a field legitimate certain patterns...IB researchers should not ascriptively discredit their work or preclude their ability to analyze their own role in the “structuration” of cross-border organizational fields. Indeed, one of the most challenging prospects for the IB field as whole is to understand the role it plays in influencing as well as analyzing IB- and the institutional paradigm provides a way to do this in a wider theoretical context...Both fields will be poorer if more attempts to build bridges between them are not made.”

1.5.2 Issue of Paradigm (In)Commensurability

A key requirement for bringing together different theoretical perspectives is that they represent ontologically commensurable ideas and assumptions, which would enable making sound theoretical contributions. The matching of underlying ontological assumptions suggests that the selected theoretical approaches are commensurable. The implicit inclusion of social networks in the institutional accounts was noted in the 1970s by Meyer and Rowan, who state (1977:353) that “all organizations, to one degree or another, are embedded in both relational and institutionalized contexts”. The key assumption underlying neoinstitutional theory is that individuals have a preference for reducing uncertainty and that institutional processes resolve such uncertainty, yet since institutionalisation is not always complete, interests and agency may eliminate uncertainty as suggested by the institutional entrepreneurship approach (DiMaggio 1988; Goodrick & Salancik 1996). Social network theory, on the other hand, is based on the assumption of the importance of relationships among interacting units (Wasserman & Faust 1994). Further, relational ties are assumed to be channels for transfer of resources, and both enable and constrain individual action (ibid.). Hence, the starting assumptions cannot be regarded as contradictory; they are instead commensurable and even partly

overlapping in stressing continuity. Further, a number of prominent scholars have recently called for a more visible and compelling combination of the institutional and social network theories (e.g. Greenwood & Suddaby 2006; Maguire et al. 2004). Such scholarly calls can be taken as providing legitimacy for bridging between these theories. Similar types of calls are made between IB and institutional theory, as already referred to, and social networks theory, which is increasingly applied within the IB discipline.

Based on their analysis of published papers in the *Administrative Science Quarterly* between 1991 and 2001, Davis and Marquis (2005) report a shift from theorising within a particular theory to theoretically eclectic studies responding to problems drawn from empirical events in the world within the organisation theory. Such shift indicates growth in the use of multiple theories, and may indicate that the question that Baldrige et al. (2004) asked - “Are managers from mars and academics from venus?” - will be less relevant in the future. Indeed, constant dialog between the collected empirical evidence and between theoretical perspectives is the best way to avoid ‘theory talking only to theory’, and research efforts becoming entirely self-referential (Siggelkow 2007). Finally, and to conclude, although it remains possible, that some underlying assumptions may be found somewhat disjointed, the paradigmatic boundaries are typically fuzzy and to a certain extent permeable (Lewis & Grimes 1999; Willmott 1993). This means that scientific theories are not carved in stone but should be challenged and theoretical perspectives combined if it enables a better understanding of the empirical world as we see it. Like *institutional bricolage*, where actors recombine existing institutional principles (Campbell 2004), *theoretical bricolage* (Denzin & Lincoln 2003) enables using paradigms as conceptual toolboxes from which a researcher may construct her own approach to a phenomenon and hence, link views created by different paradigms (Gioia & Pitre 1990). With serious consideration, such metatheorising may enable richer and more revealing study of field emergence than the use of single theory could make possible.

1.6 Structure of the Study

The structure of this thesis report is depicted in Figure 1. This introductory chapter is followed by an elaboration of the theoretical orientation of the study. Chapter 3 provides description of the key characteristics and actors in the field of cholesterol-lowering functional foods. Chapter 4 describes the research design, while Chapter 5 summarises the four essays which are provided in Part II. The fifth chapter relates the essays to the overall aim and research questions of the study and discusses the main results of the essays. The concluding Chapter 6 summarises the findings, theoretical contributions and managerial implications of the study and proposes fruitful avenues for future studies. Before Part II, which is a collection of the four essays, references and appendices of Part I are provided.

Part II includes the four essays, three co-authored essays and one written by the author alone. Essay 1 investigates how micro processes of scientific and institutional entrepreneurship relate to the emergence of a spatial cluster of a new field. Essay 2 depicts how network positions enable actors to act as brokers that span structural holes between previously unconnected fields of activity and influence the emerging institutions of a new field. Essay 3 addresses the activities of institutional entrepreneurs as mediators between global discourses and local institutions in field emergence. Essay 4 examines the challenges in field emergence in a cross-regional research setting.

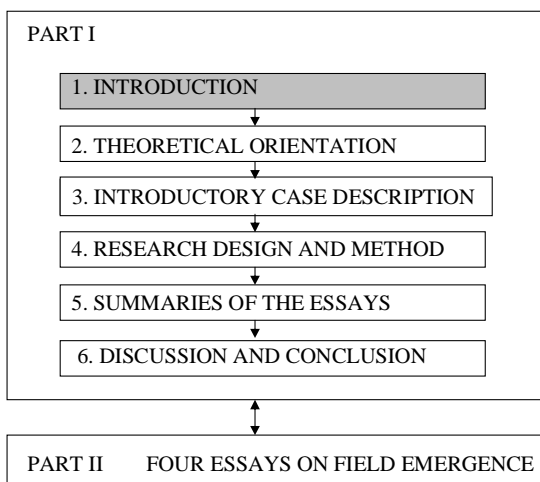
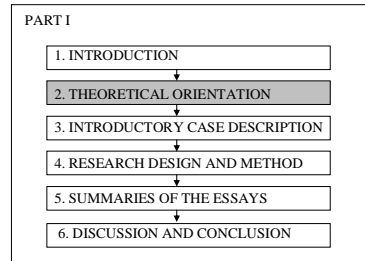


FIGURE 1 Structure of the Thesis

2 THEORETICAL ORIENTATION



2.1 Neoinstitutionalism in Organisation Theory

Institutional theory offers unique insights into the interaction between organisations and environments (Oliver 1991), and in so doing, provides an effective framework for understanding field emergence (Lawrence & Phillips 2004). In this thesis I use the term neoinstitutionalism to refer to a world view which conceptualises individuals as intertwined with complex webs of values, beliefs, taken-for granted assumptions, and norms, rules and regulations, which provide blueprints for organising. Hence, neoinstitutional theory in organisational studies possesses strong sociological origins (e.g. DiMaggio & Powell 1991[1983]; Scott, 1995). Before discussing the key insights suggested by neoinstitutional theory on field emergence, it is prudent to define more precisely the key institutional concepts used in this thesis.

2.1.1 Defining Institutions and Institutional Logics

Richard W. Scott (1995: 33) conceptualises institutions as encompassing both formal and informal elements, and by dividing between three pillars of institutions provides the umbrella definition of institutions:

“Institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. Institutions are transported by various carriers- cultures, structures, and routines- and they operate at multiple levels of jurisdiction.”

Hence, institutions are simultaneously material and ideal: “supraorganisational patterns of activity through which individuals conduct their material life in time and space, and symbolic systems through which they categorize that activity and infuse it with meaning” (Friedland & Alford 1991:232). Table 2 below differentiates between different dimensions of the three pillars.

	<i>Pillar</i>		
	<i>Regulative</i>	<i>Normative</i>	<i>Cultural-cognitive</i>
Basis of compliance	Expedience	Social obligation	Taken-for-grantedness Shared understanding
Basis of order	Regulative rules	Binding expectations	Constitutive schema
Mechanism	Coercive	Normative	Mimetic
Logic	Instrumentality	Appropriateness	Orthodoxy
Indicators	Rules Laws Sanctions	Certification Accrediation	Common beliefs Shared logics of action
Basis of legitimacy	Legally sanctioned	Morally governed	Comprehensible Recognizable Culturally supported

TABLE 2 Three Pillars of Institutions (Source: Scott 2001:52)

Djelic and Quack (2003) also stress the importance of such wide definition of institutions and argue that while the dimensions of institutions have traditionally been treated and approached separately, they should be brought together and investigated simultaneously in order to understand processes of institutional change and emergence. Overall, institutions are the results of the ways in which actors transpose, i.e. select and transport (Sewell 1992) institutional logics through precise scripts, rules, and norms in specific contexts.

Institutional Logics

Leca and Naccache (2006:632) contend that: “While institutions are the rules of the game, institutional logics are the underlying principles of the game.” At a macro level, institutional logics refer to “a set of material practices and symbolic construction- which constitutes its organizing principles and which is available to organisations and individuals to elaborate” (Friedland & Alford 1991: 248). Institutions that shape individual and organisational action are, hence, embedded within higher-order societal logics (Thornton 2002). This idea means that, individuals, organisations, and society constitute a progressively higher enabler or constraint on individual action. Such logics are the cognitive maps, the belief systems carried but also created by field participants to guide and give meaning to their practical activities (Scott et al. 2000). Institutional logics vary depending on the field. Thornton and Ocasio (1999) propose that at the industry

level, institutional logics are embodied in the common identity of industry players, which is based on social comparison and resource and status competition among competitors. Following Porac et al. (1995) such logics provide the rules and meanings that comprise a commonly understood set of action within an industry.

However, field participants share a common ideology only to a certain extent (DiMaggio & Powell 1991[1983]; Leca & Naccache 2006), meaning that there are also competing ideologies within a field. In the case of conflicting ideologies, individuals may defend one particular logic or attempt to export the symbols and practices of one institution in order to transform another (Friedland & Alford 1991). Indeed, logics may be assumed to lead to institutional change as they are based on ideas which can also be imported into a field from other arenas as proponents cross boundaries as Scott et al. observe (2000:174):

“When the new ideas and interpretations diffuse and become widely accepted-and often they do not- they can become the basis for social movements and reform programs. The most successful of these become institutionalized, replacing former truths and, over time, become taken for granted as “how things are” and “the ways these things are done”...But these ideas must find a receptive audience: their “time must come”.

A mode of logics whose transfer is perhaps best documented within organisational theory is that of transfer of managerial practices. Thornton (2002) studied the transfer from the editorial logic to market logic in higher education publishing, Scott et al. (2000) documented in detail the transfer from professional dominance to managed care within healthcare organisations, Westney (1987) investigated the transfer of Western organisational models to Meiji Japan, while Powell et al. (2005) showed how managerial practices circulated and translated into a non-profit community. Further, in a fascinating historical case study, Djelic and Ainamo (2005) depict how actors (*institutional entrepreneurs*, see section 2.1.3) transpose fashion logics into the field of mobile telephones, thereby blurring the boundary between fashion and technology logics as a result. The authors suggest that such transposition combines situated translation (for the concept of translation see p. 42) and hybridisation where multiple institutional logics ‘co-habit’ and remold field boundaries.

Besides the importance of timing in the change of logics, as suggested by Scott et al. (2000), Djelic and Quack (2003) contend that a change in logics is most likely to occur

when and where different institutional frames enter into collision such as between national and transnational spheres. Concentrating on the level of organisational logic, i.e. “the sensemaking frames that provide understanding of what is legitimate, reasonable and effective in a given context” Spicer (2006:1468) argues that logics are transformed as they move across spatial scales. Due to globalisation of activities organisational logics are embedded on a number of scales at once (ibid.). To conclude, broadly seen institutional logics are taken-for-granted social prescriptions, norms and laws, which specify the boundaries of a field and rules of its membership (Greenwood & Suddaby 2006). However, institutional logics are never totally frozen; in the case of emerging fields logics are under a constant process of negotiation.

2.1.2 Organisational Fields and Institutional Change

The concept of (organisational) field is central in neoinstitutional theory, yet it suffers to a degree from vagueness and is “perhaps the least familiar, yet the level of most significance to institutional theory” (Scott 2001:83). According to DiMaggio and Powell (1991[1983]:64-65) an organisational field refers to “those organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products”. Scott (1995:56) complements that fields are “a community of organizations that partakes of a common meaning system and whose participants interact more faithfully with one another than with actors outside the field.” Scott’s definition thus draws heavily upon the social constructionist account of reality (Greenwood, et al. 2002). Even not touching explicitly on the spatial scope by definition, organisational fields in modern societies stretch from local to global actors and influences. Lawrence and Phillips (2004:691) build on DiMaggio and Powell (1991 [1983]), yet they explicitly emphasise interorganisational links, in their definition of a field as “a set of organizations that constitute a recognized area of life, are characterized by structured network relations, and share a set of institutions”. Hoffman (1999), on the other hand, takes a somewhat different view on the concept of field and argues that fields form around common issues. Hence, field membership is defined by who have particular interest in the issue, and therefore participate in constructing the field. Institutional logics, as discussed, determine

which issues are salient and the focus of management's attention and what solutions are consistent with such logics (Thornton & Ocasio 1999; Thornton 2002).

Despite of the numerous field definitions Martin (2003:1) contends that "Field theory is a more or less coherent approach in the social sciences whose essence is the explanation of regularities in individual action by recourse to position vis-à-vis others. Position in the field indicates the potential for a force exerted on the person, but a force that impinges 'from the inside' as opposed to external compulsion." In this thesis the concept of *field* is used in a rather broad sense to refer to *a collection of varying types of organisations, their suppliers, customers, and regulators that are formed around a common issue* (compare Scott 2006). This definition stresses the multitude of different types of field participants and stresses that a common issue (in this research heart health) acts as a glue to keep the still rather fragile field together.

Typically as the reviewed definitions reflect, organisational fields are described as clusters of organisations and individuals sharing a common meaning system and identity and operating within relatively stable field boundaries. However, in the context of emerging fields such assumptions or an 'illusion of consensus' may rapidly break down. Since emerging fields are not clearly isolated from other fields, but are part of a larger whole composed of multiple, interpenetrating institutional logics of multiple sectors (Dorado 2005; Seo & Creed 2002) stable field boundaries and a commonly shared meaning system may not be a realistic assumption.

Neoinstitutional scholars have mostly concentrated on understanding why organisations adhere to dominant practices in their fields, i.e. on the durability of institutions also referred to as institutional isomorphism. Neoinstitutional theory built an answer that organisations seek legitimacy and in pursuing it, they conform to prevailing institutions (Goodrick & Salancik 1996). Indeed, within neoinstitutional theory change is considered problematic since institutions presume stability and persistence rather than emergence and transformation (Dacin et al. 2002; Hwang & Powell 2005; Kondra & Hinings 1998; Scott 1995). Consequently, neoinstitutionalism has been more applicable to the study of institutional form and functioning than to institutional origins and transformations (Brint & Karabel 1991). Further, institutional theory tend to rely on causal concepts but in so doing often fail to specify the underlying mechanisms or processes by which change

occur, hence, the concepts resemble black boxes which need to be unpacked and examined (Campbell 2004). In the current era of rapid scientific progress, technological change and globalisation, such focus is increasingly unsatisfactory. Not surprisingly then, neoinstitutional theory has been increasingly criticised for its neglect of organisational self-interest and active agency (e.g. DiMaggio 1988; Lawrence 1999; Oliver 1991; Powell & DiMaggio 1991; Hirsch & Lounsbury 1997). The growing criticism has guided prominent scholars to rethink their central theses and rejoin old institutionalism’s focus on organisational self-interests, power, vested interests, and active agency (Oliver, 1991; DiMaggio 1988). Currently, an increasing number of scholars advocate reconciliation between the “old” and “new” institutionalisms (e.g. Greenwood & Hinings 1996; Hirsch & Lounsbury; Lawrence 1999).

In sum, more recent institutionalist camps have tried to actively emancipate themselves from the overly deterministic view of neoinstitutional theory in insisting that the enabling functions of institutions need more elaboration. Greenwood et al. (2002) made a significant contribution in understanding the process through which radical institutional change may take place. They distill from the earlier literature the outlines of a model of nonisomorphic institutional change, which they name the “stages of institutional change”.

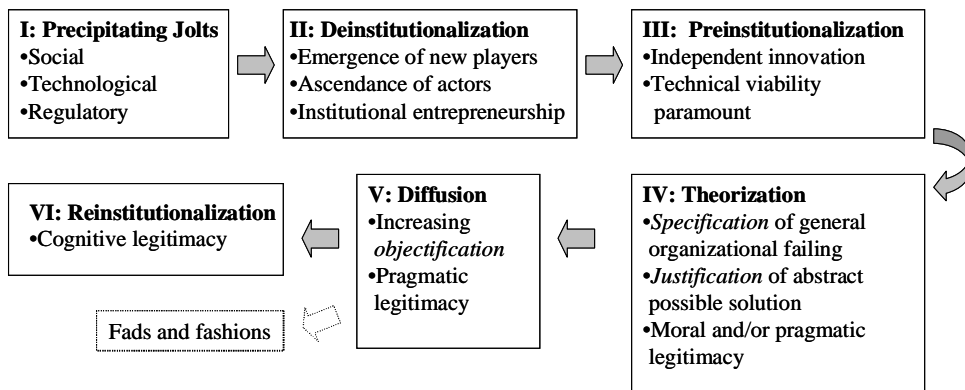


FIGURE 2 Stages of Institutional Change (Source: Greenwood et al. 2002:60)

According to this model, external jolts such as social upheavals, technological disruptions or regulatory changes result in the entry of new players, the ascendance of existing players, or local entrepreneurship. This disturbs the socially constructed field-level consensus. Preinstitutionalisation then occurs, when organisations innovate independently with the aim of seeking technically viable solutions to locally perceived problems (Greenwood et al. 2002; Tolbert & Zucker 1999). Stage four ‘theorization’ is a key stage in the stage model and a key contribution to institutional theory by Greenwood et al. (Parkhe 2003). “Theorization is the development and specification of abstract categories and the elaboration of chains of cause and effect” (Greenwood et al. 2002:60). Theorisation consists of two major tasks: *specification* of an organizational failing which can be addressed through local innovation, and *justification* of the innovation. Theorisation is expected to be critical in highly structured settings such as professions, where the boundaries of occupational communities are established (Greenwood et al. 2002; Lawrence 1999). Stage five, i.e. diffusion, occurs only if new ideas are compellingly presented as more appropriate or superior to existing ones. The novel ideas are transported within organisational communities where they become ‘objectified’, gaining social consensus concerning their pragmatic value (Greenwood et al. 2002; Suchman 1995). Full institutionalisation takes place when the ideas become taken-for-granted as natural and appropriate arrangements, meaning that there is cognitive legitimacy (Suchman 1995).

Notwithstanding the models’ significant theoretical contribution, there is some space for criticism. For a start, jolts need not be external to a field, but may also be internally created by field participants (Munir & Phillips 2005). Greenwood and Suddaby (2006) show how institutional change was initiated from the center of a field by elite firms whose network location enable them to bridge fields and became aware of alternative solutions. Moreover, rather than being just one stage, theorisation spans the entire institutional change process (Munir & Phillips 2005). Analogously institutional entrepreneurship is associated only with the deinstitutionalisation stage, while it may be suggested that the different stages of the process are likely to necessitate a different type of institutional entrepreneurship in order to lead to the next phase. In effect, Spicer & Perkman (2007) found that the nature of institutional entrepreneurship changes from an initial emphasis on interactional projects to technical in the theorization stage and cultural in the diffusion stage. Furthermore, it may be suggested that when an idea

transfers across institutional (and national) borders rather than diffuse intact, it must be adapted to the demands of the host environment, i.e. translated (Czarniawska & Sevón 1996; 2005), as discussed later in this chapter. Finally, the model is portrayed as unidirectional and therefore deterministic, even though one may also assume that backward steps do occur along institutional change.

Firms are increasingly active constructors of their institutional environments. This is reflected in scholarly works focusing in the convergence between strategic management and institutional analysis (e.g. Djelic et al. 2005). While strategy theorists take the position of managers looking “out”, institutional scholars have traditionally taken the viewpoint of society looking “in” (Elsbach 1994; Suchman 1995). However, organisations may exercise strategic choice in relating to their institutional environments like they do within their technical environments (Scott 1991). Indeed, since the early 1990s, institutional scholars have increasingly linked institutional perspective with strategic choice to better understand how institutional pressures relate to organisational strategic responses (Goodstein 1994). Christine Oliver (1991) proposes a conceptual typology of five categories of strategic responses to institutional pressures: acquiescence, compromise, avoidance, defiance, and manipulation. This typology varies in active agency from passive acquiescence to increasingly active institutional responses. Oliver’s theorised model receives support in a number of empirical studies (e.g. Clemens & Douglas 2005; Goodstein 1994).

In a rich, lovely conceptual study of managing legitimacy, Suchman (1995) adopts and refines Oliver’s (1991) typology into three main strategies for gaining legitimacy: conformance, manipulation and selection. In the context of building of legitimacy in new ventures, Zimmerman and Zeitz (2002) build both on Oliver (1991) and Suchman (1995) and add a fourth strategy, *creation*, which involves developing something that did not already exist in the environment. Yet, in my view, empirically distinguishing between manipulation and creation is in practice difficult since new institutions borrow from the old institutions. Such institutional bricolage in which actors recombine locally available institutional principles and practices (Campbell, 2004) could be an efficient mean to build early institutions of a field. Further, building on the earlier insights that entire industries may possess more or less legitimacy than presented by the firms operating within them (Aldrich & Fiol 1994; Suchman 1995) Zimmerman and Zeitz (2002)

propose a new type of legitimacy they term *industry legitimacy*. An industry's legitimacy is affected by the variety of actions and consequences caused by the collective action of industry members (Zimmerman and Zeitz 2002).

Beckert (1999) argues that institutional rules and strategic agency can be conceptualized as two coordination mechanisms that destabilize each other, but remain interdependent. On the one hand, institutions form a precondition for strategic agency. On the other hand, institutions come under pressure from agents constrained by institutions, whose violation might carry a profit premium (ibid.). The concept of *institutional entrepreneur* was suggested for those individuals or organisations that go after this profit premium, whether mental or financial. The concept of institutional entrepreneurship is important since it introduces strategic agency and proactive behaviour back into institutional theory, thus, enabling us to account for the dynamics of our era. It also helps us to understand how new fields get constructed by actors who are able to infuse new ideas and thinking, resulting in the transformation of existing institutions and the generation of new ones.

2.1.3 Institutional Entrepreneurship

Institutional entrepreneurs play central roles in creating new institutions, and hence, in field emergence (Lawrence & Phillips 2004; Maguire et al. 2004). DiMaggio (1988:14) introduced the concept of institutional entrepreneur by asserting: "New institutions arise when organized actors with sufficient resource (*institutional entrepreneurs*) see in them an opportunity to realize interests that they value highly". This resource mobilisation argument (Beckert 1999) stresses the role of bottom-up processes for challenging the top-down adaptation to institutional isomorphism predicted by neoinstitutional theory.

The scope of institutional entrepreneurship within neoinstitutionalist approach is remarkably broad, ranging from mature fields and powerful firms (Greenwood & Suddaby 2006; Sherer & Lee 2002), to new technological fields (Garud et al. 2002), non-governmental organisations (Leca & Naccache 2006) and professional associations (Greenwood et al. 2002). The heterogeneity of institutional entrepreneurship literature contributes to its richness by providing multiple perspectives on institutional entrepreneurship and on the tools institutional entrepreneurs have at their disposal for

affecting institutional change. The growing support of the concept of institutional entrepreneurship in the neoinstitutionalist tradition that has stressed fixity of institutions and considered change as an exception rather than rule, represents a fundamental theoretical shift in the collective understanding and conception of an actor (Hwang & Powell 2005: 201).

Indeed, the idea that institutional entrepreneurs are interest-driven, aware and calculative runs against the taken-for-granted thesis of institutional theory (Greenwood & Suddaby 2006). Djelic and Ainamo (2005), on the other hand, criticise what they consider as overly rationalistic view on institutional entrepreneurs and suggest that early pioneers and innovators may be moved more by a combination of intuition and chance than by rational strategy of transposition and innovation, and that late adopters are more likely to adopt a rational and systematic strategy. Also Hwang and Powell (2005) maintain that entrepreneurial activities are often purposive, but not directly intentional, rather unintended consequences often follow. Building on the previous, I define *institutional entrepreneurs as motivated individuals or organisations able to identify and act on novel insights which result in the change of existing or in the emergence of new institutions*³.

Institutional scholars largely agree that institutional change reflects actors' will and creativity, requires resources (cognitive, social and material), and depends on the availability of opportunities (Dorado 2005). Oliver (1991) maintains that stable environments enable manipulation of existing or creation of new institutions. Such stability grows institutional entrepreneurs' confident in their ability to acquire future legitimacy and resources (Beckert 1999). In the words of DiMaggio (1991:287): "[...] institutionalization bears, if not the seeds of its own destruction, at least openings for substantial change". However, in the case of emerging fields characterised by high institutional and market uncertainty, institutional entrepreneurs need to mobilise a larger group of proponents for the new issue or idea. Fligstein (1997:398) proposes that success of such endeavour is "the outcome of the type of social skill⁴ that institutional entrepreneurs possess and how that skill translates into institutional arrangements that produce organizational fields". Fligstein criticises that sociology, economics, and

³ For a new conceptualisation of an institutional entrepreneur made based on the findings of this study, see p. 84 of this thesis report.

⁴ Social skill is the ability of an actor to "motivate cooperation in other actors by providing those actors with common meanings and identities in which actions can be undertaken and justified. (Fligstein 1997: 398).

political science explains action entirely in terms of the positions of actors in the social structure and argues that the basis of social skill is the ability to relate to the situation of the “other” (ibid.). Indeed, “reading the current level of organization in a field” and “responding to it by taking the position of the other actors in the field” is suggested by Fligstein as forming a socially skilled actor. Hence, the tactics of institutional entrepreneurs in mature fields are likely to differ from those who craft institutions of an emerging field. However, the total neglect of how position of institutional entrepreneurs in social, organizational, and institutional location affects their skills make Fligstein’s theoretical argument less compelling (Campbell 2004).

However, apart from remaining at a relatively early stage of development, the literature on institutional entrepreneurship is somewhat fragmented. For instance, a lot remains to be done both in conceptualising institutional entrepreneurs, what constitutes institutional entrepreneurship, and what kind of an institutional environment enables or encourages institutionally divergent behaviour. Further, very few studies look at individuals acting as institutional entrepreneurs (Battilana 2006; Lawrence & Phillips 2004; Zilber 2002). Overall however, the key criticism directed at institutional entrepreneurship concerns the paradox of embedded agency.

The Paradox of Embedded Agency and Position in the Field

The theoretical paradox in the broad structure-agency debate is as follows: *How can actors envision and enact changes in institutions if their actions, intentions, and rationality are all conditioned by the very institution they wish to change?* (Holm 1995) While there are a number of suggested solutions to this theoretical puzzle, I concentrate here on two related solutions, which I consider the most central in the emergence of new fields.

The first solution stems from the definition where institutional entrepreneurs can be conceptualised to be able to *disembed* themselves from existing institutional arrangements (Beckert 1999). Such disembedding requires sufficient resources and high interest or motivation caused by an opportunity to realise something that the institutional entrepreneur values highly (DiMaggio 1988). Hence, a central challenge for the institutional entrepreneurship approach is to show *why, how, and under which conditions*

embedded actors are both enabled and motivated to change institutions (Seo & Creed 2002). Second, the nested-systems perspective makes a *distinction between action guided by institutions and action aimed explicitly at manipulating, changing or defending institutions* (Holm 1995). Along this perspective, institutions are considered as human products, created for some purpose, which may be changed if institutional entrepreneurs succeed in mobilising external and internal constituents behind them (ibid.). Hence, both solutions resemble the idea of structuration by Anthony Giddens (1984), which recognises the *mutually constitutive nature of structure and agency*. According to Giddens (1984:19), “the rules and resources drawn upon in the production and reproduction of social action are at the same time the means of system reproduction (the duality of structure)”. Field emergence can hence be thought of as a process of destructure and restructure, where destructure is the breakdown of traditional patterns of behaviour, belief systems etc., while *restructure* refers to attempts to put into place new logics and systems of governance (Scott et al. 2000). Moreover, both solutions seem to point towards the importance of position in the field vis-à-vis others to enable mobilisation of needed constituents behind an institutional change project.

A number of empirical studies underline the importance of interpersonal and interorganisational networks in showing that institutional entrepreneurs do not normally have enough resources to act alone, rather they need a group of proponents (Garud et al. 2002; Lawrence et al. 2002; Leca & Naccache 2006). Likewise, a recent body of literature emphasizes the collective mobilisation aspect of institutional change called ‘collective institutional entrepreneurship’ (Möllering 2007; Wijen & Ansari 2007). This approach stresses the process of overcoming ‘collective inaction’ (Wijen & Ansari 2007) and the necessity of gaining support from a wide array of actors for institutional entrepreneurship and market constitution. Also, Maguire et al. (2004:676) suggest a link between network and institutional entrepreneurship literatures in the following words “An important connection between our study and this work concerns the processes that institutional entrepreneurs use to theorize the changes they are proposing- assembling an array of arguments and establishing stable coalitions- two sets of activities that similar to those considered critical in managing interorganizational relationships (Gray, 1989).” Such an argument is in line with Aldrich and Fiol (1994), who suggest that the uniqueness of a pioneer organisation must be followed by the collective efforts of other actors in the emerging field to portray the new activity as familiar and trustworthy in

order for them to survive as a group. Only by understanding of the interaction between existing institutional systems and individuals acting as institutional entrepreneurs from specific network positions, may we reach a fuller understanding of institutional change and field emergence.

Hence, institutional scholars have identified various benefits for the integration of network theory with institutional analysis. Also, Meyer et al. (2005) contend that social networks are the key to the emergence of an organisational field. Connectedness between actors within a social system may provide clues on where institutional emergence or break down may happen (Hirsch & Lounsbury 1997) or how position in the structure of social networks provide access to new insights and resources (Aldrich 1999; Dorado 2005). Individuals and social networks act as ‘a connecting link’ and a ‘dynamic mechanism’ explaining the coevolution between firms, market structures and practices and wider institutional settings, i.e. what is often a ‘missing’ link (Djelic et al. Whitley 2005). The impact of network location is still insufficiently embraced within institutional theory, which considers networks as constraints or vehicles by which norms are diffused, resulting in isomorphic practices (Greenwood & Suddaby 2006). In the next section I discuss the role of network position in field emergence.

2.2 Social Network Position and Field Emergence

Recent decades have seen considerable advance in the understanding of how the network positions of firms impact their behaviour, performance and innovativeness (Shipolov 2006; Ahuja 2000; Powell et al. 1996). The central argument of the social network approach is that actors are embedded within networks of interconnected relationships that both enable and constrain their behaviour (Faust et al. 2004). The social-network model developed within sociology (Granovetter 1985, 1992) was primarily a critique of neoclassical economics with sole focus on rationality based on transaction-costs (Gordon & McCann 2000). According to Granovetter (1992:25) “*Economic action (like all action) is socially situated and cannot be explained by reference to individual motives alone. It is embedded in ongoing networks of personal relationships rather than carried out by atomized actors*”. However, besides such undersocialised conception, Granovetter (1992:32) cautions the other extreme of oversocialized view by continuing “[...] *nor do*

they adhere slavishly to a script written for them by the particular intersection of sociocultural categories they happen to occupy.”

The concept of network is an abstract notion referring to a set of nodes and relationships or ties between them. Nodes are actors, which can be organisations, units or individuals, whereas relationships can be either formal such as contracts or informal (Brass et al. 2004) such as personal contacts between two researchers (Bouty 2000). The unit of analysis in social network analysis is an entity consisting of a collection of individuals and the linkages between them (dyads, triads, or larger systems) not the individual as such (Wasserman & Faust 1994). Networks have traditionally been conceptualised as channels, conduits, pipes or ‘plumbing’ of the market through which ‘market stuff’ are transferred between actors (Kogut 2000; Podolny 2001; Powell 1990). The more recent sociological view of networks stresses that a tie between actors is not only a pipe conveying resources, but also an “informational cue on which others rely to make inferences about the underlying quality” of market actors (Podolny 2001:34). Indeed, in new field emergence ties to high status actors are crucial to reduce the high uncertainty involved and, thus, to increase legitimacy at the level of an organisation or the entire field. Of the four key functions of networks - learning, gaining legitimacy and status, improving economic performance and managing resource dependencies (Podolny & Page 1998) the first two in particular are crucial to field emergence.

Rather than using social network analysis methods, this research capitalises on the concept of structural holes (Burt 1992) which offers a great potential in furthering understanding on the mechanisms of field emergence at the intersection of established industries and spatial scales.

Structural Hole Argument

The structural hole argument is a theory about competition for the benefits of relationships (Burt 1992: 5). It is a theoretical metaphor which stresses the role of holes in social structure in creating entrepreneurial opportunities. Structural holes refer to the absence of connection between separate networks, resulting in different flows of information in the networks, hence a person belonging to otherwise disconnected

networks may connect and act as a broker between the separate flows of information (Burt 1992, 1997). Such connectors possess a “vision advantage” in early exposure to diverse information and a general political advantage as a hub in the information flow (Burt 2007) which both has central roles in creating new fields.

The argument of structural holes builds on the concepts that emerged within sociology in the 1970s: most notably White (1970) on the importance of gaps as opposed to ties in social structure and Granovetter (1973) on the strength of weak ties. Yet, Burt (1992) argues that the causal agent is not the weakness of a tie but the structural hole it spans, weakness is correlate, not a cause. Further, standing near structural holes in a social structure provides control benefits beyond information stressed by the weak tie argument. Hence, the concept of structural holes is a rather broad attempt to account for the potential benefits of specific boundary positions in social structure. A number of studies have shown the benefits from occupying brokerage positions between separate network partners both at individual and firm level (Burt 2007; Shipolov 2006; Hargadon & Sutton 1997). Shipolov (2006) complements the earlier studies in claiming that firms’ specialisation (generalist or specialist) can affect their ability to benefit from bridging activities across structural holes. His argument is that generalists are likely to be better positioned to take advantage of diverse types of information. Also, temporal dimension is crucial since network structures are relatively inert, implying that brokering positions are established early in the history of a network (Walker et al. 1997) or a field.

Owen-Smith and Powell (2004) suggest that *geographical proximity*, access to a common labour market, and central organisations committed to information sharing generate trust. Indeed, space as a notion of different geographical and institutional context is important, since field emergence is inherently multi-local phenomenon. The concept of structural holes is also applicable to analyse the interaction and mediating levels between different geographical spaces in field emergence. Spencer (2003) extends the structural hole argument into a spatial level by arguing that firms can act as global knowledge brokers and diffuse knowledge between various cross-national networks. Global gatekeepers are seen to absorb information from foreign firms and pass it to domestic actors. Global representatives, on the other hand, absorb information from domestic organisations and convey it to foreign actors. MNCs as well as other type of

multinational organisations such as intergovernmental organisations (IGOs) and international non-governmental organisations (INGOs) have a specific role in linking together localised processes of knowledge accumulation and bridging between otherwise disconnected actors and spaces (cf. Malmberg et al. 1996; Teegeen et al. 2004). Besides organisations, individuals may possess similar roles as bridges between spatial scales. Indeed, by becoming aware of alternative institutional rules and opportunities, knowledgeable individuals and organisations may more readily act as institutional entrepreneurs (Greenwood & Suddaby 2006; Sanders & Tuschke 2007).

Since individual and organisational attitudes and behaviour, as well as rules and regulations vary across industries and nations, it is interesting - if not necessary - to investigate multiple societal contexts in field emergence. However, organisational scholars (particularly those working with neoinstitutional theory) have largely neglected the cross-border nature of field emergence.

2.3 Spatial Scales and Field Emergence

The emergence of a new field is a multi-local process. In other words, it is difficult to think of new fields which are solely tied to a single locality. Even though scholars are relatively unanimous, for instance, that cross-national learning is crucial to new industry creation (Murtha et al. 2001), there have been surprisingly few efforts to study the interaction of spatial scales in field emergence. This section briefly elaborates two rather broad topics that are central to the emergence of new fields: spatial clusters and innovation commercialisation. While spatial clustering of innovative activity is typical to the early stages of new industries (Audretsch & Feldman 1996), the ability to operate in different institutional environments becomes crucial in the later commercialisation phase of innovations.

Spatial Clusters

Earlier empirical works show that new fields and industries (such as biotechnology and ICT) have largely developed in spatial clusters (Feldman 2005). Besides in the early stages of new industries, there appears to be a tendency for innovative activity and

production of complementary industries to geographically cluster in industries which share a common science-base (Feldman & Audretsch 1999, Audretsch & Feldman 1996; Breschi & Malerba 2005). While membership in a spatial cluster is not a requirement for succeeding in a new field, proximity lowers costs and risks such as gaining legitimacy and avoiding the liability of newness (Pouder & St. John, 1996). It may be expected that spatial closeness is particularly crucial when a new field emerges at the intersection of established industries and institutional logics, and hence, suffers from a deficit of legitimacy.

The role of spatial proximity poses a paradox in an era of rapid globalisation of business. While the mainstream international business research, particularly on MNCs, has raised doubts about the centrality of the locality for strategy and competitive advantage, Michael Porter, who popularised the concept of clusters, has instead stressed the role of 'home base' for the global firm (Porter & Sölvell 1998). Porter's conceptualisation of clusters as "geographic concentrations of interconnected companies and institutions in a particular field" (1998:78) stresses that both physical and human resources and local rivalry make specific sub-national regions advantageous as locations. The idea that spatial proximity of firms increase knowledge spillovers is old and owes much to Alfred Marshall's *Principles of Economics* going back to over 100 years where he notes in §3 (1961 [1920]: 225):

"When an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously...if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further ideas."

Gordon and McCann (2000) analytically divide between three models of processes which may underlie spatial clusters: pure agglomeration, industrial complex and social network. The pure agglomeration model corresponds largely to the quoted Marshall's work, based largely on Adam Smith's observation of labour specialisation and the increased local provision of industry-specific input and the maximum flow of information and ideas (ibid.). The pure agglomeration model assumes that markets are perfectly competitive and it ignores loyalty or relationships between firms. The industrial complexes are composed of sets of identifiable and stable relations among firms, where the benefits of

clustering derive from reduced ‘spatial transaction costs’ (Gordon & McCann 2000). The social networks approach originates from the sociological literature primarily that of Granovetter (1985, 1992) and builds an argument that clusters reflect not only rational economic responses but embeddedness in their social context or ‘social infrastructure’ (Saxenian 1994). Even though many cluster approaches do agree that formal and informal relations and more generally network effects are ultimately responsible for cluster dynamics, social network approaches typically use the tools and methodologies of network analysis and graph theory (Breschi & Marleba 2005). The conceptualisation of clusters as social networks enables analysis of micro-level emergence process of clusters by using social network tools. Even though the social network model is fundamentally aspatial, spatial proximity acts to foster trust relations (McCann & Mudambi 2004) and the acquisition of legitimacy central in field emergence.

Contrary to the traditional focus on internal cluster ties between actors, Amin and Cohendet (2005) argue for the simultaneous mobilisation of many geographies of reach and connectivity for cluster dynamics. Their approach is desirable, since unfortunately local versus global learning is often unnecessarily juxtaposed and separated rather than perceived as complementary (Coenen et al. 2004). In my view, the central vehicles or the glue between the local and global in science-based cluster emergence are epistemic communities. Indeed, clusters can be conceptualised as complex networks of professionals belonging to the same or related epistemic communities, i.e. groups of peers working on a common knowledge problem (Amin & Cohendet, 2005). However, current theorising on clusters is lacking empirical descriptions of what kinds of micro-processes lead to cluster emergence. Further, understanding on how innovations created within a cluster travel to a more global market place and relate to field emergence is unsatisfactory.

Diffusion and Translation of Innovations

Everett M. Rogers defines an innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” and its diffusion as “the process in which an innovation is communicated through certain channels over time along the members of a social system” (2003: 5,12). Diffusion scholars predict an adoption rate of an innovation through a concept of relative advantage referring to “a ratio of the

expected benefits and the costs of adoption of an innovation” (Rogers 2003:233). An innovation which has a particularly slow rate of adoption because individuals have difficulties in perceiving its relative advantage is a preventive innovation, i.e. “a new idea that an individual adopts now in order to lower the probability of some unwanted future event” (ibid.). This is due to the fact that the advantages tend to occur at some future and unknown time, hence, meaning a delayed reward. This is the case in cholesterol-lowering functional foods.

In a recent, interesting study of “nonspread” of innovations, Ferlie et al. (2005) contend that strong social and cognitive or epistemological boundaries between professional groups within an organisation slow innovation spread. In order to result into innovation diffusion, it might be expected that high boundaries should be broken down by strong actors who could thereby act as institutional entrepreneurs. A key task of institutional entrepreneurs in such highly structured settings is theorisation, as discussed before. Institutional differences between source and recipient localities may be suggested as a key explanatory factor for the nonspread or “nontravel” of innovations. Indeed, the extant literature is unanimous that organisations need to adapt to isomorphic pulls of the local or host country institutional environments in order to build legitimacy (e.g. Kostova & Zaheer 1999; Westney 1993, 1997).

More recent diffusion of innovations studies have developed from Rogers’ rather deterministic S-shaped adoption curves to more fluid, messy and interactive approaches (Ferlie et al. 2005; Djelic & Ainamo 2005; Van de Ven et al. 1999). For instance, a line of research advanced by Scandinavian scholars of neoinstitutional theory (“Scandinavian Institutionalism”) replaces the somewhat mechanical concept of diffusion by *translation* (Czarniawska & Sevón 1996). In translation, when a thing moves from one place to another it cannot emerge unchanged, and while the concept evokes symbolic associations at the same time it is stubbornly material i.e. “Ideas must materialize, at least in somebody’s head; symbols must be inscribed” (Czarniawska & Sevón 2005:9). Powell et al. (2005) show that the role of ‘primary carriers’ is critical in importing novel ideas for an organisation to consider, and leading the translation of those ideas into action. Transposed to the case of field emergence it may be hypothesised that institutional entrepreneurs act as primary carriers of ideas across various kinds of boundaries.

The profound understanding of field emergence necessitates understanding on barriers to diffusion and translation of novel ideas. However, institutional entrepreneurs may proactively try to transform existing institutions or create new ones, and thereby prepare better ground for field emergence. International business (IB) research with a specific focus on the MNC as an organisational form stresses the ability of MNCs to act as agents for institutional change in host-country and global institutions (Geppert et al. 2006; Dahan et al. 2006; Kwok & Tadesse 2006). Yet, neoinstitutional theory (and different variants of comparative and historical institutionalism) has tended to neglect the active and reactive roles that MNCs have in globalisation and transnational institution building (Geppert et al. 2006). IB research, which like institutional theory is an interdisciplinary field of study, drawing on sociology, economics, and psychology (Westney 1997), is well positioned to be of assistance in identifying actors linking local and global in field emergence and in evaluating the role of distance in field emergence.

Institutional Distance

The most traditional way of discussing institutions in international business research has been through the concept of distance. Much of the empirical work, however, narrows down the concept of distance to Hofstede's (1980) work on cultural value dimensions⁵ (Kogut & Singh 1988, for a recent reviews see Kirkman et al. 2006; Soares et al. 2007) which capture only very partially the dimensions of distance (Shenkar, 2001; Xu & Shenkar, 2002). The Nordic research streams and the concepts of 'psychic distance' (Johanson & Vahlne, 1977, 1990; Johanson & Wiedersheim-Paul, 1975) and 'business distance' (Luostarinen 1989 [1979]) extend beyond cultural factors and include factors such as language, education and level of economic development. However, none of the 'traditional' distance measures account for politics, ideology, law or other such societal institutions (Zaheer 2002; Gaur & Lu 2007).

Institutional distance (Kostova 1999; Kostova & Zaheer 1999; Kostova & Roth 2002), including regulatory, normative and cognitive aspects of institutions, offers a more comprehensive alternative to the dominant culture-based approach in international management and may be used to explain spatial challenges of field emergence caused by

⁵ Masculinity-femininity, uncertainty avoidance, individualisms-collectivism, power-distance and long-term orientation which was added later.

institutional differences. Kostova (Kostova 1999; Kostova & Zaheer 1999) builds on Scott's three pillars of institutions and develops a holistic measure for *institutional distance referring to the extent of similarity or dissimilarity between the regulatory, cognitive, and normative institutions of home and host countries*. When the institutional distance between two countries widens it becomes more difficult to understand and adjust to the legitimacy requirements of a host country (ibid.). In my view, such a holistic measure of institutional differences is a powerful tool in analysing field emergence, a process which is inherently highly uncertain. However, typically the investigations of the effect of institutional distance are limited to managerial practices or ownership strategies (Kostova & Roth 2002; Xu et al. 2004; Gaur & Lu 2007). Further, the recent study by Tempel et al. (2006) found that a country level institutional distance alone is not able to explain sectoral differences in legitimacies between two countries. Thus, industry level distance measures are needed to better understand the multi-local nature of field emergence.

2.4 Analytical Framework of the Study

As stated before, the objective of this research is to add understanding of the interaction between actors and institutions in the emergence of a new field at the intersection of established industries and spatial scales. Reaching of this objective necessitates analysing a complex moving 'target' composed of multiple levels and processes including mixes of agency and adaptation within and between different institutional systems. The analytical lens for such a complex system requires a framework encompassing multiple levels and allowing for constant dynamics and cross-border structuration typical to emerging fields.

Figure 3 below visualises the analytical framework developed for this study. The initial trigger for field emergence and institutional change may originate from a relatively universal issue or scientific and technological advancement (Greenwood et al. 2002), or be endogenous to a system (Munir & Phillips 2005; Greenwood & Suddaby 2006). Whatever the source of the change, actors, i.e. individuals, groups of individuals and different types of organisations, are both constrained and enabled (Giddens 1984) by existing institutions. Neoinstitutional theory maintains that institutions are relatively

stable and create isomorphic behaviour among organisations, and hence, higher level institutions put pressures for conformance for the elements below it. The constraining force of existing institutions is described with the top-down arrow directed to actors (individuals and organisations) in Figure 3. Yet, simultaneously counter-processes, through which actors shape the contexts they are embedded in, are at work. The institutional entrepreneurship approach (DiMaggio 1988) enhances our understanding of how motivated individuals (Lawrence & Phillips 2004; Battilana 2006) and organisations (Greenwood et al. 2002; Garud et al. 2002; Greenwood & Suddaby 2006) are able to identify new opportunities and actively manipulate existing institutions or to create new institutions. Such bottom-up structuration takes place e.g. through social networks. I depict this by the bottom-up arrow from actors to institutions.

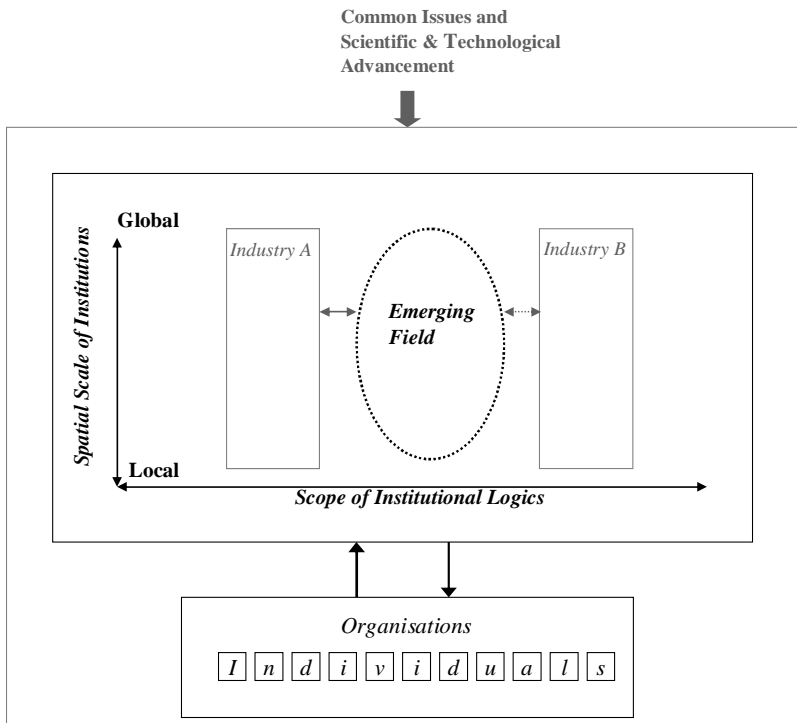


FIGURE 3 Analytical Framework of the Study

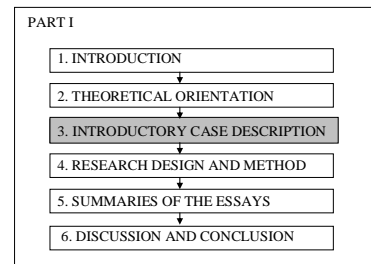
As discussed earlier, field emergence is multi-local by nature. Hence, actors in emerging fields are simultaneously embedded in multiple institutional environments.

This is depicted in the vertical axis titled *spatial scale of institutions*. The ‘global’ institutional environment, increasingly shaped by worldwide regulative, political, economic and social institutions (Geppert et al. 2006), provides the highest level for investigating field emergence, while local institutions (e.g. national and sub-national regulations and norms) the lowest level. Spatial effects are likely to be different during the emergence of a new field. While in the early emergence of science and technology-based fields spatial clustering is crucial for innovative output (Feldman & Audretsch 1999, Audretsch & Feldman 1996), the ability to operate in different institutional environments is central in the commercialisation of innovations. The greater the institutional differences that an actor faces, the more difficult it is for it to adapt to the legitimacy needs of the various host environments (Kostova 1999; Kostova & Zaheer 1999).

Actors are also embedded in multiple institutional logics (Friedland & Alford 1991). This is depicted in the horizontal axis titled *scope of institutional logics*. Broad scope of institutional logics adds complexity to actors’ operations but may simultaneously increase their innovativeness as they are exposed to novel ideas and institutions. In the case when a field emerges at the intersection of established industries, actors may face contradictory institutional logics, which may empower institutionally divergent behaviour. The absence of connection, i.e. structural holes (Burt 1992), between established industries may benefit those occupying boundary positions between them.

In sum, inspired by Scott (2001), this framework stresses the top-down and bottom-up processes in field emergence; the enabling and constraining implications of institutions and the interaction between local and global in field emergence. It analytically divides between sectoral and spatial gaps, the bridging of which remain to be addressed based on the four essays. The first two essays focus on the bridging of sectoral (and disciplinary) gaps, while the last two essays focus on spatial gaps. Further, the essays concentrate on investigating the interaction between actors and institutions of different spatial scale. Essay 1 starts from a spatial cluster level while Essay 4 closes with discussing the challenges in field emergence in a cross-regional setting and presenting a model of semi-global field emergence.

3 INTRODUCTORY CASE DESCRIPTION



Functional foods may be positioned between four key systems which all have strong effects on the field: the food industry, the pharmaceuticals industry, the public health system and regulation. Figure 4 below visualises the position of functional foods in the grey transition zone between foods and pharmaceuticals. This boundary position poses a cognitive challenge to food marketers, consumers, medical community and regulators (Brännback & Wiklund 2002; Lehenkari 2003). Scientific substantiation of safety and efficacy of functional foods is necessary to gain the support of the public health system and regulative authorities. Health care professionals and nutritionists also form a key target of marketing efforts within this product segment. Further, public heart health education conducted by public health institutes and various health associations is crucial for providing general awareness and legitimacy for these new types of food products.⁶ The rising health care costs of ageing populations obviously create limits for public health care systems, which again stimulate the interest of governments to actively support the field.

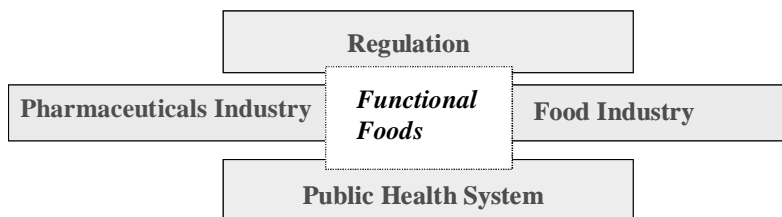


FIGURE 4 Position of Functional Foods between Four Systems

The four interacting systems also provide four distinctive perspectives to analyse the field. In order to gain a holistic understanding, I have interviewed a broad range of interviewees. The following quotes reflect how differently field participants perceive functional foods.

⁶ For instance, the cholesterol-lowering functional foods markets are particularly developed in Finland and Australia where investments in the public heart health education have been significant.

First, a food industry actor phrases:

“We are a brand that wants to make the world heart healthier. Of course we are a business, and we have to sell products, but ultimately we want to improve the heart health of people. We want to reduce cholesterol, through educating initiatives, through providing people with products...”

Thus, food manufacturers acknowledge their business drivers, but want to stress the health benefits for people for using these products. Second, a highly experienced public health professional notes that:

“From the perspective of public health functional foods are nice but only a spearhead. The composition of conventional food is more important- but they [functional and conventional foods] go in parallel in a way.”

Hence, public health actors see functional foods as a way to push conventional foods towards being healthier and see their role as important in raising the general awareness of people about the link between nutrition and health. Third, and not surprisingly, a pharmaceuticals marketing manager is more suspicious:

“What I consider as a key difference is that we are supported by scientific data while I consider the evidence behind functional foods very light- how they [functional foods] relate to terminal events such as a heart infarct.”

However, pharmaceuticals firms with their research and development expertise have also expressed interest in the functional foods category. Yet, different operating logics have caused major problems and for instance, the Swiss pharmaceuticals giant Novartis withdrew its Aviva functional foods business within a year of launch. Fourth, a regulative authority stresses its formal role in the following way:

“First of all we check whether we have a food product, which goes under the Novel Foods Regulation and then we evaluate its safety. We do not take any stance whether these food products are needed.”

At the centre of these four interacting systems are consumers and patients, whose needs, life styles and awareness have a clear impact on the viability of the whole field. Consumer and patient associations have their specific perspectives for functional foods, which are not specifically analysed in this research. On average, patient associations appear to have neutral or positive attitudes towards functional foods while consumer associations tend to take a more critical position. The rest of this chapter introduces the key terms and central issues from the four interacting systems in field emergence while

the essays provide more micro-level data from the perspective of individuals and organisations acting across the boundaries of these systems.

3.1 **Origins and Definitions**

The origin of the idea of combining food and medicine goes back to over 2000 years to Hippocrates' immemorial sentence: 'Let food be thy medicine and medicine be thy food'. Yet, only the advancement in nutrition science and technology during the last decade or two has provided the food industry with increasingly sophisticated methods to modify the physical structure and chemical composition of foods. This has resulted in redrawing the boundaries between food and medicine in numerous ways. Besides scientific and technological change, international competition, structural change (e.g. globalisation of retailing, increased cooperation along the value chain), and consumers' changing eating habits have driven the emergence of functional foods (Lagnevik et al. 2003). Since the identification of the relationship between nutrition and disease in the 1950s, governments and public policies have actively tried to modify food composition and consumers' eating habits (see Appendix 4).

'Functional foods' first appeared as an English term in a 1993 issue of *Nature* with the headline '*Japan explores the boundary between food and medicine*'. Nine years earlier, in 1984, a Japanese ad hoc research group had started a large-scale national research project under the sponsorship of Ministry of Education, Science and Culture (MESC) to explore the interface between the medical and food sciences. In 1991, the MESC project was followed by the policy initiative of Ministry of Health and Welfare to launch the world's first legal framework for the commercialisation of selected functional foods under "Foods for Specified Health Use" (FOSHU). (Arai et al. 2002). Hence, the government took an active role in building the field. A key enabler was clearly a philosophy of strong interconnections between food and medicine where the boundary between these was not well defined.

At most general level functional foods are any foods with a positive health effect. The International Life Sciences Institute (ILSI)⁷ defines functional foods:

“A food can be regarded as ‘functional’ if it is satisfactorily demonstrated to affect beneficially one or more target functions in the body; beyond adequate nutritional effects, in a way that is relevant either to improved state of health and well-being and/or reduction of risk of disease. Functional foods must remain foods and they must demonstrate their effects in amounts that can normally be expected to be consumed in the diet: they are not pills or capsules, but part of a normal food pattern.”

Cholesterol-lowering Functional Foods

In this study I concentrate on modified foods that have been enhanced with plant sterols and plant stanols, also called as phytosterols and phytostanols, and as a group as phytochemicals, which diminish the intestinal absorption of cholesterol. Even though cholesterol is necessary for the functioning of the human body, a high cholesterol-level, particularly that of low-density lipoprotein (LDL), is a major causal risk factor for heart disease and stroke (Hicks & Moreau 2001; Puska 2000).⁸ Heart disease is the leading cause of death in both high and low-income countries (WHO 2007). The symptoms of heart disease develop over many years and typically manifest themselves only in the late middle-age or old age, which necessitates education campaigns to raise the general cholesterol awareness. Typically, people who develop heart disease have one or more controllable risk factors which can be proactively eliminated or managed. Controlling the cholesterol level is one major way to prevent heart disease besides quitting smoking, losing overweight and increasing physical activity. Cholesterol-lowering medication has been the traditional treatment of high blood cholesterol-level. Statin pharmaceuticals (blocking cholesterol synthesis by the liver) dominate the medical treatment of high cholesterol and may lower LDL cholesterol by 30-50 percent, yet they may potentially have serious side effects (Berger et al. 2004).

One avenue for decreasing cholesterol level is the inclusion of foods based on plant sterols and stanols that lower LDL cholesterol (Devaraj et al. 2004). The structural

⁷ The International Life Sciences Institute (ILSI) is a non-profit, world-wide foundation established in 1978 to advance the understanding of scientific issues related to nutrition, food safety, toxicology and the environment. ILSI brings together scientists from academia, government, industry and the public sector and is affiliated with the World Health Organization. (Diplock et al. 1999:1)

⁸ (Coronary) Heart disease refers to a disease caused by atherosclerotic narrowing of arteries near or in the heart that often leads to a heart attack <http://www.americanheart.org/presenter.jhtml?identifier=3039342>

similarity between cholesterol molecules and plant sterols explains why they are able to reduce or even block the absorption of cholesterol from the intestine⁹. The serum cholesterol-lowering property of plant sterols has been known since the 1950s (Peterson 1951; Pollak 1953). In 1957 Eli Lilly introduced a cholesterol-lowering pharmaceutical containing sitosterol called Cytellin. However, due to poor solubility and bioavailability, doses were high and when statin pharmaceuticals became available, their use decreased rapidly. (Hicks & Moreau 2001). Finally in the 1990s the major breakthrough was made by the Finnish Raisio Margarine, which discovered how plant stanol ester could be incorporated into foods (Miettinen et al. 1995). A meta-analysis of 41 trials shows that the intake of two grams of stanols or sterols reduces LDL cholesterol by ten percent (Katan et al. 2003). The efficacy of plant sterols and stanols is similar, but the food form may affect LDL reduction (Katan et al. 2003).

Statin pharmaceuticals were launched in the marketplace around the same time as the first test results of the pioneering Benecol stanol ester concept were introduced at the conference of the American Heart Association in the U.S. in 1991. At that time there was, however, still significant concern and debate going on within the medical community about the association existing between low cholesterol-level and violent behaviour (including suicides). However, with the publication of two-to-three major statin studies in 1994-95 such concerns were lessened as it was shown that lower cholesterol decreases total mortality. Thus, even though the Benecol margarine was basically ready for market launch in 1992, the acceptance of such a food format would have very likely been low according to Ingmar Wester, vice president R&D, Raisio Benecol.

In terms of the safety of plant sterols, there are some observations of slightly decreased levels of absorption of other lipid soluble components such as vitamins and antioxidants such as β -carotene (e.g. Katan et al. 2003; Mensink et al. 2002). Beta-carotene is associated with some protection against cancer and heart disease. Further, while the absorption of sterol is about 10-15% in the intestinal tract, the similar figure is 4-7% for campestanol and 1% for sitostanol (Katan et al. 2003). Thus, there is some evidence that plant stanols are slightly safer than plant sterols since they are almost unabsorbed, and

⁹Cholesterol and plant sterols share identical ring structures as displayed in the Appendix 5 p.102. This explains why plant sterols can compete with cholesterol for absorption.

hence, pass unchanged out of the digestive system. Yet it remains uncertain whether consumers are able to understand such safety difference in already relatively complex food products. There are two main sources of the active components used in cholesterol-lowering functional foods: plant sterols and vegetable oil-derived sterols. Vegetable oil-derived sterols (soybean, rapeseed, palm, sunflower and corn oils) are used less in the EU since manufacturers need to prove the 'non-GM (gene manipulation) status' required by the EU's anti-GM stance.

In summary, plant sterol-based functional foods are a result of a long scientific and technological development process. Due to the complexity of the underlying science, and the lack of general awareness of their functionality, firms have made significant investments in developing the field.

3.2 Market Size and Firms¹⁰

The retail sales value of sterol-based functional foods (end products) was estimated to account for 670 million euros in 2005 of which Europe accounted for approximately 500 million, Japan around 100 million and the U.S. market for only somewhat more than 60 million euros.¹¹ Hence, in terms of the success of field emergence, Europe and the U.S. are the polar cases. Essay 4 of this thesis addresses the transferability of the cholesterol-lowering functional foods concept between these regions. Due to the importance of understanding both favourable and unfavourable conditions for institutional entrepreneurship and for the emergence of this field, this chapter will focus on describing field level components particularly in Europe and the U.S.

Firms Active with Cholesterol-lowering Functional Foods or Ingredients

Competition between actors active with plant sterols takes place in two segments: end products and ingredients. In terms of food categories, the market has evolved from yellow fat spreads into a wide range of dairy products, dressings, orange juice, and even to rye bread (see Essay 4 Appendix 1). Due to solubility problems, phytochemicals were

¹⁰ Unless otherwise indicated this section is based on the firms' Internet pages.

¹¹ IRI and AC Nielsen data and industry estimates by New Nutrition Business 2006 Vol.11 No.2

initially incorporated into nutritional fats. However, through technical developments the enrichment of low-fat foods with phytochemicals was found effective.

The cholesterol-lowering functional foods firms may be analytically divided into three categories. The first group of firms is formed by the suppliers of phytochemicals, which supply the raw sterol material or processed ingredient to other food manufacturers. Such actors include Archer Daniels Midland Company (ADM), Arboris, Cargill Inc., Cognis, Les Derives Resiniques et Terpeniques (DRT) Phyto-Source L.P., Forbes Medi-Tech Inc., Pharmaconsult Ltd., the Raisio Group, and Teriaka Ltd. Of these, the Raisio Group also manufactures and markets a range of end products with the Benecol® brand, while others provide only the ingredient. According to Frost & Sullivan, the three leading suppliers in Europe in 2005 were Cognis with 33% of the market, Raisio with 29%, and ADM with 17%¹². Second, there are big consumer goods firms that have diversified into functional foods, for instance, Unilever, Group Danone, CocaCola and Pepsico. Often these relatively global actors license or use other actors' ingredients, for instance Coca Cola uses Cargill's CoroWise sterols in its Minute Maid Heart Wise orange juice. Third, there are relatively small science-based firms, often university start-ups such as Triple Crown AB (Karolinska Institute is the major shareholder) in Sweden and MultiBene Group in Finland.

In the following, I will provide further background information on the four case companies of this study. These firms were selected for in-depth investigation because they form a good mix of major early actors who dominate the field (Raisio and Unilever) and small innovative followers (MultiBene and Teriaka). In Appendix 2 of Essay 4 (p. 246) a relatively full list of late entrants into the segment can be found. Such followers tend to possess new process solutions with fewer production phases; this enables them to compete in price against the early actors.

The Raisio Group, headquartered in Raisio, a city in south-western Finland, was originally founded by Finnish wheat farmers in 1939. The company specialises in plant-based nutrition. During 1986-87, the Raisio Group designed and implemented a strategy process where a decision was made to invest heavily in vegetable oil research in order

¹² The estimated value of the phytosterol ingredient market in Europe was around \$150 million in 2006 (Frost & Sullivan 2006).

to raise the image of the margarine segment. Via this strategy, the company began a research program on rapeseed oil, a by-product of its animal-feed business. The image of rapeseed oil was poor at the time in Finland, even though international research literature indicated the positive health benefits of its use. Raisio made major investments in a new pilot laboratory and factory, which were to become crucial in the later development of its functional foods ingredients business.

The ingredient business concentrates on developing, producing and marketing, sterol-based ingredients, most notably the Benecol® ingredient, a patent-protected stanol ester. Due to this patent protection all other actors use plant sterols or sterol esters. Rather than development of the 'functional foods business' the objective of Raisio was initially to raise the image of the entire margarine segment, as already discussed. Nevertheless, Benecol became "the colossus of the functional food world" (Heasman & Mellentin 2001). Benecol cholesterol-lowering functional food margarine was launched in Finland on November 16, 1995. Raisio licenses the Benecol brand and sells the ingredient to food companies worldwide. Initially, Raisio entered into a global commercialisation deal with the American McNeil Nutritionals, a part of the pharmaceuticals giant Johnson & Johnson. Subsequently, Raisio has gradually bought back the marketing rights to Benecol. As of the beginning of 2007, McNeil has marketing rights in North America, Ireland, the Benelux countries, France, and the UK. The pioneer position has also necessitated significant investments in research. Over 40 clinical trials have proved the cholesterol-lowering effect of plant stanol ester. The estimated value of all Benecol sales for 2006 was 250 million euros. The company has faced several hurdles, ranging from regulatory matters to market building, when acting as the pioneer in the field. In the recognition of Raisio's achievements, Frost and Sullivan dedicated its 2006 Brand Development Strategy Leadership Award to Raisio Benecol (Frost & Sullivan 2006). Raisio (Benecol) and Unilever (Flora/Becel/Fruit d'or pro.active, Take Control in the U.S.) both possess an approximately 30 percent share of the global end product market.

Unilever is the Anglo-Dutch consumer goods manufacturer that was established through the merger of British soap and Dutch margarine companies in 1929. Unilever has long invested significantly in nutrition and health research. The Unilever Food and Health Research Institute located in the Netherland, comprises 450 experts from 40

nationalities. The institute works closely with Unilever's global nutrition network, consisting of nutrition experts teaming up with local authorities and customers. Unilever quickly followed Raisio's Benecol launch with its plant sterol based Flora pro.activ. In fact, Unilever was first to launch its Take Control cholesterol-lowering margarine in the U.S. on April 30, 1999, just ahead of Raisio. Ever since, the two firms have built the market side-by-side.

The MultiBene Group¹³ is a start-up company founded by Professor of Pharmacology Heikki Karppanen at the University of Helsinki (Finland). In 1996, Professor Karppanen invented the MultiBene® ingredient which combines plant sterols with calcium, potassium and magnesium. The ingredient promotes blood pressure and bone health besides reducing blood cholesterol levels. It therefore represents a multifunctional concept, a type of second generation of cholesterol-lowering concepts. This family business follows a strategy of licensing the MultiBene Technology to major players worldwide such as the General Mills in the U.S., Glanbia in the Ireland, and Nestlé in Singapore.

Teriaka Ltd. is a subsidiary of the Finnish Paulig Group, specialising in coffee, seasoning and ethnic foods. In close cooperation with the University of Helsinki, Teriaka has developed a cost-effective process for producing a cholesterol-lowering ingredient called Diminicol®. The ingredient is a semisolid mass where plant sterols are partly dissolved in microcrystalline form. Diminicol is said to be significantly cheaper than most other sterol ingredients as the process does not include the costly esterification process or any chemical reactions. The Swedish dairy company Skånemejerier is the first European firm to launch a cholesterol-lowering food containing Diminicol.

Besides late entrants mimicking the earlier innovations, a sign that a field has emerged is field specific regulation. Indeed, regulation and regulative agencies have a crucial role in functional foods as such novel types of foods are under strict regulation. Nevertheless, there are major differences in the regulative systems depending on the market area.

¹³ MultiBene Group uses also Pharmaconsult Ltd. as its business name.

3.3 Regulatory Framework of Functional Foods

The key regulatory issues for functional foods concern pre-market approvals and health claims in product packing, i.e. “any representation that states, suggests or implies that a relationship exists between a food or nutrient or other substances contained in a food and a disease or health-related condition” (Codex Alimentarius Commission 2004, p.1). From a global perspective, Japan has the most advanced system for regulating functional foods along with the FOSHU (see p. 49). The U.S. regulatory framework comprises two major possible regulative paths for gaining pre-market approval for functional foods: the food-additive path and the dietary-supplement path.¹⁴ In the food additive path, manufacturers are required to obtain pre-market approval by filing a food additives petition or by demonstrating that the ingredient is “Generally Recognized as Safe”. Another route involves submitting the product as a dietary supplement under the Dietary Supplement & Health Education Act, hence bypassing the approval requirements needed for food additives. This procedure involves simply filing a notification letter, including proper data and clinical test results, with the FDA 60 days prior to launch of the product or ingredient. In the Nutrition Labelling and Education Act of 1990, the FDA was authorised to allow certain health claims in food labelling. Currently, the FDA has approved 14 health claims. In 2001 FDA authorised the claim “Plant sterol/stanol esters “may” or “might” reduce the risk of coronary heart disease” (FDA 2006). In summary, even though the U.S. regulatory system is complex with alternative approval routes and confusing names for claims (depending on the strength of scientific evidence), most of the actors interviewed had good words to say about the transparency of the system.

The EU Novel Foods and Novel Food Ingredients Regulation [(EC) No 258/97] was adopted in 1997 to apply to all foods that do not have a history of significant consumption in Europe prior to 1997. The regulation stipulates that all novel foods are subject to a pre-market safety assessment. Also in the EU, the novel foods must follow one of two potential regulatory paths. This means either a full safety assessment through a Community procedure or “in the case of novel foods and novel food ingredients which are substantially equivalent to existing foods or food ingredient a simplified procedure

¹⁴ Also a pharmaceutical path is possible, but that would in practice mean many more expensive years for clinical tests.

should be provided for” (EC No 258/97). In the full-assessment, a company wishing to market a novel food within the EU is required to submit a proposal to the food and safety authority in one of the member states. This expert body, consisting of subject matter experts i.e. scientists, then prepares an ‘Initial Assessment Report’ on the safety of the product, which is then delivered to the respective authorities of other EU member states, which must be returned to the Commission within 60 days. In the case of disagreement over market approval (which according to an informant has always been the case when assessments have been positive), the European Food Safety Authority (EFSA)¹⁵ will submit a draft resolution for the European Commission to decide. Out of 71 applications made between May 1997 and October 2006, only 26 novel foods were approved for commercialisation¹⁶. Since the pioneering Benecol margarine was launched within the EU in 1995 before the enforcement of the regulation, Unilever’s Flora pro.activ margarine was the first cholesterol-lowering product of its type approved by the Commission in 2000 (See Essay 4 Appendix 1). In the case of the ‘fast track’ i.e. if there is a substantially equivalent product or ingredient already in the market place the notification procedure applies. By January 24, 2007, in total 56 notifications had been made, merely relating to plant sterols.¹⁷ This means, that late adopters may take advantage of the approvals and work done by early innovators. Interestingly, half of the notifications are filed within the Finnish Novel Foods Board (NFB) (see Essay 4 Appendix 2).

As regards to health claims, there was no harmonised legislation in the EU before 2007 rather claims were dealt at a national level. In 2006, the European Parliament voted for a union-wide, simplified procedure for nutritional and health claims. Claims referring to the reduction of disease risk and to children’s development and health will have to go through a claim specific approval process. Concerning nutrition claims, a register of health claims is to be compiled allowing manufacturers who wish to introduce a product with a particular claim such as ‘helps to maintain healthy cholesterol’ to simply consult the register held by the European Food Safety Authority (EFSA). The Article 4 in

¹⁵ EFSA was established by the European Parliament in 2002 following a food scares of the 1990’s a loss of confidence by the European public. <http://www.efsa.europa.eu>

¹⁶ http://ec.europa.eu/food/food/biotechnology/novelfood/index_en.htmh

¹⁷ http://ec.europa.eu/food/food/biotechnology/novelfood/notif_list_en.pdf#page=42

nutrition profiles stipulates that foods carrying a health claim have to conform to nutrition profiles with upper limits for sugar, salt and fat content. Hence, it is unlikely that EU will approve food categories such as sweets approved in the U.S. The new regulation has entered into force on July first, 2007.

To synthesise, the prior nationally based regulative system has evolved into a relatively tightly coupled EU-level system. Despite of the inter-continental differences, different regulative systems do share also similarities. The U.S. and the EU regulative systems and their dynamics are further elaborated in Essay 4.

3.4 Spatial Clusters in Functional Foods

One of the interesting phenomena in functional foods, like in many other science-based fields, is the concentration of innovative activity in a relatively few spatial clusters. The most important functional foods clusters are in Finland, the Öresund region (Denmark and Scania in southern Sweden) and Canada¹⁸. Typically, the Nordic clusters on the southern parts of Finland and Sweden are identified as the strongest and most dynamic spatial agglomerations (Lagnevik et al. 2003).

Finland. Two critical events which took place in 1995 were central in triggering the emergence of the functional foods cluster in Finland. First, was the successful commercialisation of Benecol in Finland. It acted as a success story and as a seed for a cluster. Still, the roots of Benecol innovation go back in history to the 1970s. In 1972, ‘the North Karelia Project’ was launched in the province of North Karelia in Eastern Finland that was at the time suffering from the world’s highest coronary heart disease mortality rate among working-aged men. The severe local health issue in North Karelia became a significant trigger for Finnish nutrition-and health- related research¹⁹. Second, at macro level, a key impetus for naming functional foods as among the strategically important sectors of the Finnish economy was the country’s EU membership, which opened the market which was previously protected by high import barriers. In order to

¹⁸ Strong functional foods clusters exist also in Australia and New Zealand.

¹⁹ By 2002 the age-adjusted coronary heart disease mortality rate had fallen over 80 percent in North Karelia from the pre-program years. Hence, the project is frequently cited as the model for other international prevention trials. Today, such public health initiatives are increasingly carried out in developing countries and Asia.

smooth the transition towards an open market, the Finnish government decided to invest significantly in national food R&D in the mid 1990s. Two four-year technology programmes ‘Innovation in Foods’ (1997-2004) were coordinated by Tekes, the Technology Agency of Finland, the main public funding organisation for research and development in Finland. The aim was to develop new science-based health promoting foods and food ingredients, and promote Finland as “the Silicon Valley of functional foods”. These programmes created ground-breaking cooperation between the academy and the industry, and broadened the Finnish competence base in plant sterols, for instance, in financing the development of MultiBene and Diminicol concepts. In addition to Tekes, biotechnology department of the Technical Research Centre of Finland (VTT) was involved in two food related bioprogrammes during 1997-2004 and actively participated in EU level research networks. In 2005, the national level promotion of the field continued as the Finnish National Fund for Research and Development (Sitra) launched a five year programme to build an internationally competitive nutrition cluster in Finland, and the Academy of Finland started to prepare for a new multidisciplinary research programme.

The role of the Finnish public health authorities were crucial in triggering the early developments and, hence, contributing to legitimation for functional foods. Moreover, a high-level science base has been a major building block for developing radically new products. The role of a handful of pioneering, entrepreneurial researchers in both the public and the private sectors has been crucial in creating links between science and industry and acting as proponents of the emerging field. The initial birth took place within the existing institutional context of food industry and the public health system, where doctors and other health professionals had a strong role in legitimating the radically new concept. The University of Helsinki is the national ‘anchor institution’, while the Universities of Kuopio and Turku also have significant competences. Essay 1 of this thesis describes in more detail the Finnish cluster.

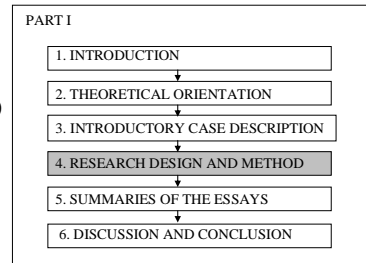
Öresund region. The Öresund food cluster stretches over two countries Sweden (Scania) and Denmark (Sjælland). Scania is home to nearly half of the Swedish food industry and as a whole the Öresund region is home to 11 universities (Lagnevik et al. 2003). The region has Scandinavia’s largest unit for academic research, Lund University and Swedish University of Agricultural Sciences. The region is ranked as

one of Europe's leading biotech areas, also known as 'Medicon Valley', and hence, is also building on the 'valley-metaphor'. Like in the Finnish cluster, support by the governments (Swedish and Danish) in the area of research, education and infrastructure is extensive, and the region is engaging in an active public health dialogue (ibid.).

Canada. As regards to the emergence of research competence on plant sterols, it is noteworthy that the Saskatoon cluster in Canada began its continuous program on rapeseed research in the mid 1940s (Coenen et al. 2006). In this respect, Raisio, who pioneered the segment of cholesterol-lowering functional foods, was a latecomer with its rapeseed oil research. Even today, the Canadian research community concentrated around the Saskatoon region is very strong. However, as stressed by a Canadian interviewee, a highly respected scientist, the major problem for developing this field is the stringent regulatory framework in Canada, which, for instance, does not allow any claims relating to the health benefits of functional foods.

To synthesise, spatial clusters are central in the early formation of science- and technology-based fields (Audretsch & Feldman 1996; Feldman & Audretsch 1999; Breschi & Malerba 2005). They act as a kind of forum or a bridge between scientists (and ideas emerging from the global science base) and industry. However, our current understanding of the micro-processes through which such clusters emerge in the first place is unsatisfactory. Essay 1 of this thesis discusses this critical issue and aims at a novel theoretical and empirical understanding of cluster emergence in relation to field emergence. Before the empirical analysis, the next section discusses the research design and method of this study.

4 RESEARCH DESIGN AND METHOD



A research design is the logic that links the research questions of the study to the data to be collected and the conclusions to be drawn (Yin 2003). It is important to notice, however, that a good qualitative research design uses a set of procedures that are simultaneously open-ended and rigorous and do justice to the complexity of the social setting under study (Denzin & Lincoln 2003; Flick 1998). Hence, since qualitative research is open to unanticipated events that necessitate contextualised judgement by the researcher, qualitative studies are often designed while they are being conducted (Gephart 2004). Indeed, as recently pointed out by Greenwood and Suddaby (2006), it is unnecessary to represent the research process, particularly data collection and analysis in qualitative research as neatly ordered and designed in advance of fieldwork. Rather because events are unfolding, a flexible research design and approach to data collection and analysis is more suitable as it enables capitalising on emerging issues. Such an approach is needed when studying field emergence, which is a highly dynamic phenomenon.

This research follows a *qualitative case study method*. *Qualitative* implies an emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity, or frequency (Denzin & Lincoln 2003). Qualitative research approach was needed due to my aim to understand a complex and dynamic research phenomenon where motivations and actions of various field participants were not immediately apparent (Greenwood & Suddaby 2006). A *case study* is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin 2003:13). This is the situation in field emergence where drawing the line between field participants and the context is necessarily somewhat arbitrary. Further, a case study allows in-depth inquiry, which survey methods often do not, offering increasing possibilities to find new links among variables, i.e. the discovery of new ideas and concepts (Glaser & Strauss 1973; Yin 2003). The case of the cholesterol-lowering functional foods is employed to identify

and illustrate conceptual ideas that have the potential to extend existing understanding and theories on field emergence (Siggelkow 2007).

A case study is both a process of inquiry and the product of that inquiry (Stake 2003). I follow a single case embedded case study design (Yin 2003) with three units of analysis: individual, organisation (including its innovation), and institutions. The case in this research is the whole emerging field, which is studied from the multiple angles represented by different actors. Hence, the case is singular, but it has subsections (Stake 2003) made of different organisational and individual actors and institutions where the actors are embedded across different spatial scales. An embedded design was selected since it enables a richer, more accurate theory by uncovering aspects of a phenomenon taking place at multiple levels (Santos & Eisenhardt 2006) as already discussed before.

The selected approach contributes to increasing calls for in-depth qualitative research both in neoinstitutional theory and IB (Lawrence et al. 2002; Marschan-Piekkari & Welch 2004; Parkhe 2004; Piekkari & Welch 2006). Indeed, in calling for more case studies on IB research Boddewyn and Iyer admonish (1999:169):

“Plain IB cases are abundantly available, but one has to turn to (poorly indexed) books and book chapters to find in-depth analyses of what developed in particular companies and industries- as if there was no room between pure conceptual/theoretical and quantitative articles. Most empirical research relies on secondary data/or questionnaire responses, with the serious problems associated with these sources.”

4.1 The Case Study Setting

The field of cholesterol-lowering functional foods was selected as the case context for studying field emergence for a number of reasons. Functional foods cut across the food and pharmaceuticals industries and are therefore subject to two contradictory institutional logics (Friedland & Alford 1991, See Chapter 3 for a detailed description of the field). Functional foods provides a rare and rich case study setting to investigate field emergence where the admission standards and rules of play are revealed and contested (Davis & Marquis 2005). Moreover, the emerging field could be studied from its inception as the early actors of the field could be interviewed to obtain first hand data on the early developments. Further, since the life cycle of the field covers decades rather

than years, it is possible to draw conclusions on the underlying causes and institutional change mechanisms. Finally, extensive secondary data allowed cross-checking of critical events and actors to trace field emergence reliably and fully.

Besides the delineation of a field being to some extent subjective (Greenwood et al. 2002), it is also evolving along the accumulating knowledge of the field by the researcher. I started the interviews from the key manufacturers of cholesterol-lowering functional foods. I soon realised, however, that inclusion of top university scientists and public health authorities was necessary in order to gain insights from the triggers, events, and circumstance under which the early series of events took place. Thereafter, I interviewed regulators, pharmaceuticals firms, a heart association and other field participants in order to gain a wider perspective. Overall, such a broad range of interviewees and perspectives contributed to a comprehensive view on the field emergence.

Since the emergence of a new field is a history of a past and present, a longitudinal research design with both retrospective and real-time data was used. I use three independent key sources of evidence: interview data, observation, and secondary data including the analysis of patent and publication databases. Interviews are the key empirical data source while observation was used only for supplementary evidence. The use of diverse types of data accounts for the recognition that any specific observation is subject to distortion and bias but together these diverse sources provide a more accurate interpretation of the actors, events and institutional environments (Scott et al. 2000). Since particularly retrospective interview data are susceptible to post-rationalisation, real-time observation and a wide variety of secondary data were added to increase the internal validity of the study (see appendix 3 for data sources).

4.2 Data Collection

Interview data

The interaction between actors, institutions and spatial scales was investigated from the perspective of European firms. This decision was motivated by theoretical interest on the early emergence, making pioneering European actors at the forefront of the field

more relevant for the purposes of the study. Such a focus also complements the traditional extension approach of environmental analysis in international marketing, which take the U.S. as their domestic counterpart for cross-country comparisons (Cavusgil et al. 2005). The case of cholesterol-lowering functional foods was a goldmine for a Finnish researcher, since the field emergence was triggered by Finnish researchers and firms. Being a Finn probably helped me to obtain access to the key actors and the first-hand data on field emergence from the actors who were involved in the early events. A common native language and cultural background further supported acquisition of rich data through interviews which were very open and inspiring. The time period of the field emergence (1970s onwards) created an exceptional opportunity to interview actors who played central roles also in the very early stage of institutional change.

The interview data consists of 32 semi-structured in-depth interviews carried out in Finland and the U.S. between late 2004 and April 2007 (see Appendix 1 for the list of interviews and Appendix 2 for an illustrative interview guide). Most of the interviewees were conducted in Finland due to the country's pioneering position within the field. The U.S. (and the UK and Canadian) interviewees were added in an attempt to understand why field emergence has struggled in the U.S.

Four categories of actors were interviewed. The first category was formed by university professors (medicine, nutrition, and pharmacology), national public health authorities and representatives of public research institutes. The second group consisted of managers of smaller start-up businesses, while the third group was made of large MNCs involved with cholesterol-lowering functional foods. These firm-level interviewees included managers of the Finnish MultiBene Group, Raisio Group, Teriaka Ltd (Paulig Group), and Fazer Bakeries and Anglo-Dutch Unilever as already mentioned (See Chapter 3 p. 52-55). These firms were selected to form a heterogeneous group of early pioneers, small innovative actors, large MNCs operating worldwide and business-to-consumers and business-to-business firms. Raisio's Benecol is the pioneer of the field and together with Unilever's pro.activ dominate the market. The fourth category 'other key field participants' included two managers of pharmaceutical MNCs, legislative and food safety authorities, a heart association and representatives of public and private financing agencies and external consultants.

Organisation type	N
Public research organisation	12
Start-up firm	4
MNC	8
Other key field participants	8
<i>Total number of interviews</i>	32

TABLE 3 Amount of Interviews by Organisation Type

The individuals interviewed typically represented the top management level of the selected organisations such as managing directors, marketing directors and global or country level brand managers. I chose this level since managers typically interpret and catalyse their environment to the rest of the organisation and present the organisation towards the external audience. Further, interviews with experienced pioneers of the field were preferred, i.e. those who are ‘on the front line’ and have ‘dirt under their fingernails’ (Johanson 2004). Access to the interviewees was gained through interview requests via e-mail and face-to-face discussions during seminars and fairs. Also, ‘snowballing’ was used in the later phases of the research where interviewees suggested additional interviewees whom they considered critical.

Interviews were conducted in the native languages of the interviewees in either Finnish or English (British and American participants). The interviews were conducted face-to-face, except for one which was a telephone interview. With the exception of two interviews which were conducted in noisy settings, all other interviews were digitally recorded and transcribed before actual analysis. Besides the transcribed texts, the interviews are stored in voice form in two separate places. In the two cases where a tape recorder was not used, the interview notes were enriched and supplemented with additional insights immediately after the interviews so that no important fact or opinion was lost. The interview sessions lasted between one and three hours, the median being approximately two hours, which altogether makes over 50 hours of interview recordings.

The interviews were semi-structured. In the beginning of each interview the participants were given an opportunity to ‘tell their stories’ without limiting the

questions too much. Such open ended questions encouraged respondents to say more in a descriptive manner (Flick 1998). Thereafter, more detailed questions were asked based on what the interviewee had said earlier or what were considered the key issues when planning the interview. The last interview conducted at the very late phase of the research was markedly different. The interviewee, Ingmar Wester, vice president R&D Raisio Benecol, is one of the scientists behind the Benecol concept. Hence, he was considered an excellent field insider to confirm or reject the analysis already made. The conducted analyses were delivered three weeks before the actual interview in order to give enough time to get acquainted with the material. This procedure enabled deep discussions of the events and actors involved in field emergence. The interview also provided some novel details and a new perspective on what drove the actual behaviour of the pioneering firm of this field as perceived by the interviewee. As a result, I was able to confirm the reliability of my initial analysis as well as enrich my overall understanding of the field, with which I was already deeply familiar. Respondent validation is elaborated more under the section validity and reliability.

Participant Observation

Besides interviews, participation in a number of seminars and workshops during the research project has enabled observation of the interaction between various field participants. Most notably, participant observation was undertaken within the Food and Nutrition Programme orchestrated by the Finnish National Fund for Research and Development (SITRA)²⁰ and in the Health Claims Seminar organised by the Finnish Food Safety Authority²¹. Even though participant observation is a minor source of data compared with the interviews and secondary data, its complementary nature as a kind of “everyday laboratory” has provided new insights and brought out attitudes and historical insights possessed by various types of actors. Participant observation was documented through field notes which have made possible later reflection. Furthermore, participation in the workshops has enabled access to various kinds of studies and draft documents which would have been otherwise inaccessible. These have been an important addition to the interview and secondary data. Finally, my

²⁰ October 4, 2005

²¹ December 12, 2006

earlier work experience as a consultant in the food industry has provided me with extensive background knowledge on the field.

Secondary Data

Besides a collection of written material such as industry reports, symposium materials, and legislative proposals, a trade journal analysis of *New Nutrition Business*, the longest-established journal on the business of food, nutrition and health, was conducted. The analysis covers the time period between April 1999, when the first cholesterol-lowering margarine was approved in the U.S., and October 2006. Trade journal analysis provides “a historical record of issues and events as perceived within an industry” (Hoffman 1999). Moreover, the United States Patent and Trademark Office’s online search engine and esp@cenet worldwide database of the European Patent Office were used in investigating the number of patents filed. Due to different classification systems and search possibilities, a major effort was made to build and cross-check the databases for ensuring data consistency. Patent data enabled analysis of institutionalisation of the cholesterol-lowering concept at the scientific and firm level. Furthermore, the U.S. Food and Drug Administration (FDA) Center for Food Safety and Applied Nutrition web service was utilised in investigating the emergence of the cholesterol-lowering functional foods market in the U.S. (Essay 4). Documents relating to health claims, petitions, and FDA response letters and talk papers were evaluated. The independent sources of evidence enabled the cross-validation of data and the collection of complementary data. While the secondary sources provided more documented analysis of a longer time period, the interview data reflected what interviewees considered central and their sensitivity to different institutional stimuli.

Comparative Data Set on Nanotechnology

Essays 2 and 3 included a comparative data set on nanotechnology collected by Nina Granqvist, a doctoral student from the Helsinki School of Economics. This data consists of 57 interviews and included researchers, representatives of large multinational companies and small start-ups in nanotechnology-related activities, representatives of public funding agencies and lobbying organisations, and venture capitalists. The interviews took place between November 2004 and June 2007. Granqvist also

conducted an analysis of 207 news stories on nanotechnology published during 1986-2000 in the top US newspapers and the transcripts of two US Congressional Hearings which took place in 1992 and 1999. Finally, a variety of publicly available documents, i.e. reports, books, presentations and transcripts related to nanotechnology form a further source of evidence. This comparative data set on nanotechnology helped in the mutual endeavor to find common and divergent characteristics for the emergence across the two science-based fields.

4.3 Data Analysis

The data analysis started during the field work phase to enable tight coupling between the empirical data and the emerging middle range theory. All interviews were followed by immediate reflection, preferably within a few hours. All interview tapes were transcribed and reread the same day or within the next few days after the actual interview. Thereafter, interviews were transferred to QSR NVivo 2.0, the software program for computer-assisted qualitative data analysis, which helped in familiarising myself with the data, and in the data analysis. Each interview created its own document in NVivo. Besides facilitating the organisation and analysis of large volumes of data, NVivo provided more rigour and traceability in the interpretation of interview results (Lindsay 2004). Except for Essay 2, all essays used NVivo to manage and analyse the data. Different nodes were created for different papers through open coding according to identified themes and conceptual categories of the specific essay. Later codes were refined if better codes became evident. Even though NVivo helped me familiarise myself with the data and manage them (coding and compilation), I did not rely on it for in-depth analysis due to the context specificity of each interview. Since the informants consisted of very different actor types it was necessary to interpret each transcribed interview in its historical and organisational context. Indeed, the drawback of software programmes is that they may guide the researcher towards a mechanistic approach to data analysis by fostering the illusion that interpretive work can be reduced to a set of procedures (Charmaz 2003; Moisander & Valtonen 2006).

As the analysis of the interview data progressed, I also sought to verify the emerging ideas by using secondary data sources. Secondary data was also used in the very early

phase of the research and in the planning of the interviews. In the comparative studies of emergence of functional foods and nanotechnology both within-case sequence analysis and cross-case pattern search between case similarities and differences was conducted (Eisenhardt, 1989).

The research process I followed can be characterised as highly iterative dialogue between existing theory and collected fieldwork data. In such an approach, the closing of the gap between data and theory can begin at either end (data or theory) and may often iterate between them (Orton 1997). Following such practices, I aimed to craft a ‘theorized storyline’ (Golden-Biddle & Locke 2006) where I strove for converting relevant components of theoretical approaches and collected fieldwork data into theoretical insights on the emergence of new fields. Echoing Langley (1999:694), “Rigid adherence to purely deductive or purely inductive strategies seems unnecessarily stultifying”. Hence, a position between inductive theory generation and deductive theory verification through continuously comparing existing theory, fieldwork data, emerging concepts and theoretical framework was taken. Dubois and Gadde (2002) refer to this continuous movement between the empirical world and the model world as ‘systematic combining’. Such an approach allows the flexibility needed in an exploratory study where the theoretical framework, empirical framework and case analysis evolve simultaneously. In sum, I rely more strongly on theory that is typical for inductive case studies or grounded theory building. Figure 5 illustrates this research approach.

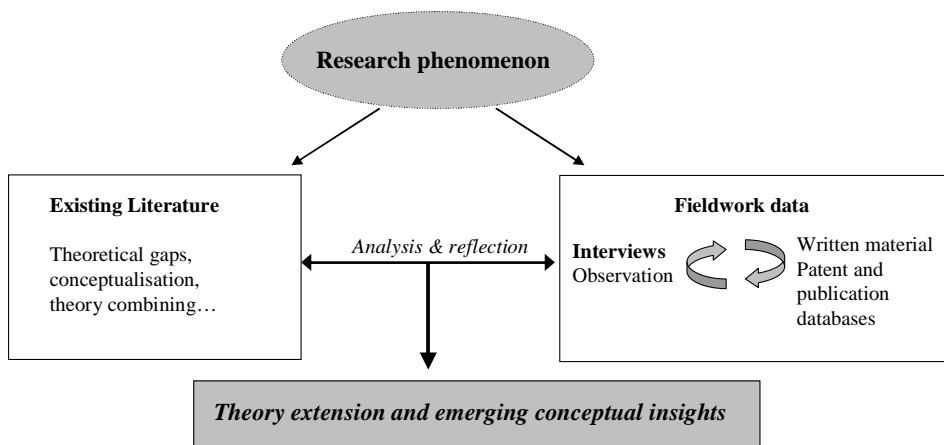


FIGURE 5 Research Approach

Writing Process

Rather than considering writing as a mode of ‘telling’, I also consider writing as ‘knowing’ - a method of discovery and analysis (Richardson 1994). Writing enables the discovery of new aspects of the research topic and may change the way to go about the research problem. Writing is also a process between readers and reviewers where actual output or text is a product of collective sensemaking (Golden-Biddle & Locke 2006). The contribution of my co-authors, colleagues and a number of conference and journal reviewers in validating theoretical ideas and concepts is gratefully acknowledged. Their contribution has been important in creating the theorised storyline of this research, i.e. in constructing a theoretically interesting and novel story from the data. Thus, writing which is perhaps often considered as the most ‘lonely’ part of the research process is a collective communication and negotiation process. Besides text, tables and figures are used to summarise the empirical evidence and to visualise the emerging conceptual ideas.

4.4 Validity and Reliability

Validity in qualitative research concerns the question of how far the researcher’s constructions are grounded in the constructions of those whom he/she studied (Flick 1998), i.e. whether ideas and concepts generated through my research form accurate representation of field emergence. As this question is difficult to answer, perhaps the most practical way is to assess whether the explanations given are credible. Yin (2003) suggests the use of *construct validity*, i.e. establishing correct operational measures for the concepts being studied, and *external validity*, i.e. establishment of the domain to which a study’s findings can be generalised, to assess the quality of exploratory case studies (2003). In terms of external validity, case studies are generalisable to theoretical propositions. Typically case study research is strong on construct validity as data is strong and “truthful”, but weak on external validity i.e. on generalisability (Ferlier et al. 2005).

I have addressed *construct validity* by using multiple sources of evidence as described above. Moreover, a chain of evidence was established by describing the data collection and analysis procedures in detail and digitally recording all interviews. Further, as

already discussed, I used respondent validation where the key informants reviewed and validated the empirical analysis for inaccuracy or incompleteness in order to ensure the plausibility of data analyses. Submitting drafts for review by informants is one of the most important forms of validation of qualitative research (Stake 2003). Since my interpretations are necessarily shaped by a particular socially and culturally conditioned knowledge and disciplinary academic knowledge (Moisander & Valtonen 2006), I took special care to ensure respondent validation with native interviewees of more alien cultures to avoid misinterpreting local institutions (Andersen & Skaates 2004). Respondent validation was done in a stepwise manner where those persons whose direct quotations were used were given the opportunity to comment on the analyses first. Respondent validation further enabled the building of rapport and interaction between the researcher and the interviewees.

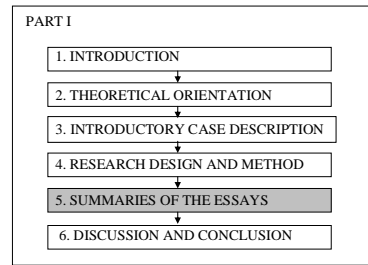
Investigator triangulation, on the other hand, is applied in order to address the *external validity* of the study. A comparative case study is conducted with the field emergence of nanotechnology in Finland. Essays 2 and 3 are co-authored with Nina Granqvist, as already discussed. The nanotechnology case was considered as an appropriate comparative case study context to investigate the multi-local nature of field emergence. While from the perspective of Finland, cholesterol-lowering functional foods is a story of global pioneering, nanotechnology is an account of local adopting, as the concept was largely adopted from the U.S.. This provided us with an interesting setting in which to study local and global influences in field emergence and how the characteristics of fields affect their emergence process.

Further, theoretical triangulation, i.e. using multiple theoretical and conceptual lenses in investigating field emergence, is used to strengthen external validity. However, since a paradigm is a net that contains the researcher's epistemological, ontological, and methodological premises, one cannot easily move between paradigms as overarching philosophical systems (Denzin & Lincoln 2003). Nevertheless, specific concepts and perspectives are less well developed systems and one may more easily 'bricolage' between them, thus, acting as *theoretical bricoleur* (ibid.). Gioia and Pitre (1990) argue that paradigmatic boundaries are perceived as conceptually permeable in 'transition zones'. Such transition zones are identified and capitalised upon in this research. The potential pitfalls of using multiple theoretical perspectives have been

actively avoided through reflective considerations of potential differences in ontological assumptions (See section 1.5.2).

On a general level, *reliability* refers to the repeatability of the study. According to Flick (1998) reliability as a criterion for assessing qualitative research is relevant only against the background of a specific theory; and frequently repeated data collection leading to the same data and results should be rejected. This does not mean, however, that the steps taken in the research should not be carefully described. Besides establishing a chain of evidence, using multiple sources of evidence and taking field notes, specific attention was paid to check and tailor interview guides prior to all interviews and to carefully select suitable respondents. Further, I conducted all interviews and observations myself, and this way secured closeness to the informants, which increases the reliability of the study. The next section positions the four separate essays conceptually and provides a summary of each essay.

5 SUMMARIES OF THE ESSAYS



In this chapter I summarise the four essays that comprise this thesis. The aim is to position the essays in the analytical framework (Figure 3 p.45), and hence, to explain how they address the overall aim and the research questions of the study. All essays concentrate on the bridging behaviour of individuals and/or organisations in the emergence of a new field as visualised in Figure 6.

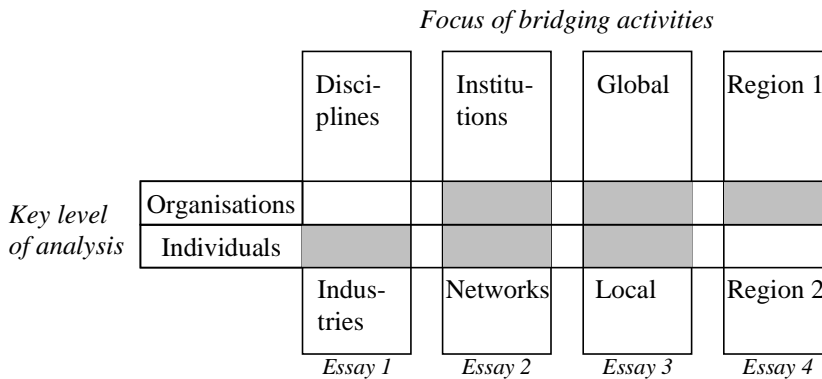


FIGURE 6 Positioning the Four Essays

The first essay focuses on how individual scientists bridge between disciplines and industries in creating the seeds for a spatial cluster in the early emergence of a new field. The second essay builds on the concept of structural holes (Burt 1992, 1997) to investigate how individuals and organisations bridge between previously separate institutions and networks in field emergence. The third essay investigates how institutional entrepreneurs mediate between globally circulating discourses and local institutions in the emergence of new science-based fields. The last essay describes the challenges that institutional entrepreneurs or pioneers may face when trying to transfer a new consumer concept cross national boundaries. The general flow of the essays

goes from identifying the central actors and their roles in the early field emergence towards an understanding of global influences and challenges in field emergence.

5.1 Summary of Essay 1

Ritvala, T. & Kleymann, B.: *Scientists as Midwives to Cluster Emergence – An Interpretative Case Study of Functional Foods*

This essay focuses on investigating the role of individual agency in the emergence of a spatial cluster. Hence, in this paper we particularly address the first sub-question of the study in a cluster context by asking “*How does a science-based cluster emerge and what roles do scientists possess along cluster emergence?*” In contrast to approaches where clusters are perceived as collections of atomistic firms, we stress the role of individual agency and institutional embeddedness in the emergence and sustainability of clusters. We argue that our current understanding of cluster emergence can be advanced by extending the coupling metaphor as a conceptual tool to investigate cluster dynamics both at micro and system level. After a conceptual discussion we proceed to a longitudinal case study of the emergence of a cluster of related actors in cholesterol-lowering functional foods in Finland.

Our results suggest that individual scientists enabled by their position in social networks, knowledge and legitimacy act to draw tightly together elements (individuals, organisations, knowledge bases) that would be otherwise loosely coupled or even decoupled. Hence, scientists act metaphorically as midwives to cluster emergence. We found that their network position enabled them to bridge between disciplinary, industry, and spatial boundaries. Based on our empirical analysis, we identify and propose a novel analytical classification of different roles for scientists along cluster emergence. These roles are interpreted from the perspective of institutional change. Further, drawing on our case study, we argue that the spatial proximity of related actors is crucial to field emergence as it enhances knowledge creation and sharing as well as legitimacy building. Even though we concentrate on a national-level cluster, our findings stress the importance of external links in emerging clusters.

This essay addresses the key research question of this thesis by depicting how scientists bridge between disciplines, industries and spatial scales in a spatial cluster setting, and in so doing also spark and catalyse the emergence of an entirely new organisational field. Theoretically, the essay contributes by extending the concept of institutional entrepreneurship (DiMaggio 1988) and coupling (Orton & Weick 1990; Weick 1976) to cluster context, and more broadly in using neoinstitutional theory to understand the phenomenon of spatial clusters.

5.2 Summary of Essay 2

Ritvala, T. & Granqvist, N.: *Institutional Entrepreneurs and Structural Holes in New Field Emergence- Comparative Case Study of Cholesterol-lowering Functional Foods and Nanotechnology in Finland*

We aim to understand how institutional entrepreneurs act as brokers to span structural holes to create new organisational fields. Institutional entrepreneurship is studied at the level of individuals and organisations. Hence, the focus of this paper is on the micro-level field structuration processes depicted in the analytical framework of the study. The research question addresses both sub-questions of this research by asking: *What characterizes early institutional entrepreneurs and their bridging behavior, and how does such activity contribute to the emergence of new fields?*

In this manuscript we combine the recent neoinstitutionalist literature with the concept of 'structural holes' (Burt 1992) from the network literature. We argue that during field emergence individuals and organisations play different roles as bridge builders over structural holes between hitherto unconnected fields and actors. Such pioneers of new fields may draw from their existing network positions and influence the emerging field level institutions. By drawing from a comparative case study of functional foods and nanotechnology in Finland, we provide rich insights into the characteristics of such actors, their bridging attempts and the outcome of eventual field emergence. Our findings indicate a strong link between developments at the national and global levels, for instance through the international migration of scientists acting as institutional entrepreneurs. After identifying different types of institutional entrepreneurs, bridging

activities and networks on different spatial scales we sequence these into a multilevel model of field emergence.

This essay contributes to the objective of this thesis by investigating the role of individual and organisational level agency in new field emergence, most notably in a national context. Conceptually, this essay captures the required changes or recombinations of existing institutions and networks when a new field emerges at the intersection of established industries. Overall, we add to the recent discussion on institutional entrepreneurship within neoinstitutional theory in a number of ways. First, we complement extant conceptualisation of institutional entrepreneurs as scientists who are able to work between disciplines and spatial scales. Second, this paper is probably the first to combine institutional theory with social network theory to understand field emergence, and among the first to bring the concept of structural holes to the institutional entrepreneurship approach (Greenwood & Suddaby 2006).

5.3 Summary of Essay 3

Ritvala, T. & Granqvist, N.: *Institutional Entrepreneurs as Mediators between Global Discourses and Local Institutions -Emergence of Functional Foods and Nanotechnology in Finland*

In this essay, we study the bottom-up and top-down interactions between local and global levels in the emergence of new science-based field, and hence, address the second sub-question of the study. More specifically, we ask *How do institutional entrepreneurs in science-based fields mediate between globally circulating discourses and the local institutions and competencies?* Our starting point is that further development of the institutional entrepreneurship approach necessitates investigating the emergence of new fields at the intersection of local institutions and global influences. Building on the complementary approaches of institutional entrepreneurship and Scandinavian institutionalism, we study the mediating activities of institutional entrepreneurs across spatial scales. By drawing from a comparative case study of a pioneering (cholesterol-lowering functional foods) and an adopting (nanotechnology) field, we contrast the activities and mediums used by institutional entrepreneurs in mediating across spatial scales. Finally, we develop a framework suggesting that institutional entrepreneurs in science-based fields are actors, who are able to operate

across spatial scales; and who create and mobilize counter discourses to prevalent discourses and embed them locally.

This Essay contributes to addressing the overall aim of this thesis by discussing how institutional entrepreneurs act as mediating agents between spatial scales in field emergence. This essay makes three distinct contributions. First, the study complements the understandings on the interaction between macro level emergence and micro level agency by discussing how local agents contribute to the macro-cultural discourses rather than merely using them as a resource. Second, we develop institutional entrepreneurship literature by investigating agency across spatial scales to address a weakness of the institutional entrepreneurship literature, namely the concentration on geographically distinct and delimited areas. Third, we focus empirically on the emergence of science-based fields, which are curiously understudied contexts for institutional entrepreneurship.

5.4 Summary of Essay 4

Ritvala, T.: *“Industry Level Institutional Distance and the Cross-Border Transferability of a New Consumer Concept.”*

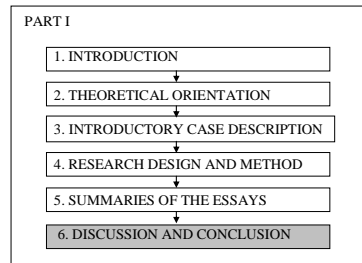
In Essay 4 I investigate the challenges involved in field emergence in a comparative research setting between the two major markets of functional foods: the EU and the U.S. By building on the concept of institutional distance (Kostova 1999; Kostova & Zaheer 1999), I discuss the impact of institutional differences on the cross-border transferability of a novel consumer concept. The research question motivating this essay is: *How can industry specific institutional distance be assessed in emerging fields?* The essay complements and contrasts with the other three essays which portray rather successful stories on field emergence in that here the challenges and failures in field emergence and the “nonspread” of innovations (Ferlie et al. 2005) are discussed.

I examine field emergence following a multiparadigm theory-building approach drawing from sociological neoinstitutionalism and international business research. Neoinstitutional organisational theory frequently discusses emergence in a single institutional context despite the fact that emergence takes place in multiple

environments. International business literature, on the other hand, possesses a long tradition of comparative studies and distance measures applicable in field emergence. Yet, traditional distance measures tend to be relatively static, and operate at country level. Building on the concept of institutional distance (Kostova 1999; Kostova & Zaheer 1999; Kostova & Roth 2002) I propose a dynamic, industry-specific concept of '*industry institutional distance*'. The concept is operationalised in a comparative case study setting between two regions: one where the field has successfully emerged and other where the field has faced significant challenges. With the use of traditional country-level distance measures such difficulties could not have been anticipated.

This essay contributes to the overall aim of this thesis in addressing the multi-local nature of field emergence. Furthermore, the essay contributes to existing literature by proposing a novel dynamic, industry (and field) level distance measure. It also discusses how industry level institutional distance may be one viable explanatory factor for the phenomena of semiglobalisation, i.e. incomplete cross-border integration (Ghemawat 2003b) and regional multinationals (Rugman 2005). Further, by using a longitudinal research design the study complements recent theorising on institutional distance which typically uses cross-sectional research methodology.

6 DISCUSSION AND CONCLUSION



The purpose of this chapter is to integrate the findings of the four separate essays and answer the research questions of the study. First, I answer both sub-questions of the study. In the subsequent section I build on the previous discussion and integrate the findings into a model of science-based field emergence, which answers the overall research question of the study. The aim is to provide an analytical model that describes field emergence at the intersection of multiple industries, disciplines and spatial scales. Thereafter, I discuss the limitations of the study and stress the context-specific, complex and messy process of field emergence. Finally, I discuss the theoretical and managerial contributions of the study and suggest paths for future research.

6.1 Central Actors in the Emergence of a New Field

The first sub-question of this study asked: *Who are the central actors in the emergence of a new field?* In essays 1-3 we showed that such actors often act as institutional entrepreneurs by challenging the earlier truths and by bridging between previously unconnected actors, knowledge and other resources. As discussed before, institutional entrepreneurs are typically conceptualised within neoinstitutional theory as interest-driven, aware and calculative actors who due to their location at the periphery of an organisational field (Leblebici et al. 1991) are motivated to change existing rules of the game (Greenwood & Suddaby 2006). However, the results of this study support the idea that central actors representing *scientific elites are central triggers and proponents of institutional change*.²² This study found that early institutional entrepreneurs in field emergence were scientists. Even though being an almost tautological finding in the context of science-based fields, this insight is novel within the institutional entrepreneurship literature. As to the best of my knowledge no earlier

²² Some recent empirical studies recognise central organisations acting as institutional entrepreneurs e.g. Greenwood et al. 2002; Greenwood & Suddaby 2006; Phillips & Zuckerman 2001; Sherer & Lee 2002.

attempt has been made to *conceptualise scientists as institutional entrepreneurs* in emerging fields or spatial clusters. The roles of scientists were found to change along both field and cluster emergence processes. In Essay 1, we maintained that rather than being associated solely with the discovery stage of innovations, scientists play key roles throughout the emergence process: *from triggering institutional change until advising legislators and the commercialisation of novel concepts* where the credibility of functional foods had to be created from scratch. Well-known scientists were legitimate sponsors of the novel idea due to their perceived objectivity and trustworthiness. In terms of the sequence, institutional entrepreneurs first needed to introduce radically new ideas within their epistemic community. This was highlighted by an interviewee when recalling the reaction of some member of the medical community to the initial attempts to prevent heart disease by claiming that heart disease is a “normal age related phenomenon, which can’t nor even should be tackled” (see Essay 3 p.196).

After the intra-community deinstitutionalisation of earlier truths, new ideas and beliefs started to diffuse and translate between communities. This necessitated a wide range of institutional entrepreneurs from different communities and in-depth cooperation between these. Such activities involved mobilisation of consumers at the grass-roots level until motivating powerful actors such as the food industry and public policy actors. The actual discovery phase of the cholesterol-lowering functional foods concept was characterised by a number of scientists from public and private side working in a network form. Hence, the *empirical evidence underlined that a new field emerges only when there is a collective effort* of a number of different types of actors cooperating with each other. Firm level actors with high risk taking capacity and financial and human investments were crucial, as were the support of governmental, intergovernmental and non-governmental organisations.

6.2 Building Bridges between Industries and Spatial Scales in Field Emergence

The second sub-question asked the following: *How do the central actors bridge between established industries and spatial scales?* One central finding of this study is that the ability of actors to bridge across different types of disciplinary, industrial and spatial boundaries is tightly connected to their *social network position, status and legitimacy*.

Bridging between Disciplines and Industries

The gaps between established industries (food and pharmaceuticals), and related disciplines were cognitive and social spaces between different rules, norms, and values. As already discussed, the initial bridge builders were typically scientists at both academia and industry that brought specific components of different logics under the same umbrella of functional foods (e.g. medical science of human lipid metabolism, disease prevention and treatment, food chemistry and engineering). Pioneering scientists acted as institutional entrepreneurs in mediating and translating new ideas. The ability of the key scientists to translate ideas, knowledge and practices from one sector to another was highly dependent on their network position close to structural holes.

The hybridisation of separate institutional logics into a novel emerging logic took place as a negotiation process between science, technology and the interests of various stakeholders (e.g. financial, public health, intellectual). Such negotiation processes took place in various types of projects during the field emergence (e.g. early sensemaking in the North Karelia Project, creation of the Benecol concept, crafting of the EU novel foods legislation). Since the form was to be food, the logics of food industry such as sensory qualities were dominant. Conducted consumer research confirms that the same dimensions behind conventional food choices also explain functional food choices (e.g. taste, pleasure, convenience) (Urala 2005). However, the central logics of the pharmaceutical side such as efficacy, clinical testing, and dosage were transposed into the functional foods context. Also, public health logics such as population level benefits and disease prevention were central in the novel field level logic.

Figure 7 visualises hybridisation of novel field level logics from earlier distinctive logics. The resultant novel logic is, thus, a composite of ‘sub-logics’ or ‘component logics’ from the different systems (e.g. P2 is recommended dosage).

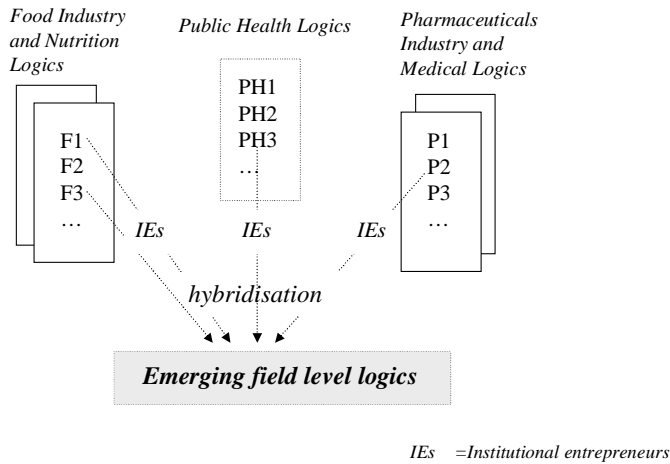


FIGURE 7 Emergence of a Novel Hybridised Field Level Logics

Burt (1992) argues that competitive advantage is a matter of access to structural holes. In the case of emerging fields structural holes by themselves are not enough, however. Instead, relational embeddedness (Granovetter 1992) and boundary-crossing competence of individuals and organisations is needed to enable the identification and combining of new knowledge. Given the internationally relatively small size of Finnish organisations, early scientists were required to possess a wide competence base which enabled them to see novel solutions at the intersection of separate disciplines and industries (Essay 1). The centrality of such a wide perspective was given as one explanation in addition to the severe local health issues by one key informant of the study when asked why it was in Finland that the pioneering concept was created. This finding suggests that *being to a degree ‘generalist’ rather than solely ‘specialist’*²³ may affect the ability of institutional entrepreneurs to benefit from structural holes. Further, the benefits of spanning across structural holes are counterbalanced by the costs of acting as a pioneer and facing legitimacy challenges necessitating high investments in

²³ See p. 38 of this study for Shipolov’s (2006) claim that generalist firms are better positioned to take advantage of structural holes.

awareness building. In fact, contrary to most consumer-oriented fields, the awareness and legitimacy for the field had to be built through health care professionals who act as opinion leaders and opinion formers and possess significant influence over how elevated cholesterol-level is treated or prevented.

In sum, it may be suggested that the early emergence of a novel science-based field is inherently tied to individual scientists who act like midwives to its emergence. In Essay 1 we found the strong role of individual scientists in the emergence of a spatial cluster. The identified scientific institutional entrepreneurs bridged between disciplines, established industries and created external links to an emerging cluster. We also found that science had a strong spatial concentration effect, which mainly resulted from the location of star scientists and the hub institution. Spatial proximity was found to increase communication and negotiation between multiple epistemic communities (e.g. in medical science and food and wood chemistry), and hence, it lead to enhanced knowledge creation and sharing. Further, spatial proximity was found to help in building legitimacy for the field that emerged at the intersection of established industries with very different operating and institutional logics. Hence, in narrow, cross-disciplinary science-based fields *spatial proximity of individual scientists contributes to innovation, which may simultaneously spark and catalyse the emergence of an entirely new organisational field*. Thus, the study finds early evidence that the same individual scientists may be central in the emergence processes of both science-based clusters and fields. This finding supports the idea of Feldman (2005), who argues for the pivotal role of entrepreneurial change agents in cluster emergence that is intricately interwoven with the evolution of industries. Hence, it seems plausible to suggest that cluster emergence may be conceptualised as local field emergence (see Essay 1 p.118). This argument is close to Owen-Smith and Powell (2004), who found that the heterogeneous organisational forms existing in biotechnology around the Boston region constitute a local organisational field. Conceptualising cluster emergence in relation to field evolution responds to the call of Martin and Sunley (2005:448) for “a cluster theory that situates cluster development within the dynamics and evolution of industry and innovation more generally”.

Bridging between Spatial Scales

Due to their formal training and the global nature of the underlying science base, scientists are typically particular skillful in working across spatial scales. Indeed, we suggested that the capacity of an actor to operate across spatial scales is an important capability that defines his/her opportunities for institutional entrepreneurship. In Essay 3 we discussed how institutional entrepreneurs in science-based fields operate across spatial scales by mediating between rather global macro-cultural discourses and local institutions. Besides the international migration of key scientists, their publishing and patenting activities were found central in bridging between local and global in field emergence. To conclude, *institutional entrepreneurs may be conceptualised as scientists who act as bridging (Greenwood & Suddaby 2006) and translating agents between disciplines, industries and spatial scales.*

In addition to scientists, intergovernmental and non-governmental organisations were found central in mediating discourses and legitimating novel ideas across spatial scales in field emergence. Also firm level actors were found to be central bridges between spatial scales. This bridging behaviour took place most importantly through the commercialisation efforts of MNCs. In Essay 4 different obstacles and institutional barriers to cross-border transferability of the new consumer concept were discussed. The finding that the success and form in which the emerging field took place varied significantly between the two studied regions (EU and the U.S.), points out the necessity of taking into account the multi-local nature of field emergence. It was shown how the pioneers of new fields are in a challenging position to introduce radically new concepts in highly differing institutional environments. It was argued that institutional distance (Kostova 1999; Kostova & Zaheer 1999) operating at the level of established industries and the emerging field itself, may explain a large portion of the challenges actors face when crossing spatial boundaries in emerging fields. *The larger the industry institutional distance, the more aware of institutional differences between home and host regions actors need to be and the more they need to promote (institutional) entrepreneurial acts.*

Besides consumers' awareness of the nutrition-disease link and cholesterol-lowering functional foods, the role of the medical doctors (MDs) and their socialisation of

medical institutions were found crucial. This was understood to be linked to the role and power of the pharmaceuticals industry in a society. Thus, tentative evidence was found that boundaries between professions (here MDs and nutritionists) are not spatially constant, and their permeability is instead embedded in local institutional base. Hence, it may be hypothesised that inter-community diffusion necessitates strong institutional entrepreneurship since cognitive and social boundaries between professionals are highly cellular, self-sealing, and institutionalised (Ferlie et al. 2005). While earlier research has stressed the “permeability” (Greenwood & Hinings 1996) or “plasticity” of professional boundaries (Greenwood et al. 2002), the empirical evidence of this study suggests that such permeability may exhibit significant variation depending on the spatial institutional context, hence, extending the findings of Ferlie et al. (2005). Overall, this finding stresses the importance of power besides legitimacy, which tends to be one-sidedly emphasised by neoinstitutional theory (Beckert 1999)²⁴.

In sum, similar to the idea that a new firm faces the liability of newness and a greater risk of failure (Stinchcombe 1965) also new fields and industries are under higher failure risk (Aldrich & Fiol 1994). The findings of my study imply that field level risk of failure is highly dependent on the spatial scale in question, and that such risk appears to be greater the more unknown the institutional environment is from the perspective of institutional entrepreneurs or pioneers of a new field. This finding suggests that in field emergence early actors face both the liability of newness (Stinchcombe 1965) and the liability of foreignness (Zaheer 1995) while building up the market. This multi-institutional embeddedness of field emergence appears to suggest that the stages of institutional change may be markedly different depending on the institutional environment. In the language of Greenwood et al. (2002) an innovation in an emerging field may either reinstitutionalise or become a fad or a fashion (or not even that) depending on the institutional environment it is embedded in. Hence, I argue that rather than one there are multiple field legitimacies and stages of institutional change within a field. To complement Scott et al. (2000) *novel ideas must find not only their correct time but also their correct place.*

²⁴ However, increasing amounts of institutional accounts do stress the role of power in institutional change (Hargrave & Van de Ven 2006; Reay & Hinings 2005; Oliver 1991, DiMaggio 1988).

6.3 Model of Science-Based Field Emergence

This section summarises the above discussion and thereby answers the overall research question which was formulated as follows: *How do new fields emerge from the interaction between actors and institutions at the intersection of established industries and spatial scales?* Based on the literature review an analytical framework was deduced that stressed both the enabling and constraining effects of institutions that actors face when operating at the intersection of established industries and spatial scales.

The characteristics and activities of individuals and organisations remained to be addressed on the basis of the empirical data. The four essays of this study investigated how agency in different spatial settings resulted in the emergence of a new field marked as an oval in the analytical framework. As discussed above and visualised in Figure 8 below, the identified scientists played the key roles as institutional entrepreneurs by bridging between institutional logics and spatial scales, and by mobilising a wide support base for the new field.

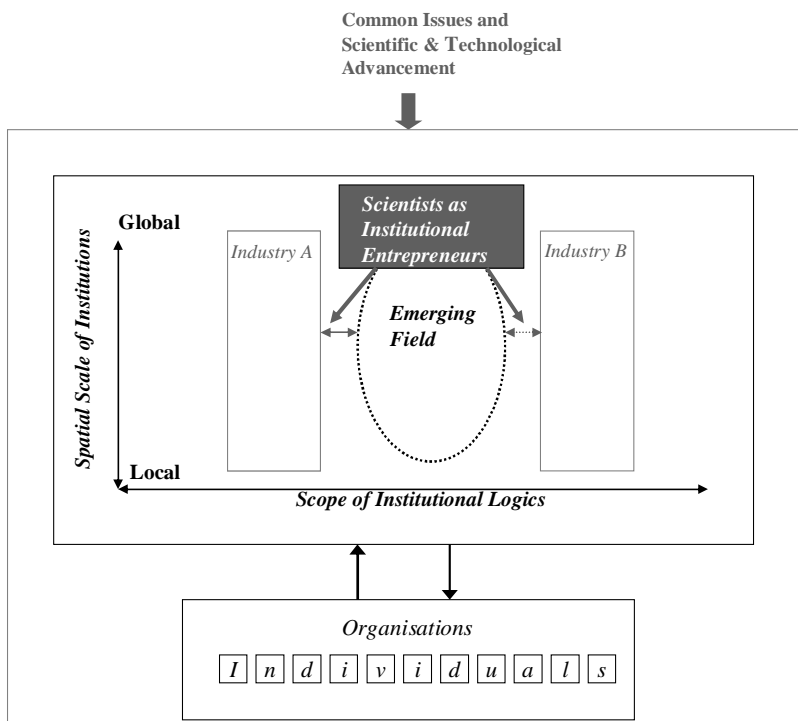


FIGURE 8 Analytical Framework Revisited (see original Figure 3 p. 45)

More specifically, it was found that central to field emergence are *institutional entrepreneurs who, enabled by their social network position, knowledge and legitimacy are able to translate and create new ideas and beliefs*. Through *network positions spanning structural holes* such pioneers of emerging fields were found to connect industries and related disciplines as well as spatial scales ranging from local to global as visualised in Figure 9.

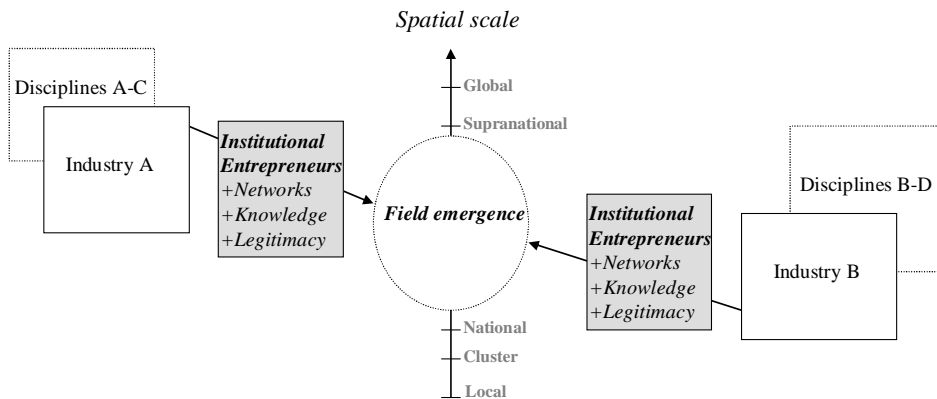


FIGURE 9 Model of Science-Based Field Emergence

Indeed, crucial for institutional entrepreneurs is the *capability to work across spatial scales and industry and disciplinary boundaries*. Further, successful field emergence necessitates *legitimacy and high status* for pioneering actors as well as the emerging field level. Legitimacy deficit and strong inter-industry pressures delay or may even prohibit field emergence. Thus, field emergence is highly dependent on the *environmental constraints* of the recipient environment.

Further, the emergence of a new field necessitates strong commitments by individuals and organisations. Commitments were found highly dependent on beliefs e.g. what is healthy, scientifically and technologically feasible or commercially viable. Beliefs in the novel concepts have to be first created within pioneering organisations. For instance, Ingmar Wester, the key inventor behind the technological breakthrough of Benecol, recalls in a recent interview: “Unilever would never have thought that we would be stupid enough to launch this type of product [so expensive] into the market”. Also Raisio’s own marketing management was suspicious about the price premium caused by

the expensive stanol ester ingredient. Thus, strong belief in novel concepts and their potential is one of the key factors driving the early emergence of a new field. Further, field emergence is always a collective process; early actors of the field must take the perspective of others into account in order to build a sufficiently large support base for the nascent field. To conclude, successful bridging behaviour of institutional entrepreneurs results in institutional change, which creates a base for the emergence of new science-based fields and related product markets.

6.4 Generalisability and Limitations of Findings

This study found some potentially universal features of field emergence. Essays 2 and 3 included a cross-case analysis for functional foods and nanotechnology in Finland. The identified central mechanisms of field emergence were found to operate to a large extent in the nanotechnology emergence. Both cases stressed the importance of individual agency in institutional change which was found to be highly dependent on a favourable network position and the high legitimacy and status of the actors themselves.

However, due to the earlier stage of the emergence of nanotechnology it does not appear so firmly rooted in a single industry as is the case for functional foods in the food industry. In fact, nanotechnology is peculiar as a field because it is a horizontal field of activity and its implications will extend across a wide variety of industries. Nanotechnology appears to be at a stage where different communities associated with it are negotiating about the meaning and boundaries of the concept. Especially companies are currently estimating its commercial potential, and a majority are waiting for inventing in nanotechnology to become more feasible. A further difference between these cases is that besides functional foods products being established as consumer products, cholesterol-lowering functional foods are anchored around the clearly defined heart health issue, which may make legitimacy building easier than in the case of nanotechnology, which is characterised by utter ambiguity. Due to these factors, the number of different field level actors in functional foods appears to be somewhat larger (e.g. consumer associations, patient associations, public health authorities, INGOs etc.).

Both investigated emergence cases are multidisciplinary science-based fields which may limit the applicability of the findings to similar type of fields. Besides these field specific features, the institutional environment of Finland appears to be far more supportive of boundary-crossing and novel ideas than is typical of many countries. Furthermore, the small size of the country and tight social networks through which field participants know each other either directly or through common acquaintances, is supportive for rapid emergence of new fields and clusters. It is very likely that becoming an institutional entrepreneur is also easier the smaller the country and the more confined the necessary base of support for an institutional change. Also, the strong position or even domination of one central media (newspaper and TV channel), enables the highlighting and spreading of specific issues effectively and with high coverage. Thus, more studies are called for on the role of individual agency in emerging fields and on the institutional conditions under which institutional entrepreneurship may lead to the emergence of new fields.

Besides context-specific aspects of field emergence, there are some important limitations of studying field emergence as a process, as well as studying the role of individual-level agency in it. These are discussed next.

When did the emergence process really start? One of the great challenges that a researcher of field emergence faces is how to identify the starting point for the emergence process. Where do you draw the line for the phenomenon to be studied? In the emergence process I investigated, in a sense the field started to take shape during the 1950s in the first international studies showing the cholesterol-lowering property of plant sterols. However, even though such roots were identified (Essays 2 and 3, see also appendix 4), it was considered that only the social, scientific and technological developments during the past couple of decades have enabled the emergence of the cholesterol-lowering functional foods field.

Clear stages or non-linear paths of field emergence? Besides the analytical division between key actors, their roles, and mechanisms of field emergence discussed in the previous section, it is tempting to answer the key research question by proposing distinctive phases of field emergence. Certainly, it is entirely viable to propose a stages model of science-based field emergence, and hence, to continue the line of argument of

Greenwood et al. (2002, See Figure 2 p.29). Such a model would, however, be less deterministic in the sense that the long emergence path of a science-based field is likely to include backward steps. Indeed, it would be misleading to describe field emergence as a linear and smooth process, rather different types of tensions within the medical community (see e.g. Essay 2 for the “great fat debate” p. 161) and occasionally also between the identified institutional entrepreneurs were present. Further, rather than characterising merely the deinstitutionalisation stage, institutional entrepreneurship was present in the other stages of the emergence of cholesterol-lowering functional foods, but was qualitatively different. This difference in kind was reflected in a shift of focus from institutional environment to task environment. This transfer is seen in the type of institutional entrepreneurs involved: from the early medical and public health scientists to firm level actors. Further, as already discussed, the stages and outcome of institutional change may differ significantly depending on the spatial scale in question. However, the inherent limitation in this type of phase models is that linearity and order may be more in the eyes of the researcher than in the messiness of the real life emergence of new fields. Such order may also result from retrospective bias or interviewees’ post-rationalisation of decisions taken. It is noteworthy, indeed, that some interviewees stressed that at the beginning there was no intention of building a ‘functional foods’ business. Rather the development process was driven by practical, everyday problems and competitive threats. Hence, field emergence appears to be both dependent on *strong individual and organisational agency and on non-linear serendipitous creation (Van de Ven et al. 1999) where lucky accidents and good timing rather than well planned agendas or strategies matter*. Local institutional entrepreneurship was tied to the global development at the time (e.g. macro-cultural discourse on the nutrition disease link). Further, market pioneering in a hostile environment (e.g. when low cholesterol-level was associated with violent behaviour, see p. 51) would certainly have made field emergence almost impossible.

Capable individuals or well-designed and orchestrated networks? The research findings of this study emphasised the significant role of specific individuals in the emergence of a new science-based field. However, I want to avoid simplistic “hero” or “great man” theories of invention depicting individual heroic tales behind an innovation or a field. Indeed, even though strong commitment and capability of central individuals were crucial, the final innovations were results of decades of work, scientific advancement,

and a wide range of actors. Consequently, the comprehension of field emergence necessitates understanding of both individual and collective institutional entrepreneurship (Möllering 2007; Wijen & Ansari 2007). What was special about the central institutional entrepreneurs was their *capability to build clever networks* enabling the combining of all bits and pieces of knowledge and resources needed for the development of novel concepts and technologies, as well as for building coalitions to solve the common issue (heart health). Thus, this study supports the earlier literature that argues that fields form around common issues when institutional entrepreneurs succeed in bringing together actors with disparate interests to build new institutions (Hoffman 1999; Hwang & Powell 2005; Wijen & Ansari 2007).

6.5 Theoretical Contributions

In this study I have investigated field emergence by using multiple theoretical lenses. Even though such theoretical bricolage has enabled making a number of novel theoretical insights, the strongest contributions are made to the emerging body of neoinstitutionalist literature on institutional entrepreneurship.

This study extends the discussion of institutional entrepreneurship in emerging fields (DiMaggio 1991; Garud et al. 2002; Lawrence & Phillips 2004; Maguire et al. 2004) into the context of science-based fields. By analysing the role of scientists in the field and cluster emergence processes, the study complements the few existing studies looking at individuals as institutional entrepreneurs (Zilber 2002; Boxenbaum & Battilana 2005; Battilana 2006; Trish et al. 2006). The discussion on scientists as institutional entrepreneurs able to work across spatial scales contributes strongly to the conceptualisation of institutional entrepreneurs and to the motives that drive their behaviours. In contrast to earlier conceptualisation of institutional entrepreneurs as interest-driven, aware and calculative, in this study I argue that scientists acted more spontaneously and were driven mostly by the search for scientific answers and by the common good. Besides scientists, also the pioneering firm was initially found to use an emergent rather than a deliberate, i.e. realised as intended strategy (Mintzberg & Waters 1985). Hence, this study follows Djelic's and Ainamo's (2005) criticism of the overly

rationalistic view on institutional entrepreneurs and studies on unintended consequences of institutional entrepreneurship (Khan et al. 2007; Hwang & Powell 2005; Rao 1998).

This study advances our understanding on how spatial scales interact in field emergence. It contributes by identifying different mediators used by institutional entrepreneurs in channelling knowledge and legitimacy between local and global. Further, it discusses the complex interaction between macro-cultural discourses and institutional entrepreneurship across spatial scales and complements the existing literature (Lawrence & Phillips 2004) by discussing how micro-level agency may contribute to macro-cultural discourses, rather than merely using them as a resource.

Also, by analysing field emergence across two regions, this study provides a unique comparative setting in studying field emergence and institutional entrepreneurship. Further, by focusing on the cross-border transferability of the new consumer concept, the study provides a complementary view on typical studies on institutional change and emergence which tend to focus on agency within a limited spatial setting. To the best of my knowledge, this study is among the first to introduce a multi-local perspective into the study of institutional entrepreneurship. The study also advances international business research with a novel institutional perspective to study industry-level dynamics. Building on the concept of institutional distance (Kostova 1999; Kostova & Zaheer 1999), I suggested the use of a novel dynamic and industry specific distance concept to analyse cross-border transferability of new field-level ideas. This concept responds to recent scholarly calls for bringing industry specificity into international business research (Dow & Karunaratna 2006; Ghemawat 2001, 2003; Ricart et al. 2004) and for more fully utilising the potential of institutional theory in the empirical research of international business (Geppert et al. 2006; Orr & Scott 2005).

Finally, the conceptual integration of structural holes (Burt 1992, 1997) with the concept of institutional entrepreneurship contributes by identifying one central mechanism in field emergence, i.e. how specific positions in social network structures enable behaviour as an institutional entrepreneur.

6.6 Managerial and Policy Implications

While the key focus of this research has been on the conceptual understanding of a complex phenomenon and thereby providing several implications for theory advancement, I have also sought to keep the other foot in the management problems faced under high uncertainty. The observations made along the research process have a number of managerial and policy implications.

First, to understand and really support the emergence of new fields and spatial clusters, managers and policy makers must consider individuals as the key units of analysis (Rosa 1998). This study stressed the centrality of visionary individuals who are able to work across various types of boundaries- be they disciplinary, professional, industry, or spatial by nature. The key challenge which emerges both at firm and spatial cluster level is how to keep knowledgeable individuals within organisations and regions. One route might be to identify and support such entrepreneurial individuals by promoting an atmosphere of freedom, cooperation and personal risk taking. Further, and importantly, the study pointed out the importance of building open-mindedly new networks across established industries and disciplines. Overall, a central policy contribution of this study was depicting how micro-processes of change led mainly by scientists may create a new industrial focus and internationally competitive business.

Second, the cross-regional analysis of field emergence showed that a field enjoying great success and legitimacy in one region, may indeed suffer from a legitimacy deficit in other contexts. A key issue from a managerial perspective is how to be able to anticipate such difficulties and what kind of institutional response strategies may be applied. In this study I proposed the use of a novel distance measure I termed *industry institutional distance* when planning and implementing market entry and development strategies. Besides helping in anticipating potential market development threats, this measure could be of help in identifying ways to proactively influence certain aspects of institutions. Obviously, rival explanations for the nonspread of innovations must also be considered, e.g. wrong decisions in pricing, product format, or alliance partner choices. However, in this case such explanations are unlikely to hold when taking into account that all actors have faced similar types of challenges in the U.S. while being extremely successful in Europe. Back in the late 1990s and the early 2000s when both Raisio and

Unilever failed with their U.S. entry and market development, market analysts commonly blamed the companies for unrealistic high price premiums and the wrong product formats. However, in late 2003 when the Coca-Cola Company launched its own cholesterol-lowering product²⁵ in the U.S. market, the owner of one of the most famous brand in the world failed to create a major business with the cholesterol-lowering concept regardless of the zero price premium. Hence, among the most important strategic considerations is how to identify key institutional enablers and inhibitors of field emergence. Practitioners should be conscious of such institutional differences, and develop response strategies such as the use of non-market strategies targeted at diverse type of stakeholders such as consumer advocates and INGOs. To conclude this section, the ability to see beyond the boundaries of disciplines and industries and to operate in different institutional environments is crucial in order to succeed in building new product markets.

6.7 Avenues for Future Research

In closing, the results of this doctoral thesis raise many interesting issues that need to be addressed in future studies. Due to the relatively recent scholarly interest in field emergence and institutional entrepreneurship, there exist numerous paths for future theoretical and empirical research.

First, together with Greenwood and Suddaby (2006) we took the first steps to combine institutionalist and network perspectives to better understand the ability of individuals and organisations to act as institutional entrepreneurs. Further investigations on the interplay between networks and institutions in field emergence, and in institutional change in general, are needed. One promising area of such cross-feeding between institutional and network approaches is the emerging concept of collective institutional entrepreneurship (Möllering 2007), which inherently includes a network aspect. Collective institutional entrepreneurship is needed in resolving complex social problems such as the climate change (Wijen & Ansari 2007), obesity and overweight.

²⁵ Minute Maid Premium Heart Wise orange juice enriched with Cargill's CoroWise plant sterols.

Second, we conceptualised scientists as institutional entrepreneurs of new fields. More research is needed on the role of scientists acting as institutional entrepreneurs and how they differ from other types of institutional entrepreneurs. Future research on institutional entrepreneurship should also address and define more explicitly the form and degree of institutional entrepreneurship involved. Further, as entrepreneurship literature recognises cases where individuals “happen into” their entrepreneurial role, future investigations could better elucidate transposition of such ideas to a wider conceptualisation of institutional entrepreneurship.

Third, in this study I provided some initial insights on how the hybridisation of separate institutional logics may result in the emergence of a new field. I hope to see future empirical studies and theory development on how spatial scales interact with such hybridisation processes. Finally, and related to the previous idea, this study was among the first to study field emergence and institutional entrepreneurship in a multi-local setting with a comparative research design. Additional data is needed and much theorising remains to be done in order to make more profound cross-border analysis of field emergence. Certainly, more cross-feeding between institutional theory and international business literature is called for in order to develop both paradigms. A better appreciation and understanding of the institutional factors enabling and constraining the emergence of new fields are needed to benefit both the research community and practitioners.

APPENDIX 1 List of the Interviews

<i>Name</i>	<i>Organisation</i>	<i>Position</i>	<i>Date of Interview</i>
Ezra Titta	Raisio Benecol Ltd.	Vice President, Marketing	Nov.17, 2005
Haarasilta Sampsä	Fazer Bakeries	Director, Research and Development	Oct. 9, 2006
Harkki Anu	Finnish National Fund for Research and Development (SITRA)	Executive Director	Sept.13, 2005
Haikonen Anne	Ministry of Trade and Industry	Special Advisor, Chairman of the Finnish Novel Food Board	Oct. 6, 2006
Heinonen Esa	Orion Pharma	Vice President, Research and Development, (On sabattical)	Oct. 10, 2006
Heinonen Marina	University Helsinki, Department of Applied Chemistry and Microbiology	Professor of Functional Foods, member of EFSA Panel on Dietetic Products, Nutrition and Allergies, Member of the Finnish Novel Food Board	Nov.15, 2006
Heiskanen Seppo	Finnish Food and Drink Industrie's Federation	Director, Research and Development, Food Law	May 24, 2005
Hinds Eva	Unilever Finland	Brand Manager, BeceI	March 31, 2005
Hopia Anu	Raisio Benecol Ltd.	Director, Asia & Oceania	Dec. 21, 2006
Hällsten Bengt	Teriaka Ltd /Paulig Group	Managing Director	March 15, 2005
Jenkins David	University of Toronto, Canada	Professor, Research Chair in Metabolism and Nutrition, Director of The Clinical Nutrition and Risk Factor Modification Centre	June 12, 2006
Karppanen Heikki	MultiBene Group, Institute of Biomedicine, Helsinki University	Chairman of the Board, Professor of Pharmacology	May 18, 2005 June 13, 2006
Karppanen Pasi	MultiBene Group	Export Director	June 13, 2006
Ketola Eeva	Finnish Medical Society Duodecim	Editor in chief, Current Care	Nov. 15, 2006
Kimmons Joel E.	Centers for Disease Prevention (CDC), Atlanta, U.S.A	Nutrition expert, Coordinator 5ADay	Aug. 16, 2006

Krazman Val Arthur	Finpro, Stamford, U.S.A.	Health Sciences Director	June 19, 2006 Oct. 10, 2006
McNair Kevin	Unilever Bestfoods, West Sussex, UK	Brand Development Director pro activ	June 20, 2006
Miettinen Tatu A.	Biomedicum Helsinki, University of Helsinki	Emeritus Professor of Medicine	March 15, 2006
Mäkinen-Aakula Marjo	Functional Foods Forum, University of Turku	Project Manager, ELO coordinator	Nov. 17, 2005
Mäyrä-Mäkinen Annika	Raisio Group	Vice President, Research and Development	Sept. 14, 2005
Nuotio Sirpa	Academy of Finland	Programme Manager on Nutrition, Food and Health	Oct. 6, 2006
Piironen Vieno	University of Helsinki, Department of Applied Chemistry and Microbiology	Professor, Food Chemistry, Member of the Finnish Novel Food Board	Nov. 15, 2006
Poutanen Kaisa	VTT Biotechnology (the Finnish Technical Research Centre) University of Kuopio/ Food and Health Research Centre	Research Professor, Food Technology	Sept. 9, 2005
Puska Pekka	National Public Health Institute - KTL	Director General	Oct. 20, 2005
Pättiniemi-Fagerström Liisa	Unilever Finland	Nutrition Manager, Nordic & Finland	Oct. 24, 2006
Rajala Anna-Liisa	Finnish Heart Association	Programme Director	Oct. 9, 2006
Raussi Tuula	Pfizer Global Pharmaceuticals, Pfizer Oy	Marketing Manager	Sept. 20, 2006
Rosi Liisa	Technology Agency of Finland, Tekes	Technology Specialist	Aug. 24, 2004
Vartiainen Erkki	National Public Health Institute	Professor, Department of Health Promotion and Chronic Disease Prevention	May 5, 2006
Wester Ingmar	Raisio Benecol Ltd.	Vice President, R & D	April 3, 2007

APPENDIX 2 Illustrative Interview Guide

Background Information:

Date of interview:

Place of interview:

Interviewee name:

Nationality/geographic location/unit:

Educational background/ scientific career (if applicable)

Organisational position (job title/function):

Years within the organisation:

History at organisation (current and previous positions & responsibilities)

Themes and illustrative questions

Personal Involvement with Cholesterol-lowering Functional Foods & Background

- Could you elaborate how you got involved with cholesterol-lowering functional foods?
- Can you identify different phases in the emergence of this field?
- The merging of nutrition, medical and public health science in functional foods

The Early Emergence of Functional Foods

- Who would you name as the key actors in the early emergence of cholesterol-lowering functional foods?
 - Individuals (e.g. scientists)
 - Organisations (e.g. research organisations, firms)
 - In what ways were they central?
- The role of public R&D financing (e.g. Technology Agency of Finland, Tekes) in innovation related to functional foods

Institutions

- *Regulative*
 - In what ways formal institutions (rules and regulations) support or hinder the emergence of cholesterol-lowering functional foods field? How does this reflect in your daily work?
 - the EU pre-market approval system
 - the novel EU health claims regulation
 - Possible response strategies (e.g. lobbying)

- *Normative*
 - In what ways do normative institutions (appropriate and accepted things to do) support or hinder the emergence of cholesterol-lowering functional foods field? How does this reflect in your daily work?
 - Possible response strategies

- *Cognitive*
 - How aware are consumers of the link between nutrition and health (cholesterol awareness)?
 - Variation between countries
 - The central communications barriers
 - Response strategies

International cooperation & institutional differences

- How much of your daily work is concerned with organisations or work tasks outside of your home country?
 - Key cooperation partners & areas of cooperation
 - co-publications & co-patents (if applicable)
- The main institutional differences across geographic markets

Additional key issues and comments

- Important themes not yet discussed

APPENDIX 3 Data Sources

Interviews: See Appendices 1 and 2.

Observation: October 4, 2005, Helsinki, Finland. Workshop on “Yritysten uuden liiketoiminnan kehittäminen ja pääsy kansainvälisille markkinoille” (on new business development and access to international markets) The Food and Nutrition Programme (ERA 2004-2008) orchestrated by the Finnish National Fund for Research and Development (SITRA). <http://www.sitra.fi/en/Programmes/era/era.htm>

+ Background material (delivered to the participants before the workshop, 7 pages)

+ Workshop report (delivered to the participants after the workshop, 14 pages)

December 12, 2006, Helsinki, Finland. Health Claims Seminar organised by the Finnish Food Safety Authority. Supported by the on-demand webcast of the European Food Safety Authority’s Health Claims Conference in Bologna November 8-10, 2006. <http://www.flyonthewall.com/FlyBroadcast/efsa.europa.eu/NutritionAndHealthClaimsConference/>

+ Draft report on health claims used in the Finnish market (delivered to the participants before the seminar, 171 pages)

Trade Journals: New Nutrition Business (the longest-established online and hard copy journal on the business of food, nutrition, and health) April 1999-October 2006. <http://www.new-nutrition.com> + other journals related to functional foods

Key Web Pages and Web Databases: Companies web-pages

Meeting memorandums of the Finnish Novel Food Board

<http://www.ktm.fi/index.phtml?s=76>

European Patent Office (EPO) esp@cenet Advanced Search Engine

http://ep.espacenet.com/advancedSearch?locale=en_EP

United States Patent and Trademark Office USPTO Online Search Engine

<http://www.uspto.gov/patft/index.html>

U.S. Food and Drug Administration (FDA) Center for Food Safety and Applied Nutrition

<http://www.cfsan.fda.gov/~dms/lab-qhc.html>

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=77ed7da9463357d9a09892213e5c74db&rgn=div8&view=text&node=21:2.0.1.1.2.5.1.14&idno=21>

(for health claims for plant sterol/stanol esters and coronary heart disease)

NCBI National Library of Medicine and the National Institutes of Health PubMed the publication database of medical sciences

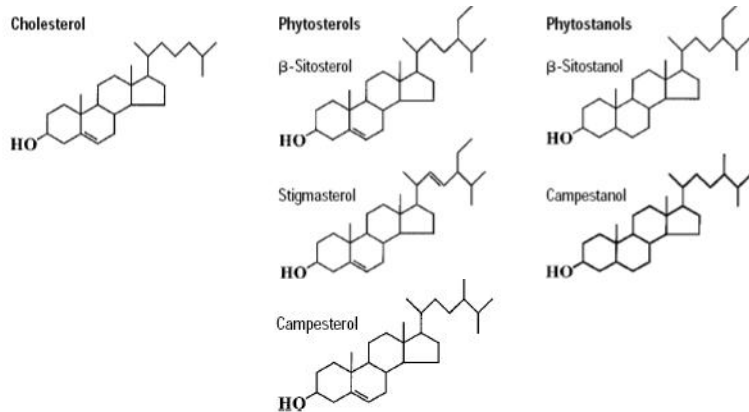
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?DB=pubmed>.

APPENDIX 4 Chronology of Key Milestones in Cholesterol-lowering Functional Foods

1950s	Relationship between nutrition and diseases identified.
Onward	Seven country study by Ancel Keys demonstrates the link between saturated fat intake and heart disease “the cholesterol hypothesis”
1953	Relationship between the use of sterols and reduced serum cholesterol-level proved by Pollak.
1969	US White House Conference on Food, Nutrition and Health-draws public attention to the links between diet and the risk of chronic disease.
1972	The North Karelia project (NKP) initiated as a community intervention
1976	Norwegian Government publishes dietary guidelines
1977	Dietary Goals published for the U.S. e.g. sets quantitative target levels for reducing fat, saturated fat, and cholesterol in the diet
1980	The Dietary Guidelines for Americans, the foundation of national nutrition policy published for the first time. Since then, an advisory committee appointed to review and revise the guidelines every five years.
1991	Early clinical trial results of Benecol released at the scientific meeting of the American Heart Association FOSHU system of self regulation allows health claims in Japan
1993	The English term functional foods created and lands into Europe
1994	Structure-function claims for dietary supplements without prior approval by FDA effective in the US
1995	New England Journal of Medicine publishes results that Benecol lowers LDL blood cholesterol by 14%, launch of Benecol in Finland
1997	EU novel foods regulation effective
1999	Benecol and Unilever’s direct competing product Take Control launched in the US
2000	Unilever launches Becel/Flora pro.activ in Europe
2001	FDA approves the health claim for plant sterol/stanol esters
2007	EU regulation for nutrition and health claims effective

Source: Compiled by the author and Heasman & Mellentin 2001

APPENDIX 5 Structures of Cholesterol and Common Phytosterols and Phytosteranols



Source: Hicks and Moreau 2001: 63

REFERENCES

- Ahuja, G. 2000. Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45: 425-455.
- Aldrich, H. E. 1999. *Organizations evolving*. Thousand Oakes, CA: Sage.
- Aldrich, H. E., & Fiol, C. M. 1994. Fools rush in? The institutional context of industry creation. *Academy of Management Review*, 19(4): 645-670.
- Almeida, P. & Phene, A. 2004. Subsidiaries and knowledge creation: The influence of the MNC and host country innovation. *Strategic Management Journal*, 25: 847-864.
- Amin, A. & Cohendet, P. 2005. Geographies of knowledge formation in firms. *Industry and Innovation*, 12(4): 465-86.
- Andersen, P.H. & Skaates, M.A. 2004. Ensuring validity in qualitative international business research. In R. Marschan-Piekkari & C. Welch (eds.), *Handbook of qualitative research methods for international business*. Cheltenham, UK: Edward Elgar.: 464-485.
- Anderson, U. & Forsgren, M. 2000. In search of centre of excellence: Network embeddedness and subsidiary roles in multinational corporation. *Management International Review*, 40(4): 329-350.
- Arai, S., Morinaga, Y., Yoshikawa, T., Ichiishi, E., Kiso, Y., Yamazaki, M., Morotomi, M., Shimizu, M., Kuwata, T. & Kaminogawa, S. 2002. Recent trends in functional foods science and the industry in Japan. *Biosci.Biotechnol.Biochem.*, 66(10): 2017-2029.
- Audretsch, D. B. & Feldman, M. P. 1996. Innovative clusters and the industry life cycle. *Review of Industrial Organization*, 11: 253-273.
- Baldrige, D. C., Floyd, S. W. & Markóczy, L. 2004. Are managers from mars and academicians from venus? Towards an understanding of the relationship between academic quality and practical relevance. *Strategic Management Journal*, 25(11): 1063-1074.
- Bathelt, H., Malmberg, A. & Maskell, P. 2004. Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography*, 28(1): 31-56.
- Battilana, J. 2006. Agency and institutions: The enabling role of individuals' social position. *Organization*, 13(5): 653-676.
- Beckert, J. 1999. Agency, entrepreneurs, and institutional change. The role of strategic choice and institutionalized practices in organizations. *Organization Studies*, 20(5): 777-799.
- Berger, A., Jones, P. J. H. & Abumweis, S. S. 2004. Plant sterols: Factors affecting their efficacy and safety as functional food ingredients. *Lipids in Health and Disease*, 3(5): 1-19.
- Boddeyn, J. J. & Iyer, G. 1999. International-business research: Beyond deja vu. *Management International Review*, 39: 161-184.
- Bouty, I. 2000. Interpersonal and interaction influences on informal resource exchanges between R&D researchers across organizational boundaries. *The Academy of Management Journal*, 43(1): 50-65.
- Boxenbaum, E. & Battilana, J. 2005. Importation as Innovation: transposing managerial practices across fields. *Strategic Organization*, 3(4): 355-383.
- Brass, D. J., Galaskiewicz, J., Greve, H. R., & Tsai, W. 2004. Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal*, 47(6): 795-817.

- Breschi, S. & Marleba F. (eds.) 2005. Clusters, Networks, and Innovation: Research Results and New Directions. In: *Clusters, networks, and innovation*. Oxford: Oxford University Press: 1-26.
- Bresnahan, T., Gambardella, A. & Saxenian, A-L. 2001. 'Old economy' inputs for 'new economy' outcomes: Cluster formation in the new Silicon Valleys. *Industrial and Corporate Change*, 10(4): 835-860.
- Brint, S. & Karabel, J. 1991. Institutional origins and transformations: The case of American community colleges. In W. W. Powell & P. J. DiMaggio (eds.), *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press: 337-360.
- Brännback, M., & Wiklund, P. 2002. Globalisation of functional foods: The emergence of new business systems. In N. Nummela (ed.), *Viewpoints on the economic dimension of globalisation*. Turku, Finland: Publications of the Turku School of Economics and Business Administration: 133-149.
- Buckley, P. J. 2002. Is the international business research agenda running out of steam? *Journal of International Business Studies*, 33(2): 365-373.
- Burt, R. S. 1992. *Structural holes: The social structure of competition*. Cambridge, Mass.: Harvard University Press.
- Burt, R. S. 1997. The contingent value of social capital. *Administrative Science Quarterly*, 42(2): 339-365.
- Burt, R.S. 2001. Structural holes versus network closure as social capital. In N. K. Lin, K. Cook & R.S. Burt (eds.), *Social capital: Theory and research*. Sociology and Economics: Controversy and Integration series; New York: Aldine de Gruyter: 31-56.
- Burt, R.S. 2007. Secondhand brokerage: Evidence on the importance of local structure for managers, bankers, and analysts. *Academy of Management Journal*, 50(1):119-148.
- Campbell, J.L. 2004. *Institutional change and globalization*. Princeton: Princeton University Press.
- Cavusgil, S. T., Deligonul, S. & Yaprak, A. 2005. International marketing as a field of study: A critical assessment of earlier development and a look forward. *Journal of International Marketing*, 13(4): 1-27.
- Charmaz, K. 2003. Grounded theory. Objectivist and constructivist methods. In N.K. Denzin & Y. S. Lincoln (eds.), *Strategies of qualitative inquiry*. Thousand Oaks, CA: Sage: 249-291.
- Clemens, B. W. & Douglas, T. J. 2005. Understanding strategic responses to institutional pressures. *Journal of Business Research*, 58(9): 1205-1213.
- Coenen, L. Moodysson, J. & Asheim, B. T. 2004. Nodes, networks and proximities: On the knowledge dynamics of the Medicon Valley biotech cluster. *European Planning Studies*, 12(7): 1003-1018.
- Coenen, L., Moodysson, J., Ryan, C. D., Asheim, B. & Phillips, P. 2006. Comparing a pharmaceutical and an agro-food bioregion: On the importance of knowledge bases for socio-spatial patterns of innovation. *Industry & Innovation*, 13: 393-414.
- Czarniawska, B. & Sevón G. (eds). 1996. *Translating organizational change*. Berlin, Germany: Walter de Gruyter.
- Czarniawska, B. & Sevón, G. 2005. (eds). *Global Ideas. How Ideas, Objects and Practices Travel in the Global Economy*. Malmö: Liber & Copenhagen Business School Press.
- Dacin, M. T., Ventresca, M. J. & Beal, B. D. 1999. The embeddedness of organizations: Dialogue & directions. *Journal of Management*, 25(3): 317-356.

- Dacin, M. T., Goodstein, J. & Scott, W. R. 2002. Institutional theory and institutional change: Introduction to the special research forum. *Academy of Management Journal*, 45: 45-56.
- Dahan, N., Doh, J. & Guay, T. 2006. The role of multinational corporations in transnational institution building: A policy network perspective. *Human Relations*, 59 (11): 1571-1600.
- Davis, G. F., & Marquis, C. 2005. Prospects for organization theory in the early twenty-first century: Institutional fields and mechanisms. *Organization Science*, 16(4): 332-343.
- Delbridge, R. & Edwards, T. 2007. Reflections on developments in institutional theory: Toward a relational approach. *Scandinavian Journal of Management*, 23(2):191-205.
- Denzin, N.K. & Lincoln, Y. S. 2003. Introduction: The discipline and practice of qualitative research. In N.K. Denzin & Y. S. Lincoln (eds.), *Strategies of qualitative inquiry*, (2nd edition). Thousand Oaks, CA: Sage:1-45.
- Devaraj, S., Jialal, I. & Vega-López, S. 2004. Plant sterol-fortified orange juice effectively lowers cholesterol levels in mildly hypercholesterolemic healthy individuals. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 24(3):e25-8.
- DiMaggio, P. 1988. Interest and agency in institutional theory. In *Institutional patterns and culture*. Cambridge, MA: Ballinger: 3-21.
- DiMaggio, P.J. 1991. Constructing an organizational field as a professional project: U.S. art museums, 1920-1940. In W.W. Powell & P.J. DiMaggio (eds.), *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press: 267-292.
- DiMaggio, P. J. & Powell, W. W. 1991 [1983]. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. In P.J. DiMaggio & W. W. Powell (eds.), *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press: 63-82.
- Djelic, M-L, & Ainamo, A. 2005. The telecom industry as cultural industry? The transposition of fashion logics into the field of mobile telephony. *Research in Sociology of Organizations*, 23: 45-80.
- Djelic, M-L, Nooteboom, B. & Whitley, R. 2005. Introduction: Dynamics of interaction between institutions, markets and organizations. *Organization Studies*, 26(12): 1733-1741.
- Djelic, M. & Quack, S. (eds.). 2003. *Globalization and institutions. Redefining the rules of the economic game*. Cheltenham, UK: Edward Elgar.
- Dorado, S. 2005. Institutional entrepreneurship, partaking, and convening. *Organization Studies*, 26(3): 385-414.
- Dow, D. & Karunaratna, A. 2006. Developing a multidimensional instrument to measure psychic distance stimuli. *Journal of International Business Studies*, 37(5): 578-602.
- Dubois, A. & Gadde, L-E. 2002. Systematic combining: An abductive approach to case research. *Journal of Business Research*, 55(7): 553-560.
- Dunning, J.H. 2003. The moral imperatives of global capitalism: An overview. In Dunning J.H. (ed.) *Making globalisation good. The moral challenges of global capitalism*. Oxford: Oxford University Press: 11-40.
- Eisenhardt, K. M. 1989. Building theories from case study research. *Academy of Management Review*, 14(4): 532-550.

- Elsbach, K.D. 1994. Managing organizational legitimacy in the California cattle industry: The construction and effectiveness of verbal accounts. *Administrative Science Quarterly*, 39(1): 57-88.
- Emirbayer, M. & Mische A. 1998. What is Agency? *The American Journal of Sociology*. 103 (4): 962-1023.
- Erlingsdóttir, G. & Lindberg, K. 2005. Isomorphism, Isopraxism, and Isonymish: Complementary or Competing Processes? In B. Czarniawska & G. Sevón (eds.), *Global ideas. how ideas, objects and practices travel in the global economy*. Malmö, Sweden: Liber & Copenhagen Business School Press: 190-212.
- FDA. 2006. *A food labeling guide-appendix C*. U.S. Food and Drug Administration. www.cfsan.fda.gov/~dms/lab-qhc.html
- Feldman, M. 2005. The Entrepreneurial Event Revisited: Firm Formation in a Regional Context. In: S. Breschi & F. Marleba (eds.) *Clusters, networks, and innovation*. Oxford: Oxford University Press: 136-168.
- Feldman, M., Francis, J. & Bercovitz, J. 2005. Creating a cluster while building a firm: Entrepreneurs and the formation of industrial clusters. *Regional Studies*, 39(1): 129-141.
- Feldman, M. & Audretsch, D. 1999. Innovation in cities: Science-based diversity, specialization and localized competition. *European Economic Review*, 43(2): 409-429.
- Ferlie, E., Fitzgerald, L., Wood, M. & Hawkins, C. 2005. The nonspread of innovations: The mediating role of professionals. *Academy of Management Journal*, 48 (1): 117-134.
- Flick, U. 1998. *An introduction to qualitative research*. Thousand Oaks, CA: Sage.
- Fligstein, N. 1997. Social skill and institutional theory. *American Behavioral Scientist*, 40(4): 397-405.
- Friedland, R., & Alford, R.R. 1991. Bringing society back in: Symbols, practices, and institutional contradictions. In W.W. Powell & P.J. DiMaggio (eds.), *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press: 232-266.
- Frost & Sullivan. 2006. *2006 Frost & Sullivan brand development strategy leadership award*. Press announcement.
- Garud, R., Jain, S. & Kumaraswamy, A. 2002. Institutional entrepreneurship in the sponsorship of common technological standards: The case of Sun Microsystems and Java. *Academy of Management Journal*, 45(1): 196-214.
- Gaur, A.S. & Lu, J.W. 2007. Ownership strategies and survival of foreign subsidiaries: Impacts of institutional distance and experience. *Journal of Management*, 33(1): 84-110.
- Gephart, R.P. 2004. Qualitative research and the Academy of Management Journal *Academy of Management Journal*, 47: 454-462.
- Geppert, M., Matten, D. & Walgenbach, P. 2006. Transnational institution building and the multinational corporation: An emerging field of research. *Human Relations*, 59(11): 1451-1465.
- Gertler, M. S. & Levitte, Y. M. 2005. Local nodes in global networks: The geography of knowledge flows in biotechnology innovation. *Industry & Innovation*, 12(4): 487-507.
- Ghemawat, P. 2001. Distance still matters. The hard reality of global expansion. *Harvard business review*, 79(8): 137-147.
- Ghemawat, P. 2003a. The forgotten strategy. *Harvard business review*, 81(11): 76-84.

- Ghemawat, P. 2003b. Semiglobalization and international business strategy. *Journal of International Business Studies*, 34(2): 138-152.
- Giddens, A. 1984. *The constitution of society. outline of the theory of structuration*. Cambridge, UK: Polity Press.
- Gioia, D. A. & Pitre, E. 1990. Multiparadigm perspectives on theory building. *Academy of Management Review*, 15(4): 584-602.
- Glaser, B.G. & Strauss, A.L. 1973. *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine Publishing Company.
- Golden-Biddle, K. & Locke, K. 2006. *Composing qualitative research* (2nd edition). Thousand Oaks, CA: Sage.
- Goodrick, E. & Salancik, G. R. 1996. Organizational discretion in responding to institutional practices: Hospitals and cesarean births. *Administrative Science Quarterly*, 41(1): 1-28.
- Goodstein, J. D. 1994. Institutional pressures and strategic responsiveness: Employer involvement in work-family issues. *Academy of Management Journal*, 37(2): 350-382.
- Gordon, I. R., & McCann, P. 2000. Industrial clusters: Complexes, agglomeration and/or social networks? *Urban Studies*, 37(3): 513-532.
- Granovetter, M. 1973. The strength of weak ties. *American Journal of Sociology*, 78: 1360-1380.
- Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3): 481-510.
- Granovetter, M. 1992. Problems of explanation in economic sociology. In N. Nohria & R. Eccles G. (Ed.), *Networks and organizations: Structure, form, and action*. Boston, MA: Harvard Business School Press: 25-56.
- Greenwood, R. & Hinings, C. R. 1996. Understanding radical organizational change: Bringing together the old and the new institutionalism. *Academy of Management Review*, 21(4): 1022-1054.
- Greenwood, R., Suddaby, R. & Hinings, C. R. 2002. Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal*, 45(1): 58-80.
- Greenwood, R. & Suddaby, R. 2006. Institutional entrepreneurship in mature fields: The big five accounting firms. *Academy of Management Journal*, 49(1): 27-48.
- Guba, E.G. & Lincoln, Y.S. 1994. Competing paradigms in qualitative research. In N.K. Denzin & Y. S. Lincoln (eds.), *Handbook of qualitative research*. Thousand Oaks, CA,: Sage: 105-117.
- Hargadon, A. & Sutton, R. I. 1997. Technology brokering and innovation in a product development firm', *Administrative Science Quarterly*, 42 (4): 716-749.
- Hargrave, T. J. & Van de Ven, A. H. 2006. A collective action model of institutional innovation. *Academy of Management Review*, 31 (4): 864-888.
- Heasman, M. & Mellentin, J. 2001. *The functional foods revolution. healthy people, healthy profits?*. Sterling, VA: Earthscan.
- Hedmo, T., Sahlin-Andersson, K. & Wedlin, L. 2005. Fields of imitation: The global expansion of management education. In B. Czarniawska & G. Sevón (eds.), *Global ideas. How ideas, objects and practices travel in the global economy*. Malmö, Sweden: Liber & Copenhagen Business School Press: 190-212.
- Hicks, K. B. & Moreau, R. A. 2001. Phytosterols and phytostanols: Functional food cholesterol busters. *Food Technology*, 55(1): 63-67.
- Hirsch, P. M. 1997. Sociology without social structure: Neoinstitutional theory meets brave new world. *American Journal of Sociology*: 1702-23.

- Hirsch, P. M., & Lounsbury, M. 1997. Ending the family quarrel: Toward a reconciliation of "old" and "new" institutionalisms. *The American Behavioral Scientist*, 40(4): 406-418.
- Hoffman, A. J. 1999. Institutional evolution and change: Environmentalism and the U.S. chemical industry. *Academy of Management Journal*, 42(4): 351-371.
- Hofstede, G. 1980. *Culture's consequences: International differences in work-related values*. London: Sage.
- Holm, P. 1995. The dynamics of institutionalization: Transformation processes in Norwegian fisheries. *Administrative Science Quarterly*, 40(3): 398-422.
- Hwang, H. & Powell, W. W. 2005. Institutions and entrepreneurship. In S.A. Alvarez, R. Agarwal, & O. Sorenson (eds.), *Handbook of entrepreneurship research: Disciplinary perspectives*. New York, NY: Kluwer Publishers.
- Johanson, J. 2004. Theory is not reality. In R. Piekkari-Marschan & C. Welch (Ed.), *Handbook of qualitative research methods for international business*. Cheltenham, UK: Edward Elgar.
- Johanson, J. & Wiedersheim-Paul, F. 1975. The internationalization of the firm: four Swedish cases. *Journal of Management Studies*, 12: 305-322.
- Johanson, J. & Vahlne, J.E. 1977. "The internationalisation process of the firm: a model of knowledge development and increasing foreign market commitments", *Journal of International Business Studies*, 8(1): 23-32.
- Johanson, J. & Vahlne, J.E. 1990. The mechanism of internationalisation, *International Marketing Review*, 7(4): 11-24.
- Katan, M. B., Grundy, S. M., Jones, P., Law, M., Miettinen, T., & Paoletti, R. 2003. Efficacy and safety of plant stanols and sterols in the management of blood cholesterol levels. *Mayo Clin Proc*, 78(8): 965-978.
- Khan, F.R., Munir, K.A. & Willmott, H. 2007. A Dark Side of Institutional Entrepreneurship: Soccer Balls, Child Labour and Postcolonial Impoverishment. *Organization Studies*, 28(7):1055-1077.
- Kirkman, B. L., Lowe, K. B. & Gibson, C. B. 2006. A quarter century of culture's consequences: A review of empirical research incorporating Hofstede's cultural values framework. *Journal of International Business Studies*, 37: 285-320.
- Kogut, B. 2000. The network as knowledge: Generative rules and the emergence of structure. *Strategic Management Journal*, 21(3): 405-425.
- Kogut, B. & Singh, H. 1988. The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 19(3): 411-432.
- Kondra, A. Z. & Hinings, C. R. 1998. Organizational diversity and change in institutional theory. *Organization Studies*, 19(5): 743-767.
- Kostova, T. 1999. Transnational transfer of strategic organizational practices: A contextual perspective. *Academy of Management Review*, 24(2): 308-324.
- Kostova, T. & Zaheer, S. 1999. Organizational legitimacy under conditions of complexity: The case of the multinational enterprise. *Academy of Management Review*, 24(1): 64-81.
- Kostova, T. & Roth, K. 2002. Adoption of an organizational practice by subsidiaries of multinational corporations: Institutional and relational effects. *Academy of Management Journal*, 45(1): 215-233.
- Kwok, Chuck C. Y. & Tadesse, S. 2006. The MNC as an agent of change for host-country institutions: FDI and corruption. *Journal of International Business Studies*, 37(6): 767-785.
- Lagnevik, M., Sjöholm, I., Lareke, A. & Östberg, J. 2003. *The dynamics of innovation clusters: A study of the food industry*. Cheltenham, UK: Edward Elgar.

- Langley, A. 1999. Strategies for theorizing from process data. *Academy of Management Review*, 24(4): 691-710.
- Lawrence, T. B. 1999. Institutional strategy. *Journal of Management*, 25(2): 161-187.
- Lawrence, T. B. Hardy, C. & Phillips, N. 2002. Institutional effects of interorganizational collaboration: The emergence of proto-institutions. *Academy of Management Journal*, 45(1): 281-290.
- Lawrence, T. B. & Phillips, N. 2004. From Moby Dick to Free Willy: Macro-cultural discourse and institutional entrepreneurship in emerging institutional fields. *Organization*, 11(5): 689-711.
- Leblebici, H., Salancik, G., Copay, A. & King, T. 1991. Institutional change and the transformation of interorganizational fields: An organizational history of the US radio broadcasting industry. *Administrative Science Quarterly*, 36: 333-363.
- Leca, B. & Naccache, P. 2006. A critical realist approach to institutional entrepreneurship. *Organization*, 13(5): 627-651.
- Lehenkari, J. 2003. On the borderline of food and drug: Constructing credibility and markets for a functional food product. *Science as Culture*, 12(4): 499-525.
- Lehenkari, J. 2006. *The networks of learning in technological innovation. The emergence of collaboration across fields of expertise*. Doctoral dissertation. Helsinki, Finland: University of Helsinki.
- Leitner, H. 1997. Reconfiguring the spatiality of power: The construction of a supranational migration framework for the European Union. *Political Geography*, 16(2): 123-143.
- Lewis, M. W. & Grimes, A. I. 1999. Metatriangulation: Building theory from multiple paradigms. *Academy of Management Review*, 24(4): 672-690.
- Lindsay, V.J. 2004. Computer-assisted qualitative data analysis: Application in an export study. In R. Marschan-Piekkari & C. Welch (eds.), *Handbook of qualitative research methods for international business*, Cheltenham, UK: Edward Elgar: 486-506.
- Lounsbury, M. 2007. A tale of two cities: Competing logics and practice variation in the professionalizing of mutual funds. *Academy of Management Journal*, 50(2): 289-307.
- Lounsbury, M. & Crumley, E. T. (2007). New practice creation: An institutional perspective on innovation, *Organization Studies* 28 (7): 993-1012.
- Luostarinen, R. 1989 [1979]. *Internationalization of the Firm*, Acta Academiæ Oeconomicae Helsingiensis, Series A:30, Helsinki.
- Maguire, S., Hardy, C. & Lawrence, T. B. 2004. Institutional entrepreneurship in emerging fields: Hiv/aids treatment advocacy in Canada. *Academy of Management Journal*, 47(5): 657-679.
- Malmberg, A., Sölvell, Ö. & Zander, I. 1996. Spatial clustering, local accumulation of knowledge and firm competitiveness. *Geografiska Annaler Series*, 78(2): 85-97.
- Marschan-Piekkari, R. & Welch, C. 2004. *Handbook of qualitative research methods for international business*. Cheltenham, UK: Edward Elgar.
- Marshall, A. 1961[1920]. *Principles of economics. an introductory volume*. (8th edition). London: Macmillan & Co Ltd.
- Martin, J. L. 2003. What is field theory? *American Journal of Sociology*, 109: 1-49.
- Martin, R. & Sunley, P. 2005. Deconstructing Clusters: Chaotic Concept or Policy Panacea? In: S. Breschi & F. Marleba (eds.) *Clusters, networks, and innovation*. Oxford: Oxford University Press: 433-469.

- McAdam, D. & Scott, R.W. 2005. Organizations and movements. In D. McAdam & R.W. Scott (eds.), *Social movements and organization theory*. NY: Cambridge University Press.
- McCann, P. & Mudambi, R. 2004. The location behavior of the multinational enterprise: Some analytical issues. *Growth and Change*, 35(4): 491-524.
- McEvily, B. & Zaheer, A. 1999. Bridging ties: A source of firm heterogeneity in competitive capabilities. *Strategic Management Journal*. 20: 1133-1156.
- Mensink, R. P., Ebbing, S., Lindhout, M., Plat, J. & van Heugten, M. M. 2002. Effects of plant stanol esters supplied in low-fat yoghurt on serum lipids and lipoproteins, non-cholesterol sterols and fat soluble antioxidant concentrations. *Atherosclerosis*, 160(1): 205-213.
- Meyer, A. D., Brooks, G.R. & Goes, J. B. 1990. Environmental jolts and industry revolutions: Organizational responses to discontinuous change. *Strategic Management Journal*, 11: 93-110.
- Meyer, J. W. & Rowan, B. 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83: 340-363.
- Meyer, A. D., Gaba, V. & Colwell, K. A. 2005. Organizing far from equilibrium: Nonlinear change in organizational fields. *Organization Science*, 16(5): 456-473.
- Miettinen, T. A., Puska, P., Gylling, H., Vanhanen, H. & Vartiainen, E. 1995. Reduction of serum cholesterol with sitostanol-ester margarine in a mildly hypercholesterolemic population. *The New England Journal of Medicine*, 333(20): 1308-1312.
- Minbaeva, D., Pedersen, T., Björkman, I., Fey, C. & Park, H.J. 2003. MNC knowledge transfer, subsidiary absorptive capacity and HRM. *Journal of International Business Studies*, 34(6): 586-599.
- Minzberg, H & Waters, J.A. 1985. Of Strategies, Deliberate and Emergent. *Strategic Management Journal*, 6(2): 257-272.
- Moisander, J. & Valtonen, A. 2006. *Qualitative marketing research- A cultural approach*. (1st ed.). Thousand Oaks, CA: Sage.
- Munir, K. A. & Phillips, N. 2005. The birth of the 'Kodak moment': Institutional entrepreneurship and the adoption of new technologies. *Organization Studies*, 26(11): 1665-1687.
- Murtha, T., Lenway, S. A. & Hart, J. A. 2001. *Managing new industry creation: Global knowledge formation and entrepreneurship in high technology*. Boston: Stanford University Press.
- Mutch, A., Delbridge, R. & Ventresca, M. 2006. Situating organizational action: The relational sociology of organizations. *Organization*, 13(5): 607-625.
- Möllering, G. 2007. *Organizing for Market Constitution: Uncertainty and Collective Institutional Entrepreneurship*, Paper presented at the 2007 Annual Meeting of the Academy of Management, Philadelphia, August.
- Oliver, C. 1991. Strategic responses to institutional processes. *Academy of Management Review*, 16(1): 145-179.
- Orr, R., J. & Scott, R. 2005. *Institutional exceptions on global projects: Ignorance, sensemaking and response*. Unpublished paper. Collaboratory for Research on Global Projects.
- Orton, J. D. & Weick, K. E. 1990. Loosely coupled systems: A reconceptualization. *Academy of Management Review*, 15(2): 203-223.
- Orton, J. D. 1997. From inductive to iterative grounded theory: Zipping the gap between process theory and process data. *Scandinavian Journal of Management*, 13(4): 419-438.

- Owen-Smith, J. & Powell, W. W. 2004. Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community. *Organization Science*, 15(1): 5-21.
- Parkhe, A. 2004. Interviews: A key data source in international business research. In R. Marschan-Piekkari & C. Welch (eds.), *Handbook of qualitative research methods for international business*. Cheltenham, UK: Edward Elgar.
- Parkhe, A. 2003. Institutional environments, institutional change and international alliances. *Journal of International Management*, 9(3): 305-316.
- Perkmann, M. & Spicer, A. 2007. 'Healing the Scars of History': Projects, Skills and Field Strategies in Institutional Entrepreneurship. *Organization Studies*, 28(07):1101-1122.
- Peterson, D. W. (1951). Effect of Soybean Sterols in the Diet on Plasma and Liver Cholesterol in Chicks, *Experimental Biology and Medicine*, 78 143-147.
- Pfeffer, J. & Salancik, G.R. 1978. *The external control of organizations*. New York, NY: Harper & Row.
- Phillips, D. J., & Zuckerman, E. W. 2001. Middle-status conformity: Theoretical restatement and empirical demonstration in two markets. *American Journal of Sociology*, 107(2): 379-429.
- Piekkari, R. & Welch, C. 2006. Guest editors' introduction to the focused issue: Qualitative research methods in international business. *Management International Review*, 46(4): 391-396.
- Podolny, J. M. 2001. Networks as the pipes and prisms of the market. *American Journal of Sociology*, 107(1): 33-60.
- Podolny, J. M. & Page, K.L. 1998. Network forms of organization. *Annual Review of Sociology*, 24: 57-76.
- Pollak, O.J. 1953. Reduction of Blood Cholesterol in Man. *Circulation*, 7: 702-706.
- Porac, J. F., Thomas, H. & Wilson, F. 1995. Rivalry and the industry model of Scottish knitwear producers. *Administrative Science Quarterly*, 40(2): 203-227.
- Porter, M., E. 1998. Clusters and the new economics of competition. *Harvard Business Review*, 76(6): 77-90.
- Porter, M., E. & Sölvell, Ö. 1998. The role of geography in the process of innovation and the sustainable competitive advantage of firms. In A.D. Chandler, Ö Sölvell, & P. Hagström (eds.), *The dynamic firm: The role of technology, strategy, organization, and regions*. Oxford: Oxford University Press: 440-457.
- Pouder, R. & St. John, C. H. 1996. Hot spots and blind spots: Geographical clusters of firms and innovation. *Academy of Management Review*, 21(4): 1192-1225.
- Powell, W. W. 1990. Neither market nor hierarchy: Network forms of organization. *Research in organizational behavior*, 12: 295-336.
- Powell, W., W. & DiMaggio, P., J. (eds.). 1991. *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press.
- Powell, W. W., White, D. R., Koput, K.W. & Owen-Smith, J. 2005. Network dynamics and field evolution: The growth of interorganizational collaboration in the life Sciences. *American Journal of Sociology*, 110(4): 1132-1205.
- Powell, W.W., Gammal, D.L., & Simard, C. 2005. Close encounters: The circulation and reception of managerial practices in the San Francisco bay area nonprofit community. In B. Czarniawska & G. Sevón (eds.), *Global ideas. how ideas, objects, and practices travel in the global economy*. Malmö, Sweden: Liber & Copenhagen Business School Press: 233-258.
- Puska, P. 2000. Nutrition and mortality: The Finnish experience. *Acta Cardiol*, 55: 213-220.

- Rao, H. 1998. Caveat emptor: The construction of non-profit consumer watchdog organizations. *American Journal of Sociology*, 103 (4): 912-961.
- Reay, T. & Hinings, C.R. 2005. The recomposition of an organizational field: Health care in Alberta. *Organization Studies*, 26(3): 351-384.
- Ricart, J. E., Enright, M. J., Ghemawat, P., Hart, S. L. & Khanna, T. 2004. New frontiers in international strategy. *Journal of International Business Studies*, 35(3): 175-200.
- Richardson, L. 1994. Writing: A method of inquiry. In N.K. Denzin & Y. S. Lincoln (eds.), *Handbook of qualitative research*, Thousand Oaks, CA: Sage: 522-523.
- Rogers, E., M. 2003. *Diffusion of innovations* (5th edition). New York, NY: Free Press.
- Rosa, P. 1998. Entrepreneurial processes of business cluster formation and growth by 'habitual' entrepreneurs. *Entrepreneurship: Theory & Practice*, 22 (4): 43-61.
- Rugman, A.M. 2005. *The regional multinationals: MNEs and 'global' strategic management*. Cambridge, UK: Cambridge University Press.
- Sanders, W. & Tuschke, A. 2007. The adoption of institutionally contested organizational practices: The emergence of stock option pay in Germany. *Academy of Management Journal*, 50 (1): 33-56.
- Santos, F. N. & Eisenhardt, K.M. 2006. *Constructing markets and organizing boundaries: Entrepreneurial action in nascent fields*. Working paper: INSEAD.
- Saxenian, A-L. 1994. *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Schwandt, T.A. 1994. Constructivist, interpretivist approaches to human inquiry. In N.K. Denzin & Y. Lincoln S. (eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage: 118-137.
- Schwandt, T.A. 2000. Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social constructionism. In N.K. Denzin & Y. Lincoln S. (eds.), *Handbook of qualitative research* (2nd ed.) Newbury Park, CA: Sage: 189-213.
- Scott, W.R. 1991. Unpacking institutional arguments. In W.W. Powell & P. DiMaggio J. (eds.), *The new institutionalism in organizational analysis*: 164-182. Chicago: University of Chicago Press.
- Scott, W.R. 1994. Institutions and organizations. Towards a theoretical synthesis. In R.W. Scott & J.W. Meyer (eds.), *Institutional environments and organizations*. Thousand Oaks, CA: Sage.
- Scott, W.R. 1995. *Institutions and organizations* (1st edition). Thousand Oaks, CA: Sage.
- Scott, R. W. 2001. *Institutions and organizations* (2nd edition). Thousand Oaks, CA: Sage.
- Scott, W. R. 2006. Ad astra per aspera: A journey from the periphery. *Organization Studies*, 27(6): 877-897.
- Scott, R. W., Ruef, M., Mendel, P.J. & Caronna, C.A. 2000. *Institutional change and healthcare organizations. from professional dominance to managed care*. Chicago: University of Chicago Press.
- Seo, M-G & Creed, W. E. 2002. Institutional contradictions, praxis, and institutional change: A dialectical perspective. *Academy of Management Review*, 27(2): 222-247.
- Sewell, W. 1992. A theory of structure: Duality, agency and transformation. *American Journal of Sociology*, 98(1): 1-29.

- Shenkar, O. 2001. Cultural distance revisited: Towards a more rigorous conceptualization and measurement of cultural differences. *Journal of International Business Studies*, 32(3): 519-535.
- Sherer, P. & Lee, K. 2002. Institutional change in large law firms: A resource dependency and institutional perspective. *Academy of Management Journal*, 45 (1):102-119.
- Shipilov, A.V. 2006. Network strategies and performance of Canadian investment banks. *Academy of Management Journal*, 49 (3): 590-604.
- Siggelkow, N. 2007. Persuasion with case studies. *Academy of Management Journal*, 50: 20-24.
- Soares, A.M., Farhangmehr, M. & Shoham, A. 2007. Hofstede's dimensions of culture in international marketing studies. *Journal of Business Research*, 60(3): 277-284.
- Sorenson, O. 2005. Social networks and the persistence of clusters: Evidence from the computer workstation industry. In: S. Breschi & F. Marleba (eds.) *Clusters, networks, and innovation*. Oxford: Oxford University Press: 297-316.
- Spencer, J. W. 2003. Global gatekeeping, representation, and network structure: A longitudinal analysis of regional and global knowledge-diffusion networks. *Journal of International Business Studies*, 34(5): 428-442.
- Spicer, A. 2006. Beyond the convergence-divergence debate: The role of spatial scales in transforming organizational logic. *Organization Studies*, 27(1): 1467-1483.
- Stake, R. E. 2003. Case studies. In N.K. Denzin & Y. Lincoln S. (eds.), *Strategies of qualitative inquiry*, vol. 2nd edition: 134-164. Thousand Oaks, CA: Sage.
- Stinchcombe, A.L. 1965. *Social Structure and Organizations*. In the Handbook of Organizations, J. G. March (ed.). Chicago: Rand McNally & Co.
- Suchman, M. C. 1995. Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3): 571-610.
- Teegen, H., Doh, J. P. & Vachani, S. 2004. The importance of nongovernmental organizations (NGOs) in global governance and value creation: An international business research agenda. *Journal of International Business Studies*, 35(6): 463-483.
- Tempel, A., Edwards, T., Ferner, A., Muller-Camen, M. & Wächter, H. 2006. Subsidiary responses to institutional duality: Collective representation practices of US multinationals in Britain and Germany. *Human Relations*, 59(11): 1543-1570.
- Thornton, P. H. 2002. The rise of the corporation in a craft industry: Conflict and conformity in institutional logics. *Academy of Management Journal*, 45(1): 81-101.
- Thornton, P. H. & Ocasio, W. 1999. Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958-1990. *American Journal of Sociology*, 105(3): 801-844.
- Tolbert, P.S. & Zucker, L.G. 1999. The institutionalization of institutional theory. In S.R. Clegg & C. Hardy (eds.), *Studying organization. theory & method*. Thousand Oaks: Sage: 169-184.
- Trish, R., Golden-Biddle, K. & Germann, K. 2006. Legitimizing a new role: Small wins and microprocesses of change. *Academy of Management Journal*, 49(5): 977-998.
- Urala, N. 2005. *Functional Foods in Finland. Consumers' views, attitudes and willingness to use*. Academic Dissertation. Espoo: VTT Publications 581.
- Van de Ven, A., Polley, D. & Garud, R. 1999. *The innovation journey*. Oxford: Oxford University Press.

- Walker, G., Kogut, B. & Shan, W. 1997. Social capital, structural holes, and the formation of an industry network. *Organization Science*, 8(2): 109-125.
- Wasserman, S. & Faust, K. 1994. *Social network analysis: Methods and applications*. Cambridge: Cambridge University Press.
- Weick, Karl E. 1976. Educational organizations as loosely coupled systems. *Administrative Science Quarterly*, 21(1): 1-19.
- Westney, D.E. 1993. Institutionalization theory and the multinational corporation. In S. Ghoshal & D.E. Westney (eds.), *Organization theory and the multinational corporation*. New York, N.Y.: St.Martin's Press: 53-76.
- Westney, D.E. 1997. Organization theory perspectives and international business. In B. Toyne & D. Nigh (eds.), *International business: An emerging vision*. Columbia, South Carolina: University of South Carolina Press: 296-329.
- Westney, D.E. 1987. *Imitation and innovation: The transfer of Western organizational patterns to Meiji Japan*. Cambridge, MA: Harvard University Press.
- White, H. C. 1970. *Chains of Opportunity*. Cambridge, MA: Harvard University Press.
- White, D. R., Owen-Smith, J., Moody, J. & Powell, W. W. 2004. Networks, fields and organizations: Micro-dynamics, scale and cohesive embeddings. *Computational & Mathematical Organization Theory*, 10(1): 95-117.
- Whittington, R. 1992. Putting Giddens into action. *Journal of Management Studies*, 29(6): 693-712.
- WHO. 2007. *The ten leading causes of death by broad income group 2002. fact sheet no 310/February 2007*. (<http://www.who.int/mediacentre/factsheets/fs310.pdf>. ed.).
- Wijen, F. & Ansari, S. 2007. Overcoming Inaction through Collective Institutional Entrepreneurship: Insights from Regime Theory. *Organization Studies*, 28(07): 1079-1100.
- Willmott, H. 1993. Breaking the paradigm mentality. *Organization Studies*, 14(5): 681-720.
- Xu, D. & Shenkar, O. 2002. Institutional Distance and the Multinational Enterprise, *Academy of Management Review* 27(4): 608-618.
- Xu, D., Pan, Y. & Beamish, P.W. 2004. The effect of regulative and normative distances on MNE ownership and expatriate strategies. *Management International Review*, 44 (3): 285-308.
- Yin, R.K. 2003. *Case study research. Design and methods* (3rd edition). Thousand Oaks, CA: Sage.
- Zaheer, S. 1995. Overcoming the liability of foreignness. *Academy of Management Journal*, 38 (2): 341-363.
- Zaheer, S. 2002. The liability of foreignness, redux: a commentary. *Journal of International Management*, 8:351-358.
- Zilber, T. B. 2002. Institutionalization as an interplay between actions, meanings, and actors: The case of a rape crisis center in Israel. *Academy of Management Journal*, 45(1): 234.
- Zimmerman, M. A. & Zeitz, G. J. 2002. Beyond survival: Achieving new venture growth by building legitimacy. *Academy of Management Review*, 27(3): 414-431.

ESSAY 1

SCIENTISTS AS MIDWIVES TO CLUSTER EMERGENCE- AN INTERPRETATIVE CASE STUDY OF FUNCTIONAL FOODS

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Abstract: We investigate the emergence of a spatial concentration of interconnected individuals and organisations in a new field. In contrast to approaches where clusters are perceived as collections of atomistic firms, we stress the role of individual agency and institutional embeddedness in the emergence and sustainability of clusters. We argue that our current understanding of cluster emergence can be advanced by extending the coupling metaphor as a conceptual tool for investigating cluster dynamics both at micro and system level. We contend that scientists, enabled by their network positions, act as institutional entrepreneurs to create tight couplings at the cluster level. Such individual level activity crosses industry and spatial boundaries and increases the innovativeness of the cluster. Based on a longitudinal case study of a cholesterol-lowering functional foods cluster in Finland, we propose a novel analytical classification of different roles for scientists along cluster emergence.

Key words: cluster emergence, social networks, scientists, coupling metaphor

INTRODUCTION

The last two decades have witnessed a rapid and simultaneous scientific and policy interest in the concept of cluster. Spatial clustering of innovative activity is crucial, particularly in the early stages of new industries (Audretsch & Feldman, 1996) and in science-based fields where knowledge plays an important role. It is argued that the physical proximity of related actors is important in enhancing legitimacy and in reducing the liability of newness as stressed by institutional scholars (Pouder & St. John, 1996, Aldrich & Fiol, 1994; Suchmann, 1995, Singh et al. 1986).

The starting points of this study are the centrality of knowledge creation and sharing in cluster emergence, and the scholarly consensus about how little is known both theoretically and empirically regarding how clusters emerge in the first place (e.g. Bresnahan et al., 2001; Feldman et al., 2005). We argue above all that current research is underdeveloped regarding how the micro processes of entrepreneurship, particularly scientific and institutional entrepreneurship, relate to cluster emergence (cf. Thornton & Flynn, 2003). More specifically, despite the centrality of scientists as knowledge producers, there is much to be learned and understood about the role of scientists in the emergence and dynamics of clusters (Håkanson, 1995). With the purpose of filling the identified gap in literature, this study is motivated by the following research question: *How does a science-based cluster emerge and what roles do scientists play in cluster emergence?* By answering this question we are able to provide new insights on the still unsettled role of individual scientists in cluster emergence and in scientific advancement in general.

We propose the concept of coupling (Orton & Weick, 1990; Weick, 1976) as an ideal analytical tool to provide us with clues on how clusters emerge as complex, multilevel (individuals, organisations, institutional logics) systems. Using qualitative procedures, we are able to unlock the micro-process of cluster emergence around cholesterol-lowering functional foods in Finland between the early 1970s and 2007. A longitudinal research design of this kind facilitates mapping of the roles of scientists in cluster emergence and avoids ‘temporal reductionism’, i.e. “treating relations and structures of relations as if they had no history that shapes the present situation” (Granovetter, 1992).

Our case provides an intriguing setting for investigating the proximity of the emerging field to two different institutional logics, those of the pharmaceuticals and food industries.

This paper takes a sociological perspective in studying the role and mechanisms through which key scientists contribute to cluster emergence. Our research approach is a simultaneous and continuous dialog between theory and empirical data. We found that in order for a cluster to emerge, some parts of the system must be tightly coupled, and that in a science-based field individual scientists are in a natural position to build bridges between otherwise loosely coupled organisations. We argue that the position of scientists in social networks is tightly connected to their ability to create new knowledge and legitimacy, and their ability to bridge disciplinary, industry, and spatial boundaries. Based on our longitudinal case study of the emergence of cholesterol-lowering functional foods cluster in Finland, we are able to propose different roles for scientists in cluster emergence.

Our eclectic combining of different theoretical concepts to understand cluster emergence contributes crucially to the fields of cluster research and institutional theory. First, we complement the extant body of cluster literature in considering the role of scientists in cluster emergence and as a channel for non-local connections. Hence, we contribute to the scarce literature on the interaction between local and global in cluster dynamics (Coenen et al., 2006; Amin & Cohendet, 2005; Gertler & Levitte, 2005; Bathelt et al. 2004). Second, we contend that through their novel groundbreaking ideas, scientists may act as institutional entrepreneurs (DiMaggio, 1998): We thereby extend the conceptualisation of institutional entrepreneurs. Third, we contribute to the sociological institutional theory, which has been little used in analysing cluster emergence. Finally, we extend the use of the coupling concept to the cluster literature

We present our study in four sections. The first section starts by defining the key terms and thereafter elaborates our theoretical orientation and proposes an analytical model for the empirical analysis. In the second section we describe our research design and method. We then provide a longitudinal case study on cluster emergence that leads to a multilevel model of science-based cluster emergence. In the concluding section we

discuss the theoretical contribution of our study and suggest some regional policy implications.

THEORETICAL FOUNDATION

Cluster Emergence as Social Network Emergence

In our definition of clusters we combine the definitions of Porter (1998) and Håkanson (2005), since neither of them alone is able to capture the two salient levels of clusters: organisations and individuals. Porter defines clusters as “geographic concentrations of interconnected companies and institutions in a particular field” (1998:78). Håkanson (2005) adds that clusters are also agglomerations of professionals belonging to the same or related epistemic communities, i.e. groups of peers working on a common knowledge problem (Amin & Cohendet, 2005). Practical evidence clearly shows that in science- and technology-based clusters, spatial concentrations of related actors are typically emerging rather simultaneously with new fields such as ICT. A field refers to “a community of organizations that partakes of a common meaning system and whose participants interact more faithfully with one another than with actors outside the field” (Scott, 1995:56). Hence, fields may cross traditional industry boundaries and stress socially constructed systems of common meaning. Hoffman (1999) suggests that new fields form around common issues (e.g. environmentalism or heart health), which may subsequently guide the attention process within an entire industry. Hence, while clusters typically refer to physical closeness, fields refer rather to functional and mental links. We contend, however, that the two are strongly interconnected and that cluster emergence may also be conceptualised as local field emergence. Based on our premises and with the aim of investigating the emergence of a science-based field, we refer with the concept of cluster to *a spatial concentration of interconnected individuals and organisations emerging around a common issue and developing in close interaction with other similar individuals and organisations outside the cluster*. We refer with the term interconnected to both the functionally interdependent value chain activities of firms and also to the mental closeness and personal ties of individuals.

The emergence of a cluster necessitates the emergence of new relationships between individuals and organisations, which brings us to the centrality of social networks and network emergence. Even though clusters and networks exhibit different systemic features e.g. clusters have open membership and entail local embedding (Rosenfeld, 1997; Nooteboom, 2004a), the concepts share many similarities. We suggest that there is a close connection between the emergence of a social network and that of a cluster because both tend to emerge from relations between specific individuals connecting organisations and relevant knowledge bases. Nohria (1992:4) contends that:

“All organizations are in important respects social networks and need to be addressed and analyzed as such...The premise that organizations are networks of recurring relationships applies to organizations at any level of analysis- small and large groups, subunits of organizations, entire organizations, *regions, industries*, national economies, and even the organization of the world system...” (*italics added*)

The social-network model or ‘club model’ is perhaps the most recent analytical or ideal type of cluster (Breschi & Marleba, 2005, Gordon & McCann, 2000). A cluster may be thought of as consisting of multiple overlapping social networks where social interaction or ‘social infrastructure’ (Saxenian, 1994) forms the critical base for a cluster to emerge. However, the idea that social interactions or network effects are key mechanisms through which external economies benefit local firms is by no means new as the idea has long been shared by economic geographers (Breschi & Marleba, 2005).

The social networks approach originates from the sociological literature, primarily that of Granovetter (1992, 1985), and builds the argument that clusters not only reflect rational economic responses but also embeddedness in their social context. Even though the social network model is fundamentally aspatial, social connections tend to cluster in geographic and social space and foster trust relations (Cordon & McCann 2000). However, network emergence has typically been neglected in sociological research where network analyses typically model outcomes, i.e. network structures, and are unable to provide satisfactory understanding on why, how, and under what conditions such relationships emerge in the first place, hence neglecting ‘network contextuality’. For instance, while Owen-Smith and Powell (2004) showed with great visual power how in the early emergence of the Boston biotechnology community public research organisations played a key role in bridging between private firms, their quantitative method was not able to tell a rich story of the mechanisms or conditions of such bridging behaviour. Indeed, although networks are crucial for the entrepreneurial

advantages of regions (Saxenian, 1994), little is known about the underlying micro processes of network emergence and how networks act as carriers of institutions that shape the identities and behaviour of actors (cf. Thronton & Flynn, 2003). Indeed, the micro level processes resulting in critical ties that are able to draw together complex system such as clusters are not satisfactorily understood. Gulati and Gargiulo (1999) found that previous relationships (such as cooperation between researchers) explain tie formation, but not how such relationships emerged in the first place. Furthermore, it is relatively unclear how such boundary spanning social networks, which connect scientists, are regionally or nationally embedded (Liebeskind et al., 1996). While membership in a spatial cluster is not a requirement for succeeding in a new field, proximity lowers costs and risks such as gaining legitimacy and avoiding the liability of newness (Pouder & St. John, 1996). Sorenson (2005) argues that firms cluster not because geographic proximity improves efficiency, but rather because social networks constrain where entrepreneurs locate and what type of business they start. Such mechanisms operate through social networks that enable both opportunity identification and resource mobilisation.

Given the significant consensus regarding the fact that clusters do not emerge '*de nouveau*,' but are shaped by existing social structures, it is surprising how little we know about the nature and origins of such networks. For emergence paths of this kind, the existence of individuals who are able to identify and cultivate new opportunities is crucial (Jones, 2001). We suggest that in the emergence of a science-based field, members of distinctive epistemic communities, i.e. scientists, act as the key identifiers and promoters of novel ideas.

Epistemic communities in Science and Scientists as Institutional Entrepreneurs

Membership in specific epistemic communities is obtained through the mastery of the codes, theories and tools employed in a specific practice (Håkanson, 2005: 434). In the case of a complex science-based field, such mastery is largely a result of formal professional education and membership in respected research teams. Epistemic communities do not discriminate against either local or global members (Coenen et al., 2004), and hence do not neatly reflect any existing spatial scale (Spicer, 2006). However, we are inclined to believe that physical proximity does play a role in the emergence of a science-based cluster. Science is often conducted in research teams that

typically have a ‘physical home’ and laboratory, as do the ‘gurus’ of a particular discipline. We suggest that the links within and across epistemic communities serve as conduits for two resources that are vital to a cluster’s emergence and sustenance, namely *knowledge* and *legitimacy*.

Knowledge. Since the emergence of the knowledge-based economy in the mid-1990s, clusters have been increasingly explained in terms of localised *knowledge creation and sharing*. *Knowledge*, i.e. “a fluid mix of framed experience, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information,” (Davenport & Prusak, 1998:5) is located at different levels within and outside the cluster. The dominant classification of knowledge distinguishes between tacit and explicit knowledge. Michael Polanyi’s concept of tacit knowledge, i.e. knowledge that is important but which cannot be articulated, is assumed to be sticky in nature and thus, critical for cluster emergence. Explicit knowledge, by contrast, can be easily codified, stored, and transferred across time and space independent of individuals (Ipe, 2003). Another classification of knowledge is between an analytical knowledge base, related to more universal ‘natural science’, and a more practical problem-driven synthetic knowledge base, related to ‘engineering science’ (Coenen et al. 2006). While analytical knowledge is typical of epistemic communities, synthetic knowledge is also crucial for cluster emergence. Because analytical knowledge is easier to codify than synthetic knowledge, it allows ties at greater spatial distances (ibid).

Knowledge creation refers to “a process whereby knowledge held by individuals is amplified and internalised as part of an organization’s knowledge base”, while *knowledge sharing* is the act of making knowledge available to others – typically referring to sharing of knowledge between individuals within an organisation (Ipe, 2003: 340-341). Within the context of multinational corporations (MNCs), Makela et al. (2007) show how interpersonal similarity (national-cultural background, shared language, and similarity of organizational status) drive knowledge sharing. Individual level knowledge sharing also takes place between organisations, for instance in the inter-organisational innovation networks central for cluster emergence. Nonaka and Konno (1998) argue that knowledge is embedded in ‘ba’, i.e. in a shared space for emerging relationships that can be divided into physical, virtual (e.g. e-mails), mental

(e.g. shared experiences, ideas, ideals), or any combination of them. Also, Amin and Cohendet (2005) stress the simultaneous mobilisation of multiple geographies of reach and connectivity for cluster dynamics. Unfortunately, however, local versus global learning is often unnecessarily juxtaposed and separated rather than perceived as complementary and interdependent (cf. Coenen et al., 2004).

We contend that in novel science-based fields, in addition to spatially flexible knowledge creation and sharing within distinct epistemic communities, interaction in transepistemic “issue spaces” is crucial. We suggest that as in knowledge production in general, new field emergence necessitates communication within and between multiple epistemic communities involving both perspective making, i.e. strengthening the unique knowledge of a community, and perspective taking, e.g. taking the knowledge of other communities into account (Boland & Tenkasi, 1995). Like Corley et al. (2006), we suggest that inter-disciplinary differences (e.g. different research methodologies or norms of interpreting results) may present significant obstacles for collaboration and necessitate negotiations between different cluster constituencies. Indeed, when a cluster emerges at the interface between traditional industries, actors face multiple operating and institutional logics such as legislation, values and beliefs or shared cognitive models (Porac & Thomas, 1995) of the adjacent industries. The larger the range of institutions faced by actors the more numerous the likely sources of inertia (cf. Nooteboom, 2004b).

Legitimacy. Complementary to knowledge flows, the other element that serves as “glue” to a cluster is its institutional legitimacy, its “*raison d’être*”. Suchman (1995:574) describes legitimacy as “[...] a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions”. In terms of institutional legitimacy, one can distinguish between purpose-based rationales – which typically reside at organisational level and are influenced by the industry to which the organisation belongs - and value based rationales, which are borne by individuals and their communication. In the case of a regional cluster, in other words, an organisational network consisting of a fairly heterogeneous set of organisational actors, the shared purpose-based rationale is frequently relatively weak, since the purpose is often industry-related. Hence, one can speak of a loose meta- institutional coupling between organisations in a cluster. However, individuals based in different organisations, but

sharing membership of an epistemic community, can very effectively bridge the shortcomings of these loose couplings by establishing tight couplings in terms of both knowledge flow and of working for a common goal or a common issue.

Institutional entrepreneurship. The existence of the competing operating and institutional logics of the converging industries leads us to the importance of institutional entrepreneurship as a vital form of connecting dispersed components of the emerging system. Agency²⁶ in such a context makes institutional entrepreneurs, i.e. organized actors with sufficient resources who see an opportunity in new institutions, realise interests that they value highly (DiMaggio, 1988). Actors may escape the determining power of institutions by gaining agency from the presence of multiple institutional referents that overlap and conflict (Dorado, 2005). Scientists are often in a position to be able to identify new opportunities and envision new solutions to scientific problems and to a certain extent see over scientific and institutional boundaries. In effect, their network position, which bridges different fields and spatial scales, may lessen their institutional embeddedness by exposing them to inter-institutional incompatibilities (Greenwood & Syddaby, 2006). Surprisingly, however, literature in institutional entrepreneurship has neglected scientists as initiators of institutional change²⁷. Nevertheless, our key argument is that scientific institutional entrepreneurs play key roles in sowing the seeds of future clusters. In line with Dutton (1993:207-208), such entrepreneurial individuals can be said to take the role of issue sponsors, i.e. “the individuals or groups who argue that an issue is important”. Besides scientists who aim to create new knowledge, issue sponsors can also be parts of ‘communities of practice’ (Brown & Duguid, 1991), which are groups of people engaging in the same practice or business function. Coenen et al. (2004, 2006) contend that compared with epistemic communities, communities of practice are aligned with industries drawing on a synthetic knowledge base and suggest that knowledge dynamics and thus interpersonal networks are more localised. A vital prerequisite for institutional entrepreneurs in a cluster context is that they possess a network position that enables them to span disciplinary, organisational and industry boundaries (cf. Greenwood &

²⁶ With the concept of agency we refer to (Emirbayer & Mische, 1998:970) “the temporally constructed engagement by actors of different structural environments- the temporal-relational context of action-which, through the interplay of habit, imagination, and judgment, both reproduces and transforms those structures in interactive response to the problems posed by changing historical situations” As such it refers “both to the motivation and the creativity that drive actors to break away from scripted patterns of action”(Dorado, 2005: 388).

²⁷ For an exception see Ritvala & Granqvist 2006.

Suddaby, 2006). Earlier research has shown that strong cognitive or knowledge boundaries as well as social or identity boundaries inhibit diffusion of innovative ideas (Ferlie et al., 2005). Hence, institutional entrepreneurs must be able to cross such mental and professional boundaries in order to create a base of support that is sufficiently wide for an innovation or an emerging cluster.

Our key notion is that the development of any cluster is influenced by entrepreneurial action. Besides supporting institutional structures, the degree of entrepreneurial orientation of the cluster environments is crucial for cluster dynamics. Håkanson (2005) argues that a high rate of new firm formation induced by factors such as positive attitudes towards entrepreneurship, growing demand and favourable technological regimes underline the cluster benefits to individuals by offering alternative employment when new ventures fail, as indeed most do. Also, Feldman et al. (2005) discuss the role of entrepreneurs in the formation of industrial clusters. Indeed, they criticise earlier cluster literature for ignoring the role of individual change agents. They argue that while adapting to ‘constructive crises’ and emerging opportunities, entrepreneurs contribute to the development of external resources and institutions that further the collective interest of their emerging field. Hence, entrepreneurs may act as institutional entrepreneurs, or in the cluster language ‘clusterpreneurs’ promoting cluster creation activities (Sölvell et al., 2003).

Notwithstanding the central role of individuals in creating new connections and acting as a cohesive force at the system level, cluster emergence is conditional on the approvals of public and private organisations. Public research organisations such as universities possess key roles in knowledge creation and dissemination as they adhere to the norms of the open information disclosure (Owen-Smith & Powell, 2004). With their long-term research activities around specific topics, they also contribute to the stability of clusters. MNCs and their counterparts at the non-profit sector, international non-governmental organisations (INGOs), not only provide resources and legitimacy, but also connect clusters to the outside world. Furthermore, a specific organisation mode having high involvement in cluster planning and coordination is a ‘cluster initiative’, i.e. “an organized effort to increase the growth and competitiveness of a cluster within a region, involving cluster firms, the government and the research community” (Sölvell et al. 2003:31). This form is rather the reverse of the mechanisms of the bottom-up cluster

emergence discussed above due to its orchestrated, top-down nature. In order to investigate the complex interaction between different ties, nodes (individuals, organisations) and spatial scales, we now suggest the use of the coupling metaphor for understanding clustering dynamics.

Applying the Coupling Metaphor to Cluster Emergence

Previous cluster research has tended to consider and distinguish between only a few different types of firms. However, complex systems such as an emerging cluster consist of numerous, and highly heterogeneous, interacting organisations and individuals, with interactions taking place at many levels. We are dealing with a phenomenon that is characterised by multiplexity, i.e. by a large number of relationships and content of ties between actors (Scott, 1983 based on Barnes 1972; Sydow & Staber, 2002). Sydow and Staber (2002:414) explicate multiplex relations:

“For example, individuals employed in the marketing and R&D departments of an organization have multiplex relations if they meet in different settings (conferences, professional associations, etc.) Interorganizational relations are multiplex through the linkages between boundary spanners representing different parts of each organization. A variety of resources may be exchanged in this way, with multiple uses and for different purposes, such as meeting the instrumental, affective, and legitimation needs of organisations and individuals”.

Hence, multiplex relations may result in temporary clusters of professionals (e.g. in international conferences) and thereby enable access to distant markets and knowledge pools (Maskell et al., 2004). Because of this multiplexity, we need to understand the key elements that are tied together in field emergence and how they are coupled. We have earlier suggested that individuals and organisations form the two major classes of elements and knowledge (and other vital resources) and legitimacy the major inputs contexts for their interaction. It is here that the coupling metaphor can be of use. The coupling metaphor can be seen as a conceptual tool that enables the investigation of relational patterns (Beekun & Glick, 2001); by applying it to the present case we contend that cluster emergence is about the emergence of new relationships, or the modification of existing ones.

This notion of loose coupling has been used as a meta-concept in organisation theory when trying to understand complex, evolving networks consisting of heterogeneous members that are interdependent but have different local agendas. In brief, loosely coupled systems are characterised by relatively ambiguous structures, decentralisation, delegation of discretion on the one hand and responsiveness between distinct and relatively autonomous organisational units on the other (Orton & Weick, 1990). The concept conveys that even though coupled events are responsive, each event also preserves its own identity and some evidence of its physical or logical separateness (Weick, 1976). Scholars have extended the metaphor and related terminology to industry-level (Dubois & Gadde, 2002a; Dorée & Holmen, 2004), to innovation networks (Freeman, 1991) and even to open source software development (Iannacci, 2005). In an interesting study on the construction industry, Dubois and Gadde (2002a) underline several advantages of loose coupling. First, loose coupling between organisational elements permits each element to adjust to local contingencies without this adjustment necessarily affecting the whole system. Second, they argue that loosely coupled systems are more sensitive to their environment as a whole because each system element conserves its own environmental sensing mechanisms. Third, *“loosely coupled systems preserve the identity, uniqueness, and separateness of elements and may therefore generate variety. The system can retain a greater number of mutations and novel solutions than would be the case with a tightly coupled system; The greater freedom in a loosely coupled system would imply that the actors deal with the problem in a multitude of ways, thus favouring variety and innovation”*(Dubois & Gadde, 2002a:623). Applied to the present case, this means that clusters, with the relatively loose couplings between them and their openness to the environment, are very well adapted to sensing environmental trends and to innovating based on these inputs. Furthermore, the metaphor also allows us to consider the simultaneous coexistence of competing logics of traditional industries, which may hybridise in field emergence.

There is, however, a need to focus on the links between individuals across organisations within a cluster. The reason for this lies in one of the inherent shortcomings of loose inter-organisational couplings: Two potential drawbacks of loosely coupled systems according to Weick (1976) are that they are vulnerable to faddism and that change is often slow to diffuse through the system. Especially the latter point can (and must), however, be countered through tight couplings at individual level. In a related vein,

Lang (2004) has combined the concept of coupling with the social capital approach stressing the role of social relationships and organisational routines for cooperation and *sharing and creating knowledge*. Relational patterns between individual actors therefore are of prime importance in keeping loosely coupled clusters together and in offsetting some of the drawbacks of loose coupling related to information-flow. Individuals may also potentially act as arbitrators or mediators between the competing interests, agendas and beliefs of cluster participants. The arbitrage situation we examine in this study is the emergence of a science-based cluster between the food and pharmaceuticals industries.

In Figure 1 we present an analytic model that combines our conceptual discussion and suggests investigating clusters as variably coupled systems.

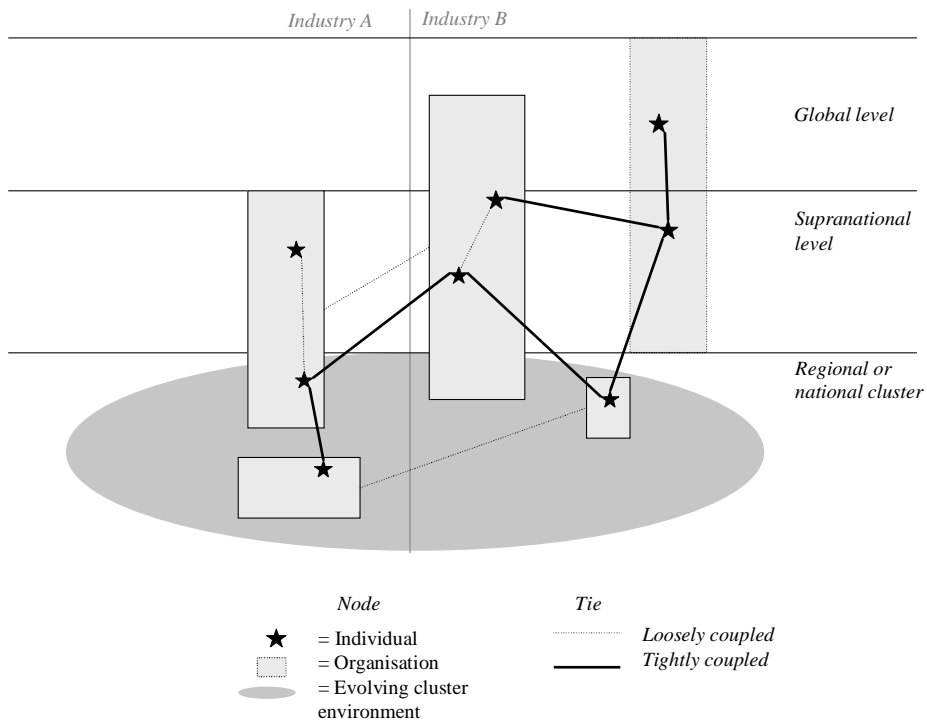


FIGURE 1 Spatial Cluster as a Variably Coupled System

An emerging cluster may be considered as an evolving network of relationships, which already displays certain interactional patterns. Both public and private organisations and specific individuals are key nodes in the system. Our key premise is that in order for the cluster to emerge some parts of the system must be relatively tightly coupled. We suggest that in science-based fields individual scientists act in the early cluster emergence as key bridging mechanisms between otherwise decoupled or loosely coupled organisations. Obviously, there also exist tight couplings between organisations in the task environment (e.g. critical resource providers) and also between institutional and task environment (e.g. regulation), as clusters are both production and social systems (Rosenfeld, 1997). However, our conception is that factor and demand conditions and rivalry (Porter, 1998) become increasingly crucial towards the later stages of emergence and subsequent cluster evolution. The proposed model contrasts traditional cluster studies that consider solely within the cluster links. We propose that scientists, through their membership in epistemic communities, also act as a key avenue for ties external to the cluster. *But what exactly triggers the emergence of new relationships, how are different elements coupled, and what roles do individual scientists possess in the emergence of a science-based cluster?* These are the type of questions that we now aim to answer with the help of our fieldwork data.

RESEARCH STRATEGY AND METHODS

Rationale and Research Design

This study is a part of ongoing research on field emergence during which we became interested in the role of spatial clusters in novel science-based fields. While we understood that scientists were crucial for the early cluster emergence, we lacked understanding on whether and how they connected with other cluster participants during the emergence process. Hence, we were lacking the micro-processes of cluster emergence. In contrast to commonly used quantitative techniques to identify clusters, we used qualitative longitudinal methods. Since the roles, motivations, and actions of scientists and other field participants were not immediately apparent, we considered only qualitative approaches as feasible. We selected an exploratory, longitudinal case study design. Such an approach avoids temporal reductionism and responds to

increasing scholarly calls for longitudinal analysis to properly capture cluster emergence (Håkanson, 2005; McEvily & Zaheer, 1999; Wolfe & Gertler, 2004). Our case study is interpretive and seeks out the emic meanings held by the field participants (Stake, 2003). Hence we aim to create an ‘insider view’ of cluster emergence.

Data Sources and Analysis

We draw from three sources of data: interviews, participant-observation and secondary data. Data collection took place between late 2004 and early 2007. First, 32 semi-structured interviews were conducted between August 2004 and April 2007. We had an exceptional opportunity to interview those actors who were actively involved in the very early ‘pre-cluster’ stage. Informants included top management from food and pharmaceutical industries and public research organisations and program managers of cluster initiatives. The interview sessions lasted between one and three hours, the median being approximately nearly two hours, which altogether makes over 50 hours of interview tapes. The interviews were semi-structured. In the beginning of each interview the participants were given an opportunity to ‘tell their stories’ without limiting the questions too much. Such open-ended questions encouraged respondents to say more in a descriptive manner (Flick, 1998). The interviews were conducted in the mother tongues of the interviewees, in either Finnish or English.

Second, participant observation was undertaken within the Food and Nutrition Programme organised by the Finnish National Fund for Research and Development²⁸ and in the Health Claims Seminar organised by the Finnish Food Safety Authority²⁹. Also, an on-demand webcast of the European Food Safety Authority’s Health Claims Conference was used as background material³⁰. Third, a multitude of secondary data was used, including documents relating to the cluster development in Finland such as the evaluation reports of technology programmes and meeting memorandums of the Finnish Novel Foods Board. Moreover, we draw from patent databases of the European Patent Office (EPO) and the United States Patent and Trademark Office (USPTO), as well as from PubMed, the publication database of medical sciences³¹. Patents and

²⁸ October 4, 2005

²⁹ December 12, 2006

³⁰ Bologna, November 8-10, 2006

<http://www.flyonthewall.com/FlyBroadcast/efsa.europa.eu/NutritionAndHealthClaimsConference/>

³¹ NCBI National Library of Medicine and the National Institutes of Health
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?DB=pubmed>

scientific publications are organised according to the names of inventors and/or authors and saved in the case study database. Table 1 provides a summary of a data sources used in mapping of the different roles of scientists during the cluster emergence.

Issue	Measure	Data Source	Illustration
Scientific discovery	Co-patents	esp@cenet/ European Patent Office	Miettinen TA, Vanhanen H, Wester I. Substance for lowering high cholesterol level in serum and methods for preparing and using the same.2005-12-08
	Co-publications	PubMed/MEDLINE	Miettinen TA, Puska P, Gylling H, Vanhanen H, Vartiainen E Reduction of Serum Cholesterol with sitostanol-ester margarine in mildly hypercholesterolemic population. N Engl J Med. 1995 Nov 16;333 (20):1308-12.
Influence on regulation	Membership in food safety authorities	Internet pages of national and the European Food Safety (EFSA) Authorities	Out of the 14 members of the NDA (dietetic products, nutrition, and allergies) panel of EFSA (European Food Safety Authority) two come from Finland.
Pre-market safety assessments	Approved sterol and stanol ingredients	European Commission/ EFSA web pages	Commission Decision (2000/500/EC) on authorising the placing on the market of "yellow fat spread with added phytosterol esters" as a novel food or novel food ingredient (Unilever U.K.)
Institutional entrepreneurship	Naming of central persons	Interviews with scientists, firms, and regulators	"If I should name one central person it is Pekka Puska.. absolutely, that Finland has become a model country for functional foods...His role since the 70s is truly unbelievable, he's a quite extraordinary Finn, truly."
Network building	Identification of bridge builders	Interviews with scientists, firms, and leaders of CI	"Ingmar Wester, the inventor, is the bridge builder"
Legitimacy	Field participant citations	Participant observation	"We should just have the credibility of Pekka Puska" (a workshop participant when explaining how to attain future success with new innovations)

TABLE 1 Summary of Data Sources in Mapping the Role of Scientists

The roles and activities of key individuals and organisations were investigated both retrospectively and in real-time to support the longitudinal analysis of cluster emergence. Transcribed interviews and participant observation memos were coded in NVivo (QSR 2), in order to help the authors to understand the data and find interrelationships between different concepts. Data analysis involved parallel investigation of different sources of empirical evidence in order to match individual and organisational agency with the structure and evolution of the surrounding institutional and task environment. We pursued our data analysis through an abductive theory-building approach with constant interplay between theoretical preconceptualisation and empirical data (Dubois & Gadde, 2002b). We combined different theoretical perspectives in order to gain a fuller and more meaningful understanding of cluster emergence. Thus, we acted as theoretical bricoleurs (Denzin & Lincoln, 2003) in a

highly iterative process between existing theoretical understanding and the collected data. In the following, our aim is to craft a ‘theorized storyline’ (Golden-Biddle & Locke, 2006) where we endeavour to convert the relevant components of our conceptual framework and collected fieldwork data into analytical insights on the roles of scientists in cluster emergence. Such methodological logic contributes to a tight coupling between the empirical data and the emerging middle range theory.

CASE ANALYSIS

In this section we present our empirical insights and findings thematically. First we describe the two intertwined logics of the food and pharmaceutical industries converging in functional foods. Thereafter, we present different roles taken by key scientists along the cluster emergence. Finally, we build a model for cluster emergence where individual scientists act as the key triggering and perpetuating force in cluster emergence of a new science-based field.

Research Setting

Our setting is the emergence of a highly research-based cluster of cholesterol-lowering functional foods actors in Finland. High blood cholesterol level is a major causal risk factor for heart disease, the leading cause of death in both high and low- income countries (WHO, 2007). The patent application for the pioneering cholesterol-lowering functional foods concept was filed by Raisio Margarine at the Finnish Patents Office in 1991.³² This event opened a new era of heart disease prevention. Functional foods have emerged in a ‘grey transition zone’ between food and medicine - at the intersection of two overlapping yet competing institutional logics (Friedland & Alford 1991, p. 248) of medical and nutritional philosophies. The local cluster acts as a forum where competing logics such as disease treatment and prevention meet. Table 2 depicts the position of cholesterol-lowering functional foods between traditional foods and pharmaceuticals.

³² Cholesterol-lowering functional foods are based on plant sterols, which lower cholesterol levels by blocking absorption of cholesterol in the intestine (e.g. Law, 2000; Miettinen, Puska, Gylling, Vanhanen, & Vartiainen, 1995).

<i>Key aspect</i>	<i>Traditional foods</i>	<i>Cholesterol-lowering functional foods</i>	<i>Pharmaceuticals</i>
<i>Research intensity</i>	Low		High
<i>Patenting</i>	Low		High
<i>Epistemic community</i>	Food and nutrition sciences		Medical science, pharmacy
<i>Regulation</i>	Safety and origin		Safety and efficacy
<i>Legitimacy</i>	Consumers		Medical community
<i>Communication</i>	Consumers (retail)		Medical professionals, patients

TABLE 2 Position of Cholesterol-lowering Functional Foods between Traditional Foods and Pharmaceuticals

At a general level, functional foods merge the analytical knowledge base of the pharmaceuticals industry (e.g. chemistry, biology and medicine) with the more synthetic knowledge base of the food industry (e.g. food technology) (cf. Coenen et al. 2006). Relatively high investments in basic and applied research and clinical tests, i.e. a rigorously controlled test of a new ingredient on human subject, in cholesterol-lowering functional foods resemble pharmaceutical development. Such investments necessitate global market scope and the use of patents for protecting intellectual property. As discussed, in the development of functional foods the epistemic communities of both nutrition and medical sciences meet. In terms of human health, the basic philosophies of the communities differ in important ways. In contrast to the pharmaceutical treatment of high cholesterol, cholesterol-lowering functional foods open a preventive approach. Functional foods have an additional safety requirement beyond traditional foods relating to the novelty of the raw material, production process and amounts used in the daily diet. Furthermore, a proof of the positive health benefits through scientific substantiation is required. Finally, in terms of legitimacy, functional foods actors have to communicate and promote their benefits both to medical professionals and final consumers. It is here where scientists act as key legitimators of functional foods.

Despite its small population of 5.3 million, Finland is said to be the world leader in the development of health-enhancing foods, the ‘Silicon Valley of functional foods’ (Dunn 2005, Heasman & Mellentin, 2001). In early 2007 we identified three regional research concentrations of functional foods in Finland: Helsinki, Turku and Kuopio. They consist

of one to two dozen public research organisations and a few MNCs with R&D departments plus a relatively large number of smaller firms producing or using functional foods ingredients. Regardless of the grand Silicon Valley metaphor, the obscure boundary between food and medicine was noticed over 2000 years ago by Hippocrates, who preached: 'Let food be thy medicine and medicine be thy food'. But what roles did contemporary scientists take in bridging between foods and medicine?

Two critical events that took place in 1995 triggered the emergence of this cluster in Finland. The first was the creation and successful commercialization in Finland of Benecol®, the pioneering cholesterol-lowering functional foods margarine. First, Benecol was initially a success story and provided the seed for a cluster, thereby tempting new actors to join. Second, at macro level, a key impetus for naming functional foods as one of the strategically important sectors of the Finnish economy was the country's EU membership, which opened a market that was previously protected by high import barriers. In order to smooth the transition towards an open market, the Finnish government decided to invest significantly in national food R&D in the mid 1990s. Two four-year technology programmes entitled 'Innovation in Foods' (1996-2004) were coordinated by Tekes, the Technology Agency of Finland, the main public funding organisation for research and development in Finland. We use the Benecol case to illustrate the more micro-level emergence of links between food and pharmaceuticals industries and the public health system, and cluster initiatives to demonstrate more top-down approach to strengthen links between cluster participants.

Roles of Scientists in Cluster Emergence

Mobilising Institutional Change. The roots of Benecol go back in history to the 1970s. In 1972 the North Karelia Project was launched in the province of North Karelia in eastern Finland, which was at the time suffering from the world's highest coronary heart disease mortality rate among working-aged men. This severe local health issue (including a significant difference between the mortality rates of the eastern and western parts of the country) became a significant trigger for the Finnish nutrition and health related research. A young public health researcher named Pekka Puska was selected to lead the North Karelia Project aimed at preventing heart disease through a healthier diet and other lifestyle factors. In this demanding endeavour, its leader needed to challenge

both the conservative medical community and the food industry. Instead of blaming the food industry, Puska started to challenge it to develop healthier food, hence acting as an agent for institutional change, an institutional entrepreneur in its literal sense. Framing and labelling an issue as an opportunity rather than a threat (Dutton, 1993) can, therefore, be done at industry level by individuals possessing social skills (Fligstein, 2001) and legitimacy, which was derived from Puska's membership in the medical community and the backing of the World Health Organization. Two decades later, more specifically in 1993-94, Professor Puska and his employer, the National Public Health Institute, were contacted by the Raisio Group to carry out a large clinical trial within the project to confirm the cholesterol-lowering effect of Benecol.

Scientific Exploration and Bridging. The development of the Benecol innovation was accomplished by a group of scientists working in the food and forest industries and medical science between the late 1980s and mid-1990s. The development project of Benecol was triggered by the need of UPM-Kymmene Kaukas Chemical Mill to find a suitable application and buyer for the surplus by-product of its milling process called sitosterol. The cholesterol-lowering effect of sitosterol was already known in the 1950s, but the problem had been the poor solubility of the substance. Professor Tatu Miettinen, a distinguished scientist in the field of cholesterol metabolism, his colleague Hannu Vanhanen at the Helsinki University Central Hospital (HUCS), and Ingmar Wester, a chemist acting as R&D Manager at Raisio became the key scientists to conduct further research. Earlier in 1988, Raisio financed an extensive clinical study carried out by the Faculty of Pharmacy at the University of Helsinki to demonstrate the favourable effect of the use of rapeseed oil on blood cholesterol-level. The project reached the goal of raising the low image of rapeseed oil, but it also provided Raisio with an excellent base for the subsequent more complex development process of Benecol. The Benecol research reached its major goal when Ingmar Wester made a significant technological breakthrough in finding the solution for converting plant stanols into a fat-soluble form. Besides their scientific exploration, the key scientists acted as bridge builders between previously decoupled organisations and fields. Miettinen and Vanhanen were responsible for early clinical testing at HUCS and during 1993-94 the LDL cholesterol-lowering effect of Benecol was tested by means of a larger population trial within the North Karelia project. Thus, only a handful of key scientists were able to create a new-to-the-world- innovation. However, this required membership in epistemic communities

and communities of practice that provided both knowledge and legitimacy for such a risky journey into uncharted waters.

During the early 2000s, Ingmar Wester has played a key role in transferring the research focus of Raisio Group towards more consumer-friendly product formats and actively built new research links abroad, most importantly to the University of Maastricht, to the research group of Professor Ronald Mensink, an acquaintance of Wester from the EU projects of the early 1990s. At the University of Helsinki, the Benecol innovation triggered wider interest among scientists in developing cholesterol-lowering concepts. Professor of Pharmacology Heikki Karppanen created the MultiBene concept, which besides lowering cholesterol level benefits blood pressure and bone health, and Professor Raimo Hiltunen at the Faculty of Pharmacy played a major role in developing Diminicol, a cost-effective way of producing sterols. Quantitatively, tight personal coupling between the scientists was reflected in numerous scientific co-publications and patents. Indisputably, besides Raisio Group the role of the University of Helsinki has been significant for the emergence of the cluster. The idea behind such a 'hub institution' in conducting, coordinating, and increasing stability for the research networks is analogous to the role of a hub firm (Jarillo, 1988) in innovation networks (Dhanaraj & Parkhe, 2006). To conclude, we identified two different communities: the epistemic community of scientists in cholesterol metabolism and the community of practice with a concrete problem-solving task related to food technology. The members of the two communities had to be able to understand each other and the related knowledge bases.

Legitimacy Building. The approval and recognition by the medical community was crucial for creating an environment of credibility for functional foods. The credibility of individual scientists was required for both internal and external purposes. For instance, the legitimacy of Professors Puska and Miettinen contributed to both the internal (Raisio Group) and external sales of the Benecol concept. Furthermore, since cholesterol-lowering functional foods implied a major shift in thinking from disease treatment towards disease prevention, changes in both cognitive frames and care practices were needed. Besides visible scientists acting as institutional entrepreneurs, clinical practice guidelines provided another channel. The Finnish Medical Society Duodecim (a task force of highly respected scientists) drafted the first national 'Current

Care Guidelines on Dyslipidaemia' (high cholesterol) in 2004 with the aim of producing neutral and objective, systematically collected and critically evaluated medical data to be used by both health care professionals and patients and decision makers. Plant stanol and plant sterol based foods are suggested as one lifestyle treatment alternative in the guidelines. Besides locating at the interface between medical and nutritional sciences, in what we earlier discussed as a transepistemic issue space, such guidelines also indirectly connect to translocal guidelines given by the European Society of Cardiology and, thereby also to the U.S. Cholesterol guidelines. Yet, even though international guidelines are monitored carefully such coupling may be classified only as loose because of differences in local situation and health care systems, which in turn necessitate different treatments. Furthermore, since medical doctors have a high degree of autonomy and discretion it is relatively common that guidelines do not easily transfer into everyday clinical practice. On the private side, on the other hand, individuals with considerable scientific background also do marketing. Such a background enables credible communication of science to both authorities and customers, thus, supporting the commercialisation of innovations.

Advising and Representing. Due to the necessity of understanding underlying complex mechanisms, scientists have key roles as advisors to legislators and regulators. Scientific evaluations are important particularly in pre-market safety assessments and concerning the claims allowed in the marketing of functional foods. The panel on dietetic products, nutrition, and allergies (NDA) of the European Food Safety Authority (EFSA)³³ deals with novel foods and possesses a significant role concerning these issues. The members of the NDA panel are selected based on scientific merits and its decision-making is based strictly on scientific evidence. However, NDA members are also embedded with their home country interests and regulative and normative institutions. Out of the 14 members of the NDA panel (and 27 EU countries) four come from the Netherlands, two from Ireland and two from Finland. Through these scientists, still somewhat loosely coupled regulative systems exhibit tighter links. The new EU nutrition and health claims regulation aims to harmonise health claims regulation across the member countries. In such a process of institutional bricolage (Campbell, 2004), some features may also be borrowed from outside the Union. For instance, in an

³³ EFSA was established by the European Parliament in 2002 following the food scares of the 1990s and the loss of confidence by the European public. <http://www.efsa.europa.eu>

international scientific conference, which was organized by EFSA in November 2006, the representatives from the U.S. (Food and Drug Administration) and Australia were also heard. Furthermore, participants from the European food and drink industries, consumer advocates, and 'health lobbyists' were present to actively further their own agendas. Notwithstanding multiple stakeholders and strong institutions, the inherent asymmetry of the system also leaves room for individual agency. What is interesting in terms of the cluster development is that the scientists at the NDA act as agents of a kind in transferring both codified but also tacit knowledge across the national and supranational systems. Scientists act as representatives with multiple positions, thus leveraging their personal relationships or bringing their social capital to other social contexts.

At the national cluster level, scientists have also led technology programmes, multidisciplinary research programmes and cluster initiatives and contributed to long-term couplings between public research organisations and firms, on an international basis as well. Building on the earlier national technology programmes, the Finnish National Fund for Research and Development (SITRA) launched its Food and Nutrition Programme for 2005-2009 aiming at creating a joint strategy for the Finnish food and nutrition industry, and an internationally competitive nutrition cluster in Finland. Supporting SITRA's nutrition cluster, Raisio and Valio, Finland's biggest dairy company, announced in late 2006 that they would begin research cooperation in the field of nutrition. It is noteworthy that even though Raisio had earlier licensed the Benecol concept to Valio, deeper cooperation between the two companies will be in research. Thus, scientists are playing a key role in creating tighter couplings between the firm level actors within the cluster. The cluster initiative intends to apply for 'cluster' status in 2007 from the governmental Science and Technology Policy Council of Finland, signifying that 'cluster' is also a linguistic marker. What is noteworthy is that boundary spanning individuals act as bridges between different cluster initiatives both nationally and internationally, for instance to a similar type of CI in Scania, the southernmost province of Sweden. Such links and benchmarking are crucial, since overall, we found surprisingly few links (mostly in research) between the Finnish cluster and a similar type of clusters abroad.

Symbolising. Finally, we found a peculiar role for scientists in cluster emergence, namely that of being an ‘icon’. Icons are ‘spiritual fathers’ of clusters. In our case, the key person in sowing the seeds for functional foods is Professor Puska. Icons appear to be former institutional entrepreneurs of high visibility who came to take on a quasi-mythical status within a community to the extent that they are frequently referred to or quoted by others in order to gain legitimacy. We also recognised younger scientists that cooperate with and follow in the footsteps taken by key scientists such as Professor Miettinen. ‘Disciples’ who follow their ‘gurus’ may later take the positions of their masters. It is perhaps typical of medical science, though we may also recognise a similar type of behaviour among scholars of organisation theory. In this respect, star scientists may be thought of as “the ‘seeds’ around which crystals form” (Zucker et al. 2002:630).

We have interpreted an emergence path of a science-based cluster. Our key argument is that early emergence, a type of a pre-cluster stage, is triggered by individual level links. Scientists were found to create tight couplings in the system, while organisational level links were found to institutionalise later. Our findings imply that such tight couplings at individual level are an indication that the highly specific expertise of scientists results in overlapping and consecutive research projects and in personal bonds between individuals. In the Figure 2 we visualise the interplay between start scientists at hub institutions and firms and how their network positions, knowledge and legitimacy give them different roles in cluster emergence. This interplay is grounded on the idea that the positions of scientists in social networks are a source of novel ideas and enable their groundbreaking scientific discoveries and subsequent communication of knowledge.

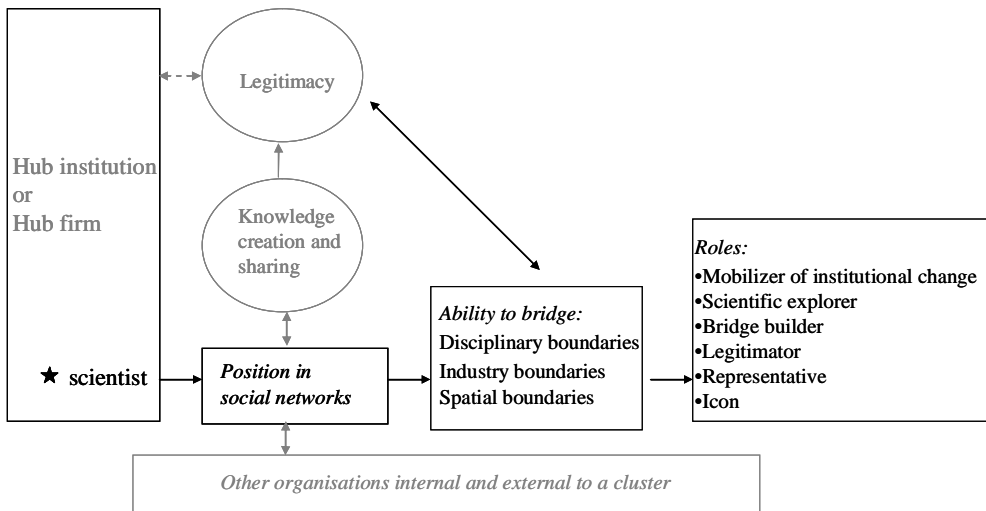


FIGURE 2 Roles of Scientists in Early Cluster Emergence

The network positions of the scientists were found to expose them to field level contradictions (Greenwood & Suddaby, 2006). More specifically, they were exposed to different institutional logics of the medical and nutritional communities (and pharmaceuticals and food industries). Hence, in contrast to earlier studies assuming relatively homogeneous cluster participants sharing similar mental models (e.g. Pouder & St.John, 1996), we found evidence for interdisciplinary negotiations within and between epistemic communities and communities of practice. Given the internationally relatively small size of the organisations, scientists were required to possess a wide competence base, which enabled them to see novel solutions at the interface between separate industries, disciplines and logics. This also enabled them to take network positions that bridge different fields. By participating in creating a radically new hybrid form of food and medicine, the scientists were found to act as institutional entrepreneurs. Their cooperation also broke down old boundaries between fields and created a more cooperative atmosphere in general, a “second-order” effect beyond the participating organisations (Lawrence and al. 2002). In our case, setting institutional and creative power was synonyms with specific individuals, thereby making the system relatively flexible and adaptable, but simultaneously also more vulnerable since knowledge and legitimacy were narrowly leveraged. Due to their profound understanding of specific issues, which are typically not accessible to others outside

narrow epistemic communities, scientists also tend to hold central positions in crafting regulation of the emerging field.

When it comes to the role of spatial proximity in cluster emergence, we need to distinguish between scientific and business activities. On the one hand, science appears to have a strong spatial concentration effect, mainly resulting from knowledge externalities and concentration effect of scientists around a hub institution. On the other hand, we found fairly limited interaction between firms within the cluster, which probably reflects the global nature of firms' value chains and end markets.

Yet, overall we argue that space possessed a specific role in the emergence of the cluster as the heart health issue got its strongest manifestations in Finland. This triggered both new business and institutional entrepreneurship. The local institutional environment, for instance, the relative flexibility between different institutional logics and the public support for R&D contributed to the fact that Finland was the pioneer in cholesterol-lowering functional foods. This finding extends the argument of Spicer (2006) who argues that organisational logics 'transform' as they move across space. We contend that field level logics differ between spatial scale, making some localities more open to change and innovation than others. However, echoing Coenen et al. (2004:1005), we want to avoid 'spatial fetishism' i.e. "that proximity makes interaction better, faster, easier and smoother". Even though local advanced knowledge infrastructure is necessary, we found that such infrastructure is tightly coupled to global science base and that during their evolution clusters need increasing external links to avoid lockouts from the global market place. This is particularly the case during the maturation of the cluster and the organisational field. Hence, in contrast to studies advancing the dualism between local and global or spatially close and more distant learning (Bathelt et al., 2004), we argue for a highly intertwined nature between these spatial levels.

CONCLUSIONS

This paper has highlighted the role of individual agency in a situation when a cluster emerges at the interface between two traditional industries. Our key thesis is that cluster emergence at the intersection of multiple institutional logics necessitates strong institutional entrepreneurs who identify and are willing to justify and defend the new concept. Hence, metaphorically individual scientists act as midwives to novel concepts and cluster emergence. Collectively, such individuals form a ‘meta’ community or ‘hybridised’ community, where distinctive philosophies meet. The concept of coupling helped us to understand how such novel meta-community emerges by blending elements from different communities. Thus, we extend both institutional entrepreneurship approach and the use of coupling metaphor to cluster context.

More specifically, we conceptualised scientists as institutional entrepreneurs and identified the different roles that they possess during cluster emergence. We found that rather than the discovery activities that scientists are typically associated with, institutional entrepreneurs are needed to theorise the problems for which innovations are solutions from the deinstitutionalisation of previous understanding and behaviours until final commercialisation (see also Munir 2005). This contradicts Greenwood et al. (2002) who suggest that theorisation is merely one stage in an institutional change process. Hence, besides identifying scientists as central actors in science-based clusters and emerging fields, our study analytically divided between different activities, and their timing and duration along cluster emergence. Our argument that the ability of scientists to channel knowledge and legitimacy is related to their position in social networks is close to Podolny (2001). However, we contend that in the situations of high uncertainty both the social network positions of scientists and their status, represent assets. Podolny (2001), on the other hand, maintained that status often leads an actor to avoid uncertainty.

We also found that those scientists acting as institutional entrepreneurs had temporal orientations (Emirbayer & Mische, 1998) favouring the future. Yet, in contrast to the institutional entrepreneurship approach, which stresses calculative, interest-driven behaviour, we found that the behaviour of scientists appears to be much more

unplanned and driven by scientific considerations related to problems, knowledge, intuition and ambition. Criticism of the overly rationalistic view of institutional entrepreneurs was pointed out earlier by Djelic and Ainamo (2005) and Hwang and Powell (2005). We suggest that analytically dividing between different types of institutional entrepreneurs and the motivations that drive their behaviour is worth future consideration. Only through such elaboration is it possible to evaluate the validity of the process models of institutional change (Greenwood et al., 2002) and institutional entrepreneurship (Greenwood & Suddaby, 2006). More research is also needed on the role of scientists acting as institutional entrepreneurs and in the emergence of science-based fields and clusters. Furthermore, as entrepreneurship literature recognises cases where individuals “happen into” their entrepreneurial role, future investigations could better elucidate transposition of such ideas to a wider conceptualisation of institutional entrepreneurship.

Even though we believe that this research contributes strongly in particular to the existing understanding of the role of individual agency in emergence of a cluster, the study is also subject to major limitations. The study was restricted to our interpretation of the single emergence path of a cluster in a unique institutional environment. Finland is more than usually supportive of boundary-crossing and novel ideas. The country appears to be distinct as a spawning ground for clusters where spanning of institutional boundaries is encouraged for instance through public financing. Moreover, the small size of the country where “every one knows everybody” and one central media dominates is supportive of the rapid emergence of new clusters. Thus, we invite further comparative research on the role of individuals and organisations in the early phases of cluster emergence, which could either prove or disprove our proposition of scientists creating tight coupling at the system level.

In terms of regional policy-making, our case portrayed innovation as a collective process characterized by both cluster policy initiatives and bottom-up serendipity where creativeness and discovery inherently resides with individual scientists. The challenge for knowledge-intensive clusters is how to establish structures that capture these generators of knowledge. Furthermore, we see a challenge regarding how to link various cluster initiatives more tightly together in a way that would produce synergies without unnecessary overlap. Regardless of the scientific innovativeness of the region, a major

issue emerging from our fieldwork data is that of a lack of entrepreneurial spirit in a business sense. A sound and well-functioning incentive system that would support and promote commercialization of science is an important goal. If the country can combine entrepreneurship with the fortunes of the current dynamisms of Europe locating at fringes like in the Nordic countries as Michael Porter put it in a recent interview (Snowdon & Stonehouse, 2006), the local functional foods agglomeration may perhaps avoid the typical decline found along cluster life cycles.

REFERENCES

- Aldrich, H.E. & Fiol, M.C. 1994. Fools rush in? The Institutional context of industry creation. *Academy of Management Review*, 19 (4): 645-670.
- Amin, A. & Cohendet, P. 2005. Geographies of knowledge formation in firms. *Industry and Innovation*, 12(4): 465-86.
- Asheim, B.T. & Coenen, L. Knowledge bases and regional innovation systems: Comparing Nordic clusters. *Research Policy*, 34: 1173-1190.
- Audretsch, D.B. & Feldman, M. P. 1996. Innovative clusters and the industry life cycle. *Review of Industrial Organization*, 11: 253-273.
- Bathelt, H., Malmberg, A. & Maskell, P. 2004. Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography*, 28(1): 31-56.
- Beekun, R.I. & Glick, W. H. 2001. Organization structure from a loose coupling perspective: A multidimensional approach. *Decision Sciences*, 32(2): 227-250.
- Boland, R. J. & Tenkasi, R. V. 1995. Perspective making and perspective taking in communities of knowing. *Organization Science*, 6(4): 350.
- Breschi, S. & Marleba, F. 2005. *Clusters, Networks, and Innovation*. Oxford: Oxford University Press.
- Bresnahan, T., Gambardella, A. & Saxenian, A-L. 2001. 'Old economy' inputs for 'new economy' outcomes: Cluster formation in the new silicon valleys. *Industrial and Corporate Change*, 10(4): 835-860.
- Brown, J.S. & Duguid, P. 1991. Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovating. *Organization Science*, 2(1): 40.
- Burt, R. S. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge, Mass.: Harvard University Press.
- Campbell, J. 2004. *Institutional change and globalization*. Princeton: Princeton University Press.
- Coenen, L., Moodysson, A. B. 2004. Nodes, networks and proximities: on the knowledge dynamics of the Medicon Valley biotech cluster. *European Planning Studies*. 12(7):1003-1018.
- Coenen, L., Moodysson, J., Ryan, C.D., Asheim B. & Phillips, P. 2006. Comparing a Pharmaceutical and an Agro-food Bioregion: On the Importance of Knowledge Bases for Socio-spatial Patterns of Innovation. *Industry and Innovation*. 13(4): 393-414.

- Corley, E. A., Boardman, C. & Bozeman, B. 2006. Design and the management of multi-institutional research collaborations: Theoretical implications from two case studies. *Research Policy*, 35(7): 975.
- Davenport, T.H. & Prusak, L. 1998. *Working knowledge: How organizations manage what they know*. Boston: Harvard University Press.
- Dhanaraj, C. & Parkhe, A. 2006. Orchestrating innovation networks. *Academy of Management Review*, 31(3): 659-669.
- Denzin, N. K., Lincoln, Y.S. 2003. Introduction: The Discipline and Practice of Qualitative Research. In: N.K Denzin & Y.S. Lincoln (eds.) *Strategies of Qualitative Inquiry*. Thousand Oaks, CA: Sage.
- DiMaggio, P. 1988. Interest and agency in institutional theory. In *Institutional patterns and culture*. Cambridge, MA: Ballinger.
- Djelic, M-L, & Ainamo, A. 2005. The telecom industry as cultural industry? The transposition of fashion logics into the field of mobile telephony. *Research in Sociology of Organizations*, 23: 45-80.
- Dorado, S. 2005. Institutional entrepreneurship, partaking, and convening. *Organization Studies*. 26(3): 385-414.
- Dorée, A. & Holmen, E. 2004. Achieving the unlikely: Innovating in the loosely coupled construction system. *Construction Management & Economics*, 22(8): 827-838.
- Dubois, A. & Gadde, L-E. 2002a. The construction industry as a loosely coupled system: Implications for productivity and innovation. *Construction Management & Economics*, 20(7): 621.
- Dubois, A. & Gadde, L-E. 2002b. Systematic combining: an abductive approach to case research. *Journal of Business Research*, 55 (7): 553-560.
- Dunn, J. 2005. Functional in Finland. *FOOD Manufacture*. March: 36.
- Dutton, J. E. 1993. The making of organizational opportunities: An interpretive pathway to organizational change. *Research in Organizational Behavior*, 15: 195-226.
- Emirbayer, M. & Mische A. 1998. What is Agency? *The American Journal of Sociology*. 103 (4): 962-1023.
- Feldman, M., Francis, J. & Bercovitz, J. 2005. Creating a cluster while building a firm: Entrepreneurs and the formation of industrial clusters. *Regional Studies*, 39(1): 129-141.
- Ferlie, E., Fitzgerald, L., Wood, M. & Hawkins, C. 2005. The Nonspread of Innovations: The Mediating Role of Professionals. *Academy of Management Journal* 48(1):117-134.
- Flick, U. 1998. *An Introduction to Qualitative Research*. Thousand Oaks, CA: Sage.
- Fligstein, N. 2001. Social skill and the theory of fields. *Sociological Theory*: 105-125.
- Freeman, C. 1991. Networks of innovators: A synthesis of research issues. *Research Policy*, 20(5): 499.
- Friedland, R. & Alford, R. R. 1991. Bringing Society Back In: Symbols, Practices, and Institutional Contradictions. In: Powell, W.W. & DiMaggio, P.J. (Ed) *The New Institutionalism in Organizational Analysis*: 232-263. Chicago: The University of Chicago Press.
- Gertler, M.S. and Levitte, Y.M. 2005. Local nodes in global networks: The geography of Knowledge Flows in Biotechnology Innovation. *Industry and Innovation*. 12(4): 487-507.
- Golden-Biddle, K. & Locke, K. 2006. *Composing qualitative research* (second ed.). Thousand Oaks, CA: Sage.

- Gordon, I. R. & McCann, P. 2000. Industrial Clusters: Complexes, Agglomeration, and/or social networks? *Urban Studies*, 37(3): 513-532.
- Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3): 481-510.
- Granovetter, M. 1992. Problems of explanation in economic sociology. In N. Nohria & R. G. Eccles (eds.), *Networks and organizations: Structure, form, and action*: 25-56. Boston, MA: Harvard Business School Press.
- Greenwood, R. & Suddaby, R. 2006. Institutional entrepreneurship in mature fields: The big five accounting firms. *Academy of Management Journal*, 49(1): 27-48.
- Greenwood, R., Suddaby, R. & Hinings, C. R. 2002. Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal*, 45(1): 58-80.
- Gulati, R. & Gargiulo, M. 1999. Where do interorganizational networks come from? *American Journal of Sociology*, 104(5): 1439-1493.
- Heasman, M. & Mellentin, J. 2001. *Functional foods revolution. Healthy people? Healthy profits?* Sterling, VA: Earthscan.
- Håkanson, L. 2005. Epistemic communities and cluster dynamics: On the role of knowledge in industrial districts. *Industry & Innovation*, 12(4): 433-463.
- Hoffman, A. J. 1999. Institutional evolution and change: Environmentalism and the U.S. chemical industry. *Academy of Management Journal*, 42(4): 351-371.
- Hwang, H. & Powell, W. W. 2005. Institutions and entrepreneurship. In S.A. Alvarez, R. Agarwal, & O. Sorenson (eds.), *Handbook of entrepreneurship research: Disciplinary perspectives*. New York, NY: Kluwer Publishers.
- Iannacci, F. 2005. Coordination processes in open source software development: The Linux case study. *Emergence: Complexity & Organization*, 7(2): 21-31.
- Ipe, M. 2003. Knowledge Sharing in Organizations: A Conceptual Framework. *Human Resource Development Review*, 2(4): 337-359.
- Jarillo, C. 1988. On strategic networks. *Strategic Management Journal*, 9(1): 31-42.
- Jones, C. 2001. Co-evolution of Entrepreneurial Careers, Institutional Rules and Competitive Dynamics in American Film, 1895-1920. *Organization Studies*, 22(6): 911-944.
- Lang, J. C. 2004. Social context and social capital as enablers of knowledge integration. *Journal of Knowledge Management*, 8(3): 89-105.
- Law, M. 2000. Plant sterol and stanol margarines and health. *Br Med J*, 320: 861-864.
- Lawrence, T. B., Hardy, C. & Phillips, N. 2002. Institutional effects of interorganizational collaboration: The emergence of proto-institutions. *Academy of Management Journal*, 45(1): 281-290.
- Liebeskind, J. P., Oliver, A.L., Zucker, L. & Brewer, M. 1996. Social Networks, Learning, and Flexibility: Sourcing Scientific Knowledge in New Biotechnology Firms. *Organization Science*, 7 (4): 428-443.
- Makela, K., Kalla, H. & Piekkari, R. 2007. Interpersonal similarity as driver of knowledge sharing within multinational corporations. *International Business Review*. 16:1-22.
- Maskell, P., Bathelt, H. & Malmberg, A. 2006. Building global knowledge pipelines: The role of temporary clusters. *European Planning Studies*, 14(8): 997-1013.
- McEvily, B. & Zaheer, A. 1999. Bridging ties: A source of firm heterogeneity in competitive capabilities. *Strategic Management Journal*, 20(12): 1133.
- Miettinen, T. A., Puska, P., Gylling, H., Vanhanen, H., & Vartiainen, E. 1995. Reduction of serum cholesterol with sitostanol-ester margarine in a mildly

- hypercholesterolemic population. *The New England Journal of Medicine*, 333(20): 1308-1312.
- Munir, K. A. 2005 'The social construction of events: A study of institutional change in the photographic field'. *Organization Studies* 26 (1): 93-112.
- Nohria, N. 1992. Is a network perspective a useful way of studying organizations? In N. Nohria & R. Eccles G. (eds.), *Networks and organizations: Structure, form, and action*. Boston, Massachusetts: Harvard Business School Press: 1-22.
- Nonaka, I. & Konno, N. 1998. The concept of 'Ba': Building a foundation for knowledge creation. *California Management Review*, 40(3): 40-54.
- Nooteboom, B. 2004a. Innovation, learning and cluster dynamics. *ERIM Report Series Research in Management. Erasmus Research Institute of Management*.
- Nooteboom, B. 2004b. *Inter-firm collaboration, learning & networks* London: Routledge.
- Orton, J. D., & Weick, K.E. 1990. Loosely coupled systems: A reconceptualization. *Academy of Management Review*, 15(2): 203.
- Owen-Smith, J. & Powell, W. W. 2004. Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community. *Organization Science*, 15(1): 5-21.
- Podolny, J. M. 2001. Networks as the Pipes and Prisms of the Market. *American Journal of Sociology*, 107(1): 33-60.
- Porac, J. F., Howard, T. & Wilson, F. 1995. Rivalry and the industry model of Scottish knitwear producers. *Administrative Science Quarterly*, 40(2): 203-227.
- Porter, M. 1998. Clusters and competition: New agendas for companies, governments, and institutions. In M. Porter E. (ed.), *On competition*. Boston: Harvard Business Review Book.
- Pouder, R. & St. John, C. H. 1996. Hot spots and blind spots: Geographical clusters of firms and innovation. *Academy of Management Review*, 21(4): 1192-1225.
- Rosenfeld, S. A. 1997. Bringing business clusters into the mainstream of economic development. *European Planning Studies*, 5(1): 3-23.
- Saxenian, A-L. 1994. *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
- Scott, W.R. 1983. The organization of environments: Network, cultural, and historical elements. In J.W. Meyer & R.W. Scott (eds.), *Organizational environments. Ritual and rationality*. Beverly Hills, CA: Sage.
- Scott, W.R. 1995. *Institutions and organizations*. Thousand Oaks, CA: Sage.
- Sorenson, O. 2005. Social networks and the persistence of clusters: Evidence from the computer workstation industry. In: Breschi, S. & Marleba, F. (Ed.) *Clusters, networks, and innovation*. Oxford: Oxford University Press: 297-316.
- Snowdon, B. & Stonehouse, G. 2006. Competitiveness in a globalised world: Michael Porter on the microeconomic foundations of the competitiveness of nations, regions, and firms. *Journal of International Business Studies*, 37(2): 163-175.
- Spicer, A. 2006. Beyond the convergence-divergence debate: The role of spatial scales in transforming organizational logic. *Organization Studies*, 27 (10): 1467-1483.
- Stake, R. E. 2003. Case studies. In: Denzin, N.K. & Lincoln, Y.S. (eds.) *Strategies of Qualitative Inquiry*. Thousand Oaks, CA: Sage.
- Suchman, M. C. 1995. Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3): 571-610.
- Sölvell, Ö, Lindqvist, G., & Ketels, C. 2003. *Cluster Initiative Greenbook*. Stockholm, Sweden: Vinnova.

- Sydow, J. & Staber, U. 2002. Organizational adaptive capacity. *Journal of Management Inquiry*, 11(4): 408-424.
- Ritvala, T. & Granqvist, N. 2006. *Institutional entrepreneurs and structural holes in new field emergence- Comparative case study of cholesterol-lowering functional foods and nanotechnology in Finland*. Helsinki School of Economics Working Papers W-411.
- Thornton, P.C. & Flynn, K. H. 2003. Entrepreneurship, networks, and geographies. In Z.J Acs & D.B. Audretsch *Handbook of Entrepreneurship*. Kluwer Law International.
- Weick, K.E. 1976. Educational organizations as loosely coupled systems. *Administrative Science Quarterly*, 21(1): 1.
- WHO. 2007. The ten leading causes of death by broad income group 2002. Fact sheet No 310/February 2007. <http://www.who.int/mediacentre/factsheets/fs310.pdf>.
- Wolfe, D. A. & Gertler, M. S. 2004. Clusters from the inside out: Local dynamics and global linkages. *Urban Studies*, 41(5/6): 1071-1093.
- Zucker, L.G., Darby, M. R., & Torero, M. 2002. Labor mobility from academe to commerce. *Journal of Labor Economics*, 20(3): 629-660.

ESSAY 2

Institutional Entrepreneurs and Structural Holes in New Field Emergence - Comparative Case Study of Cholesterol-lowering Functional Foods and Nanotechnology in Finland

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Abstract: This paper extends the emerging body of literature on institutional entrepreneurship by introducing the concept of structural holes to investigate new field emergence. We argue that during field emergence individuals and organizations hold different roles as bridge builders over structural holes between previously unconnected fields and actors. Such pioneers of new fields may draw from their existing network positions and influence the emerging field level institutions. By drawing from a comparative case study of cholesterol-lowering functional foods and nanotechnology in Finland, we provide rich insights into the characteristics of such actors, their bridging attempts and the outcome of eventual field emergence. The research provides interesting implications for further development of institutional theory as well as for practitioners working in emerging fields.

Key words. Field emergence; institutional entrepreneurship; structural holes; cholesterol-lowering functional foods; nanotechnology

1. INTRODUCTION

Investigating the dynamics of the emergence of new institutional fields is important for comprehending, how institutions and industrial systems emerge and transform. Lawrence and Phillips (2004: 690) argue, “understanding how institutional fields emerge is an important next step in the development of institutional theory”. As a response to the theory’s limited understanding of agency and change (DiMaggio, 1988; Scott, 2001; Dacin et al., 2002), and the largely lacking explanations on how the emergence of new practices takes place in the first place (Leblebici et al., 1991; Munir, 2005), approaches incorporating agency have been developed. The institutional entrepreneurship approach adopts a more dynamic view and stresses the role of active agents, i.e. institutional entrepreneurs, in institutional change (DiMaggio, 1988; Garud et al., 2002; Campbell, 2004; Lawrence and Phillips, 2004; Maguire et al., 2004). Regarding field emergence, previous research in institutional entrepreneurship investigates the role of institutional entrepreneurs as the builders of legitimacy around their cause, aiming to create new institutions such as standards and policies that are aligned with their interests (Garud et al., 2002); and discusses the role of local actors and discourses in the emergence of a new institutional field (Lawrence and Phillips, 2004; Maguire et al., 2004). Consequently, in the institutional entrepreneurship approach bottom-up processes for building legitimation are crucial and challenge the top-down adaptation to institutional isomorphism suggested by the new institutional theory.

However, the stronger incorporation of agency to the neoinstitutionalist accounts has resulted in the need to understand the relational dynamics between the actors crafting those emerging institutions. Maguire et al. (2004: 676) suggest, “as scholars interested in institutional phenomena move increasingly to incorporate agency and change into the studies, they need to be aware of and draw more closely on research from these other research traditions and domains”. These authors particularly stress the importance of network approaches. In their grounding article on the new institutional theory Meyer and Rowan (1977: 353) state, “all organizations, to one degree or another, are embedded in both relational and institutionalized contexts”. However, there are rare attempts to investigate the dynamics of relational and institutional components in the emergence of

new fields of activity. For example, the way in which institutional entrepreneurs participate in the creation and shaping of new networks, which contribute to field emergence, has received little attention in the neoinstitutionalist tradition.

In this paper we address the outlined gap by incorporating the notion of structural holes from social network theory to the institutional entrepreneurship approach. Structural holes refer to the absence of connection between separate networks, resulting in different flows of information in the networks (Burt, 1992; Burt, 2000). We argue that institutional entrepreneurs bridge across such previously unconnected networks in their attempts to shape their institutional contexts. This paper is motivated by the question, *what characterizes early institutional entrepreneurs and their bridging behavior, and how does such activity contribute to the emergence of new fields?* The aim of this paper is to develop theory and deepen the conceptual understanding of the role and actions of institutional entrepreneurs in new field emergence, and to investigate the underlying institutional and network conditions enabling such change.

The conceptual discussion is analyzed through a comparative case study of cholesterol-lowering functional foods and nanotechnology in Finland. Such comparative research setting complements earlier single industry studies of field emergence (Van de Ven and Garud, 1993; Powell et al., 1996; Murtha et al., 2001; Garud et al., 2002). The emergence of both fields rely on developments in science, however, the underlying logics and behaviors driving the emergence are different between the cases. Functional foods represents a field driven by scientific progress in nutrition research and technology, and by changing perceptions on the role of diet in health promotion. This novel approach has resulted in the emergence of multidisciplinary research networks and requirements for institutional renewal. Nanotechnology can be represented as an ameba-like concept that a bridges across a set of technologies developed in many domains of scientific research. Wide adoption of the concept has resulted in mutual recognition and shared identities among the members of the previously separate fields, and in the emergence of both new networks and novel institutional components. Finland provides an institutionally unique context for investigating the emergence of these fields, since it was among the first countries in the world to promote and publicly legitimize the fields by forming technology programs around them.

This paper makes several contributions to the investigation of how new institutional fields emerge. Firstly, our study highlights the role of individual and organizational activity in field emergence and presents further evidence of the role of agency in institutional change. Secondly, in terms of theory development, we build an analytical framework drawing from conceptual discussion and our empirical findings. This permits simultaneous consideration of the institutional and relational processes in field emergence, and bridges between the neoinstitutional and network approaches through the concept of agency. Our empirical data strongly suggests that institutional entrepreneurs, both individual and organizational, contribute significantly to network emergence and through this activity change their institutional environments. Thirdly, we aim to make a methodological contribution by presenting a comparative case study approach to capture the bridging activity across structural holes in emerging fields, and contribute to the qualitative investigation of network emergence.

The remainder of the paper consists of four sections. We begin by discussing the type and position of institutional entrepreneurs and elaborate further the notion of structural holes in this context. After this, we present the empirical case studies to illustrate the dynamics of the bridging activity by institutional entrepreneurs. Drawing both on the empirical data and conceptual discussion, we put forward our findings and build a framework for new field emergence. Finally, we discuss the limitations of the research and the paths for further investigations.

2. INSTITUTIONAL ENTREPRENEURS AS CATALYSTS OF FIELD EMERGENCE

New field emergence is a complex phenomenon, which calls for more conceptual and empirical investigation. Lawrence and Phillips (2004: 691), building on DiMaggio & Powell (1983) define a field as “a set of organizations that constitute a recognized area of life, are characterized by structured network relations, and share a set of institutions”. Fields include organizations that stand outside an industry, but have influence on or constrain organizations (DiMaggio, 1991), examples of fields being education and biotechnology. For the emergence of a field new social relationships need to be formed

and a mutual recognition and identity within the actors, based on shared interests, goals and values, is required. We define field emergence as the process through which cognitive field boundaries, network relations and set of institutions take shape. We focus especially on individual and organizational action setting the field emergence in motion during the early stage of emergence. According to Lawrence and Phillips (2004, 692), “although pre-existing institutions constrain the potential range of activities and relationships that will make sense to other actors, they also provide the potential for innovative combinations and new practices”. Therefore, institutions are not fixed nor determined, but subject to change induced by motivated actors (Lawrence and Phillips, 2004). Hence, agency plays a central role in the emergence of new institutional fields.

In this section, we discuss the emergence of new fields through the actions of institutional entrepreneurs, both individual and organizational. Firstly, we present the types and sources of legitimacy, which provide the actors with means to act as institutional entrepreneurs. Thereafter, we suggest how the concept of structural holes may assist in the investigation of institutional entrepreneurship in new field emergence.

Types and status of institutional entrepreneurs

New field emergence requires agency of various kinds. Institutional entrepreneurs have interest in particular institutional arrangements and they leverage resources to create new institutions or to transform the existing ones (e.g. DiMaggio, 1988; Maguire et al., 2004). Similarly, the previous accounts on institutionalization (Zucker, 1977; Galaskiewicz, 1991; Jepperson, 1991) emphasize the role and activities of champions (Tolbert and Zucker, 1996) and first movers (Fligstein, 1991) in institutional change. In order to be successful, earlier studies on interaction between culture, politics and social movements in institutional change (Fligstein, 1996; Rao, 1998; Lounsbury et al., 2003) imply that institutional entrepreneurs may need to pass through multiple levels of activity, from the grassroots to the public policy level. Hence, the investigation of characteristics and sometimes confrontational actions of institutional entrepreneurs is important to the understanding of how new institutional fields emerge. Both individual and organizational actors may become institutional entrepreneurs (e.g. Lawrence and Phillips, 2004; Maguire et al., 2004; Munir, 2005; Munir and Phillips, 2005), but their legitimacy and possibilities for action draws from different sources.

According to Maguire et al. (2004), institutional entrepreneurs have strong positions with wide legitimacy and ability to bridge between diverse stakeholders; and they “theorize” i.e. develop and specify abstract categories and the elaborate of chains of cause and effect (Greenwood et al., 2002), and institutionalize new practices by connecting them to stakeholders’ routines and values. Such activity contributes to the emergence of new institutions (Maguire et al., 2004). In a similar vein, both Garud et al. (2002) and Fligstein (1997) argue that institutional entrepreneurs deploy social and political skills to both motivate and sustain cooperation. To do this it is beneficial for institutional entrepreneurs, both individual and organizational, to have a strong subject position (Foucault, 1972; Lawrence, 1999; Maguire et al., 2004). According to the previous literature, for individual actors a strong subject position may draw from a formal, bureaucratic position, but also from other socially constructed and legitimate identities (Oakes et al., 1998). These include for instance the perceived status as a pioneer in a field in the form of a star researcher or a visionary employee within an innovative organization. Equally, for organizational actors legitimacy is drawn from various sources such as the control of institutional information; expertise in technical, legal or political matters; and the degree to which it is considered as a leading organization in the field provides the organization with the ability to strategically affect its environment (Lawrence, 1999).

However, Maguire et al. (2004) argue that an emerging field is often characterized by the absence of clearly defined, dominant subject positions. This situation may provide actors, who have not been previously considered powerful, with pioneering opportunities if they possess access to relevant networks of knowledge. Likewise status marginality (Leblebici et al., 1991; Palmer and Barber, 2001) and social network embeddedness (Rogers, 1962; Davis and Greve, 1997) have been connected to higher rate of adoption of innovations. We argue that structural network positions facilitate the emergence of institutional entrepreneurs. Their position in the existing institutional contexts helps to understand, how particular individuals and organizations are able to bridge across structural holes in the first place. Indeed, incorporating agency to the neoinstitutionalist accounts makes it increasingly important to understand the role of networking in institutionalization activities.

Structural holes and position of institutional entrepreneur

The notion of structural holes from social network theory provides with tools to conceptualize the bridging activity conducted by institutional entrepreneurs. In network approaches, the actor has traditionally been given a central role. Social network theory conceptualizes networks as channels, conduits or 'plumbing' through which knowledge, information, goods and favours in return are transmitted, and actors or 'nodes' mediate and control these flows (Powell, 1990; Burt, 1992; Kogut, 2000; Podolny, 2001). Structural hole refers to the absence of connection between separate networks, resulting in different flows of information in the networks (Burt, 1997). A person belonging to otherwise disconnected networks connects between the separate flows of information (Burt, 1997). These bridging individuals monitor and move information effectively and are more in the control of their surroundings than in a formal bureaucracy (Burt, 2000). This enables the participation in, and the control of, information diffusion (Burt, 1992). The control benefits and causality inbuilt in the concept of structural holes differentiates it from the Granovetter's (1973) 'weak-tie' argument (Burt, 1992). According to Kilduff and Tsai (2003), individuals have a strong tendency for homophily, suggesting that people cluster together and support each other, based on a social comparison of shared characteristics. The authors suggest that structural holes are a result of the fragmentation into separate groups with little or no contact between them. However, structural holes between groups does not mean that people are unaware of each other; rather, it suggests that people are focused on their own activities and, hence, little cooperation takes place between them (Burt, 2000). The activities and membership of established fields may be characterized by this kind of turn inward, and hence brokering is needed in order for new influences to enter institutionalized fields.

Structural holes are typically discussed in the context of established networks or fields (see Burt, 2000 for a review). In these accounts, the central position and ability to bridge separate networks gives the actor an advantage over the other actors in terms of accessing novel sources of knowledge. This may also be the case in the emerging networks: the membership of various overlapping networks may result in a novel combination of ideas, which may trigger, and contribute to, the emergence of a new field. However, in emerging networks somewhat different logics may apply for bridging structural holes than in the established networks. Emerging networks are characterized

by continuous bridging over the structural holes that separate existing network structures thus creating new nodes. Actors bridging these previously separate nodes may be characterized as institutional entrepreneurs, and with their bridging activity they also create networks, in which they act as central nodes. When conceptualizing networks in terms of plumbing, where knowledge and ideas flow around the network, the previously centrally located and established actors may be more susceptible to receive and absorb knowledge that supports maintaining that central position. Hence, a previously peripheral actor may have a bigger incentive to create novel connections and institutional structures to support some emerging activity. Consequently, these individual or organizational actors may turn into institutional entrepreneurs, and hold the central position in the novel emergent networks. These brokers between disconnected networks are entrepreneurs in a literal sense – persons, who add value by brokering the connection between others (Burt, 1992; Burt, 1997). We suggest that the activity of building bridges over dispersed networks is a task conducted by institutional entrepreneurs. Interestingly, Porter et al. (2005) found that a handful of individuals may dominate in overlapping research and business networks, the convergence of which may result in a field emergence. In particular, the role of key scientists in bridging between academic and commercial communities and thereby facilitating the flow of knowledge, ideas and other resources from the university lab to commercial development appears to be crucial for the emergence of a new field (Porter et al., 2005).

At the organizational level, on the other hand, Owen-Smith and Powell (2004) illustrated that during the emergence stage of a new field public sector actors are the ones that bridge between separate actors, whereas private sector actors play an increasingly central role in the later stages of field emergence. This suggests that public organizations have the capacity and incentive to act as initial institutional entrepreneurs in many fields. Hargadon and Sutton (1997) demonstrate how, in developing new products, a firm may exploit its structural position and bridge structural holes between different industries. This implies that the role of broker organizations is important for transferring ideas and technological solutions between established and emergent industries. Such activity, which could in many cases be characterized as institutional entrepreneurship, may well result in the emergence of a new field. According to Spencer (2003), firms may act as “global gatekeepers” or “global representatives” and mediate technological knowledge from one network to another across borders and,

hence, bridge structural holes between domestic and foreign networks. Again, bridging across national boundaries gives rise to technological fields, which tend to be global from their inception. However, the social context and means by which such bridging activity take place are still largely undiscovered.

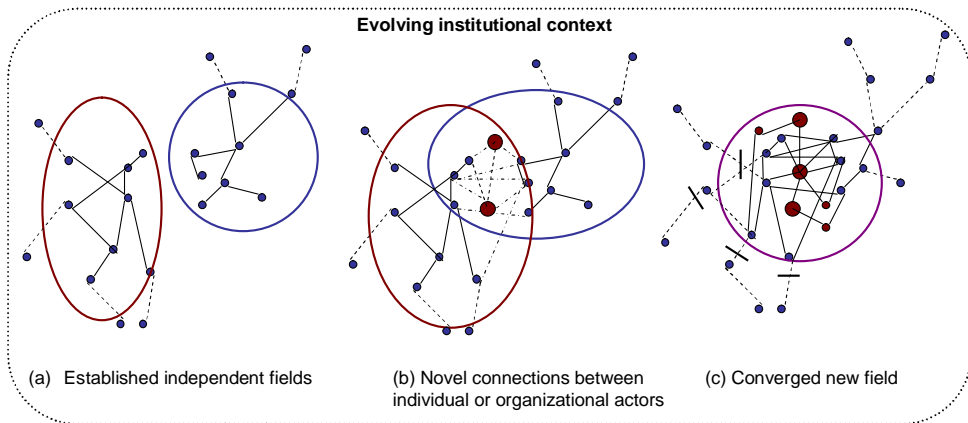


Figure 1: Field emergence as a process of bridging between structural holes

Figure 1 summarizes the conceptual discussion described above. New fields typically have their origins in public and private research (a). Bridging between academic researchers and industry, or between researchers in a company and corporate decision makers, may result in the emergence of a completely new activity on both organizational and field levels and the emergence of new actors (b). Consequently, when the actors bridge over structural holes between many organizations and become aware of each other, a new field may emerge. Isolation from existing institutionalized systems (Van de Ven, 1993) begins to take place at this stage, as indicated by the small crossing lines (c). Actors benefit from both strong subject position in their institutional environments, as well as from central position in their networks. In order for a new field to emerge most parts of the institutional infrastructure have to be in place, and some degree of wider societal level legitimation to exist, often stemming from the legitimacy

of the individual or organizational actors. In the following section we investigate such processes in more detail.

3. FIELD EMERGENCE IN CHOLESTEROL-LOWERING FUNCTIONAL FOODS AND NANOTECHNOLOGY IN FINLAND

This section presents the cases on cholesterol-lowering functional foods and nanotechnology in Finland aiming to map the characteristics of early institutional entrepreneurs and their bridging behavior, and investigating, how such activity contributes to the emergence of new fields. We also explore under what circumstances such entrepreneurial behavior is likely to be successful. Kenis and Knoke (2002) suggest that researchers of emerging relationships should investigate recently emergent organizational fields and study their early developmental phases as these relationships are far less institutionalized in emergent fields compared to mature fields. Functional foods and nanotechnology provide particularly interesting cases to study field emergence due to their future potential and the requirements they set for institutional renewal in a longer term. Theoretically interesting comparative research setting between nanotechnology and functional foods was identified, when the authors came into contact while conducting independent inquiries of field emergence, and in the discussions found interesting similarities and differences between the cases. The emergence processes of the two fields are, in part, similar, enabling the discussion of potentially universal features of field emergence, but also many field-specific differences were to be found. For instance, the underlying drivers of the field level legitimacy, and the duration of the emergence processes offer new analytical insights. Finland provides a relatively bounded and coherent context for investigation of field emergence. Finland is a Nordic country with 5.3 million inhabitants, and scientifically and technologically among the most advanced nations in the world in both described fields. Such methodological choices make it easier to track the complex process of emergence on both institutional and network level.

3.1 Methodology

Contrasting two quite different emerging fields at different stages of emergence has provided us with a broader understanding of the mechanisms of emergence, which are partly industry-driven and context specific, and partly universal. A “two-case” case study (Yin, 2003, 53) combines contextual insight, i.e. the strength of rich descriptions of a single case (Dyer and Wilkins, 1991), and more robust result of multiple case studies (Eisenhardt, 1989; Parkhe, 1993). This paper aims to increase the understanding of core concepts and new ideas (Sutton, 1997), and investigate the connections between them and thus to develop new theory. Rather than relying on quantitative network data to identify central actors in field emergence, we use qualitative methods to uncover and describe the attributes and actions of the pioneering actors. DiMaggio (1992) contends that individuals, who bridge between structural holes, are not easily captured by formal analysis of network data. Such brokers are well connected in several networks rather than extremely central in just one, hence purely structural data on a single network may not identify them.

Networks were captured through a case method based on interviews, observations and written data. Hence, data triangulation was combined with investigator triangulation (Denzin, 1978) to overcome not only the problems of bias and validity, but also to foster broader and more reflexive consideration of the research context (Cox and Hassard, 2005). Initially, networks and key nodes were identified with the help of written texts and pilot interviews. Thereafter, qualitative network analysis was conducted from the perspective of focal actors, i.e. asking the identified institutional entrepreneurs and related actors further questions regarding other actors in their network and entrepreneurial activity. This type of individual in-depth interviews have been suggested as a best way to acquire knowledge of network building attempts (Kanter and Eccles, 1992). Interviews lasted between one and four hours. Informants included top researchers from universities, representatives of public agencies conducting applied research or coordinating national and EU level programmes, and informants from both small start-ups and large multinational firms. In the functional foods case, 13 interviews were carried out between August 2004 and May 2006. For the nanotechnology case, 17 interviews were conducted between November 2004 and October 2005. All interviews were recorded and transcribed before the analysis.

The empirical analysis was conducted by collecting events from the data that illustrate field emergence across the cases. Both within-case sequence analysis and cross-case pattern search between case similarities and differences was conducted (Eisenhardt, 1989). Drawing from the within and cross-case analyses the case descriptions, delineated to the key actors in terms of creation of new networks and institutions, were written. The findings were then drawn based on the similarities and differences between the two empirical settings.

3.2 Emergence of cholesterol-lowering functional foods in Finland

The philosophy of ‘food as medicine’ underlines the concept of functional foods. The concept of functional foods remains vague and there is no universally accepted definition. At a rather general level: “a food can be regarded as ‘functional’ if it is satisfactorily demonstrated to affect beneficially one or more target functions in the body; beyond adequate nutritional effects, in a way that is relevant either to improved state of health and well-being and/or reduction of risk of disease” (Diplock et al., 1999: 1). Functional foods are associated with the prevention and treatment of chronic, degenerative diseases such as cardiovascular disease (CVD), the leading cause of death worldwide (e.g. Bonow et al., 2002).

In the following, we focus on functional foods that aim to combat high blood cholesterol, the major causal risk factor for CVD (Puska, 2000). Even though we concentrate on Finland, the pioneer in the field of cholesterol-lowering functional foods, we emphasize the role of cross-border activities for field emergence. The foundation for the strong Finnish science and research base in functional foods is built on the long term research efforts conducted in universities and other public research organizations. Yet, the emergence of cholesterol-lowering functional foods field required strong individual agency. Indeed, the early developments, can to a large extent, be traced back to few entrepreneurial individuals, working in both public and private organizations.

Deinstitutionalization of taken-for-granted eating habits and early brokering by institutional entrepreneurs 1972-1989

The early research was embedded not only in high-level local competence in cholesterol research and raw materials such as abundant forest resources, but also in severe local health problems. A public health initiative called ‘the North Karelia Project’ was launched in 1972 and coordinated by the National Public Health Institute and the World Health Organization (WHO) to reduce exceptionally high coronary heart disease mortality rates in the county of North Karelia in Eastern Finland. These early efforts to combat elevated blood cholesterol, created partly the institutional need for developing the Finnish nutrition industry. The most visible individual actor in the project was its leader Pekka Puska, who introduced radically new ideas to various rather conservative audiences. Puska successfully navigated between the taken-for-granted eating habits (diet high in saturated fat and salt), the political pressure to lower high mortality figures, and the interests of the food industry. By drawing on the legitimation provided by the public health system and the WHO, Puska was able to build the early bridges between the contradictory interests of key stakeholders. The bridging mechanisms involved, for instance, participation of the local lay opinion leaders and their interpersonal networks. Engagement of the people at the grassroots level, and consensus building within the medical community as well as at the political level, were crucial for subsequent institutional change (cf. Lounsbury et al., 2003). Through newfound demand for healthier food, the food industry also became motivated to participate in this collective effort. Besides Puska, Professor of Pharmacology Heikki Karppanen, was a key pioneering actor in functional foods. Karppanen was invited by Puska to join the project as there was strong research evidence that increasing levels of salt in the diet created a considerable health threat. Karppanen, with broad expertise in pharmaceuticals research, was in the position to bring ideas from pharmaceuticals research into the food sector, a move which well reflects the position of functional foods within a ‘gray area’ between foods and pharmaceuticals. Subsequently, mineral salt reduced with sodium and added with potassium and magnesium (called later Pansalt®), was introduced in Finland in 1979 to help combat high blood pressure.

The late 1980s saw the development of a chain of events, which resulted in the world’s first cholesterol-lowering functional foods margarine known as Benecol®. This product

played the central role in the legitimation of functional foods in Finland as well as abroad. In response to the evidence from the North Karelia project describing the harmful effects of the use of dairy fats on cholesterol levels and the development of CVD, a new type of rape plant was developed that grew well in the northern climate of Finland. The Raisio Group, originally founded by Finnish wheat farmers in 1939, invested in developing and researching the cholesterol-lowering effects of the rapeseed oil. However, the initial trigger which led to Benecol came from a forest products company. In the late 1980s the UPM-Kymmene Kaukas mill had a practical problem of how to dispose of a wood byproduct, from which a plant sterol called sitosterol may be separated. In a search for potential applications for sitosterols, UPM delivered a sample of sitosterol to Professor Tatu A. Miettinen, a renowned cholesterol scientist at the Helsinki University Central Hospital. Miettinen had built his competence on the cholesterol-lowering effects of plant sterols when working at the Rockefeller Institute for Medical Research in New York between 1963 and 1965. During 1980s Miettinen acted as the chairman of the scientific committee of Valio Ltd, the biggest dairy company in Finland, when he proposed mixing sitosterol to butter. However, Valio's R&D manager refused this idea. Later the company's entire scientific committee was dismissed due to a dispute within the company concerning a promotion campaign relating to dairy fats, which the scientific committee rejected. This battle culminated in 'the great fat debate' in the leading Finnish newspaper Helsingin Sanomat in 1988, and resembled institutional war (Hoffman, 1999). Having experienced such a backlash Miettinen had the problem of finding a committed partner to develop his ideas towards an industrial application. In 1989 Miettinen contacted R&D manager of Raisio, Ingmar Wester; a bridging attempt which proved to be successful. By building on the company's rapeseed oil research and experience Wester was able to develop and patent sitostanol ester, a fat soluble plant stanol derivative used in Benecol within a year.

The early emergence of cholesterol-lowering functional foods in Finland was distinguished with periods of competing institutions and power games where top scientists played key roles as institutional entrepreneurs by introducing radically new concepts and bridging structural holes between different fields of industries, between academia and industry and even between countries. The strong national level competence in plant sterol analytics together with health problems were crucial backdrops to the developments, yet the process was highly serendipitous. Regardless of

the different sources, processes and time of the technological breakthroughs all our interviewees pointed out that a major task of an institutional entrepreneur is to be a persistent promoter of new ideas. As one participant articulated:

[...] "It has been the biggest task, that one sells these ideas within the firm- it has been a long process." (Vice President R&D)

Organizational level approval and early institutionalization of functional foods 1990-1996

The early 1990s was continued to be marked with uncertainties since there was no consensus or understanding, whether these new cholesterol-lowering concepts would become institutionalized. As one participant stated:

[...] "when we ventured into this there was still a very big question mark and contradictory evidence whether anything will come out of it (functional foods) - is it just a butterfly or a fad? [...] Are we investing in this research just for nothing?" (Managing Director)

However, the announcement of the first clinical test results of Benecol in a major conference of the American Heart Association in 1991 resulted in international interest in plant sterols. Subsequently, in 1993 a large trial was started within the North Karelia Project, the results of which were published in the prestigious New England Journal of Medicine. The launch of Benecol in Finland in 1995 marked the birth of the current functional foods market in Europe and the U.S. (Mellentin, 2005) and led to new seeds of ideas about the use of plant sterols. In addition to 'host' organization's approval, the involvement of state finance through the Technology Agency of Finland (Tekes), a quasi governmental organization, signified a form of 'official' belief in such foods. Although, Tekes attempted to build new networks between the emerging functional foods actors through a technology program in the mid 1990s their early bridging attempts failed. For historical reasons, such as the protected domestic markets prior to Finland's membership of the EU, the general attitude towards the 'others' was perceived as somewhat distrustful.

Towards field- level support structures and global markets 1997-2005

Towards the late 1990s the global market for functional foods exceeded \$40 billion and grew nearly by ten per cent annually (Datamonitor, 2004). By 1997 functional foods actors in Finland were ready to sit around the common table and the first technology

programme in foods in Finland commenced. This programme was continued until 2004 and can be seen to have bridged structural holes between academia and industry. It resulted in the finance and development of two subsequent cholesterol-lowering concepts MultiBene® and Diminicol®. The development and commercialization of the concepts were the result of collaborative projects between Tekes, the Helsinki University Department of Pharmacy, and the firms involved. The MultiBene innovation was accomplished by Professor Karppanen basing on his previous Pansalt innovation and a growing body of knowledge on plant sterols. Besides lowering cholesterol level, MultiBene benefits blood pressure and bone health. In the case of Diminicol, a science based cost-effective way of producing sterols, Managing Director Bengt Hällsten of a subsidiary of the leading Finnish coffee and seasoning firm Paulig Group, had a key role as a bridge builder and coordinator between dispersed research networks. Along the way what started as a minor research project around seasoning and herbs ended up as a subsidiary developing, producing and marketing functional foods ingredients, reflecting serendipity typical to scientific discoveries.

In addition to Tekes, biotechnology department of the Technical Research Centre of Finland (VTT) was involved in two food related bioprogrammes during 1997-2004 and actively participated in EU level research networks. In 2005 the national level promotion of the field continued as the Finnish National Fund for Research and Development (Sitra) launched a five year programme to build an internationally competitive nutrition cluster in Finland, and the Academy of Finland started to prepare for a new multidisciplinary research programme. Besides these efforts to raise the cluster type of networking activity to a new level the increasing legitimation of functional foods was also reflected on the educational curricula of Finnish Universities and on the establishments of research centers such the Functional Foods Forum at the University of Turku. At present a comparable trend in clustering of functional foods actors and competence can also be seen in some other countries such as in Sweden.

In the late 1990s field specific regulative institutions started to take shape. However, legislation appeared rather disruptive particularly for smaller actors with limited resources. The EU novel foods legislation, which became effective in 1997, has generally been considered sluggish and complicated. Both MultiBene and Diminicol faced significant regulatory hurdles in Europe and waited for a needed EU approval for

three to four years. Although Benecol was launched in Finland, i.e. within the EU, before such regulations were effective the product faced difficulties in getting approval from the Food and Drug Administration in the U.S. Meantime, its multinational competitor Unilever, who later developed their own plant sterol-enriched margarine, was first to market in the US in 1999. This form of rapid imitation and institutionalization of innovations typically characterizes emerging fields (Lawrence and Phillips, 2004). However, while the European market for cholesterol-lowering functional foods is maturing as indicated by retailers' own label alternatives, the US consumers have not yet taken up the concept of cholesterol-lowering foods. To conclude, our empirical data suggests that institutional entrepreneurs of a new field also act as 'global knowledge brokers' (Spencer, 2003) between the domestic and more global networks, and through this activity they test and may influence regulative, normative and cognitive institutions (Scott, 2001) of varying institutional and market conditions.

In the following section we discuss the emergence of nanotechnology in Finland. Nanotechnology has many application areas, for instance in the use of nano-sized particles to increase solubility of sterols in novel food applications as well as in the encapsulation of sterols. However, the present case focuses on the key early events and actors, who brought the concept to Finland especially in the field of electronic and developed the initial institutional and network structures.

3.3 Establishing nanoscience and nanotechnology in Finland

Nanotechnology is a very broad and somewhat confusing concept typically used when referring to science and to a collection of related technologies with strong ties to research in both public and private research organizations. Nanotechnology has been defined by Wang (2004, 28) as "the construction and use of functional structures designed from atomic or molecular scale with at least one characteristic dimension measured in nanometers", and the new scientific phenomena and characteristics of matter that are revealed, when operating on the size scale between 0,1 and 100 nanometers (Budworth, 1996; European Commission, 2004). The roots of '*nanotechnology*' are twofold: on the one hand, nanotechnology draws on scientific and

technological development, which enables the investigation and manipulation of individual atoms and the phenomena related to the ‘nanoscale’ size scale. On the other hand, it draws on the very emergence of the concept of nanotechnology itself, the adoption of which has resulted in redirecting and relabeling a variety of research and business activities as ‘*nanotechnology*’.

In the following, we investigate the individual and organizational level actions contributing to the early institutionalization and emergence of local networks in Finland through brokering to international networks of nanotechnology. The later institutionalization of nanotechnology in the Finnish context was driven by the global hype and an ‘armaments race’ around nanotechnology, resulting in various networking activities and strong institutional support.

Establishing the competencies and initial networks by individual actors 1992-1995

Owing to the broadness of the concept ‘nanotechnology’ and its applicability to almost any field of natural sciences as well as to various industries, this section concentrates on the emergence of the activities in nanoelectronics in Finland. How nanoelectronics became an established area of research in the country was largely dependent on the international networks and experience of a handful of skillful researchers, but also on a strong local science and industry base in electronics, where they became embedded. Perhaps the most central individual actor was Professor Mikko Paalanen, who brought and built the initial competence in nano and quantum electronics in Finland. Gaining a PhD in the mid-1970s, Paalanen graduated from the renowned Low Temperature Laboratory (LTL) at Helsinki University of Technology, after which he worked for 15 years in Bell Laboratories in the USA. At that time, Bell Labs was the most prestigious industrial research laboratory in the world. Renowned for the invention of the transistor in 1947 they were conducting advanced research in electronics and related fields. Paalanen was involved in the research of single electron transistors, an innovation which can be considered as important in the early development of nanoelectronics. Returning to Finland in 1992, he became Professor of Applied Physics at the University of Jyväskylä, he and his group concentrated on research in nano and quantum electronics. He recognized the need to actively promote this area of research to the wider academic and technological community in Finland.

During his career at Bell Labs, Paalanen had established a reputation and networks within his field of science. These provided a good start for establishing the new unit and also credibility for gathering funding for the new activity in Finland. At this time, the concept of nanotechnology was viewed in neutral, or even negative terms, (“nanotechnology is science fiction”) and thus played no role in establishing activities. Since his return to Finland, Paalanen was accompanied by Jukka Pekola who, after his PhD defense, had worked on nanoelectronics-related topics at the University of California in Berkeley. With the lead of these two researchers, nanotechnology research in Jyväskylä was established and grew steadily to involve an increasing number of researchers in multiple disciplines. This resulted also in some early commercialization of nanoelectronics towards the mid-1990s. In 1996 Paalanen was invited to become the director of the Low Temperature Laboratory in Helsinki University of Technology, while Jukka Pekola took over nanoelectronics research at the University of Jyväskylä. At LTL Paalanen was instrumental in introducing nanophysics, particularly nanoelectronics, as an important new research direction. This built on existing competences, particularly around a sensitive magnetometer called SQUID (Superconducting Quantum Interference Device). Although originally developed in the 1960s, the applications of this device proved to have interesting similarities to the single electron transistor, which was a research interest occupying both Paalanen and Pekola.

In the mid-1990s, there were also other research groups investigating nanoscopic phenomena, most of these related to nanoelectronics. Among the most prominent was the Microelectronics Centre of the VTT Technical Research Centre of Finland, where Jouni Ahopelto’s group conducted research on self-organizing growth of compound semiconductor quantum dots. Local research competence in this area was developed strongly in Finland by Ahopelto, who was a visiting researcher at NEC in Japan several times during 1991-1993. A further project involved Professor Olli Ikkala’s group on self-organized polymer nanostructures, an internationally known and well-networked research group. The emergence of such research activity, as well as the training of PhDs and researchers within these groups, contributed to the initial activity and the recognition of nanotechnology in the Finnish context. To some extent these initial actors also cooperated, because they were located in the same university and were aware of each other’s skills and interests. Hence, they formed the initial local research community in nanoelectronics, which, drawing on their personal relationships with their

international colleagues, extended abroad to countries such as the USA, Japan and other Scandinavian countries.

Public financing organizations contributing to early institutionalization 1995-1999

Two institutions in Finland support research on emerging technologies. The Technology Agency of Finland (Tekes) takes decisions on strategic activity to ensure the adoption of technologies important to Finnish industries. They usually fund applied research relevant to industry by offering commercial opportunities. The Academy of Finland is the organization that supervises the quality of science in Finland, and supports purely scientific endeavors in the universities and other public research organizations. However, for some research areas, the division of responsibilities of the two organizations was not clear-cut. In 1995 Oiva Knuuttila, a technology expert with a background in nuclear physics and personal interest towards nanotechnology, discussed with his colleagues the importance in emerging fields such as nanotechnology for Tekes to allow investment in long-term research without immediate expectations of commercialization. Although it had become clear that there was activity in Finland which could be gathered into a technology programme, the extent and scope of this activity required investigation. As existing structures were somewhat institutionalized, some changes to the institutional base were required in order that a successful new programme, based on emergent technology, could be established.

These discussions within Tekes coincided with the ESPRIT Workshop “Long Term Research” organized in Finland by the European Commission. The focus was on ‘future emerging technologies’, which were brainstormed in the workshop. These discussions also touched nanotechnology. The workshop encouraged a small group of individuals within Tekes to investigate further the prospects for establishing a programme around nanotechnology. Consequently, a delegation, including the representatives of both Tekes and Academy of Finland, visited Japan in 1996 for benchmarking and to engage in networking. This revealed that in Japan there were already many nanotechnology-related activities, even though terms such as ‘meso scale physics’ were more legitimate at the time. Based on the negotiations in Finland, the benchmarking exercise, and legitimation from abroad, the Nanotechnology Research Programme was established. It lasted from 1997 until 1999 and was among the first nanotechnology research initiatives in the world organized in the form of a national programme. The strong focus on

electronics in the research conducted in Finland was also reflected in this technology programme: ten out of fourteen projects were related to either electronics or optoelectronics.

The establishment of this programme reflects an institutional and political shift in the relationship between the Academy of Finland and Tekes. The Nanotechnology Research Programme was the first of its kind to be planned and financed collaboratively by Tekes and the Academy of Finland, and was also the first Tekes programme to focus on both basic and applied research. Also, at the time of the initial discussions regarding the programme there were individuals in key positions in both organizations, who were both interested in small scale phenomena and wanted to increase cooperation rather than competition between these organizations. Such personal and organizational interests resulted in institutional support for nanotechnology in its early stage. These individuals and organizations were able to shape the emergence in the local context and gain access to funding and other resources. As expressed by Oiva Knuuttila:

“This type of research had been conducted for a long time already in different locations. However, financial investments in it were not so significant [...] this cooperation was the first real joint operation with the Academy of Finland, it was a politically new thing. [...] we were surely one of the first European countries with such a programme.”

Although these early developments had been encouraging when the programme came to an end in 1999, a decision was made that a new nanotechnology focused programme was not needed at that time. This was due to a lack of interest and activity in nanotechnology at an industry level, deemed to be necessary in order to support a next stage programme. However, nanotechnology was supported under other technology programmes, for instance related to electronics and new materials. The Nanotechnology Research Programme, due to the early stage of development of nanotechnology as a concept, was unable to build sufficient bridges between academia and industry. Despite this shortcoming, the programme had many important individual, institutional and national implications. Also, the central actors and researchers who contributed to the Nanotechnology Research Programme became relatively important in terms of nanotechnology from European perspective. For example, Oiva Knuuttila was invited to a number of conferences and seminars in Europe to report and discuss the nanotechnology programme. By 2000 Finland had become a benchmarking case and an

example for many of the other countries that were establishing their first national programmes around nanotechnology.

Period of global hype and local networking activities 2000-2005

Since the early 2000s, a massive adoption and legitimization of the concept of nanotechnology has taken place globally. One major triggering event for the global “hype” was the decision of the Clinton administration in 2001 to raise nanoscale science and technology to the level of a federal initiative and officially referring to it as the National Nanotechnology Initiative (NNI), to which significant funding was allocated. In this spirit, in recent years, adopting the concept of nanotechnology has transformed many research fields which until then were unknown, received little public attention, or were considered somewhat uninteresting, into ‘hot’ areas of activity. This and the fact that there is plenty of funding available for nanotechnology research has resulted in nano-labeling and the redirecting of both scientific and commercial activity. Also, since the year 2000 “an armaments race” in nanotechnology has taken place in national level, manifesting itself in cross-national and cross-region comparisons of investments in nanotechnology as well as ever increasing national budgets.

By the early 2000s in Finland, this global hype had refocused and recaptured the attention of individuals and organizations on nanotechnology research. Although, following the Nanotechnology Research Programme, there was already a good understanding and mutual identification of the central players in the domain of research, there was still no consistent opinion on how nanotechnology was currently applied within the local industry. Building local competences and networking the players in the research and industry was considered as a key issue of importance to the further developments in nanotechnology. Hence, the local networking and clustering initiatives such as HelsinkiNano took place from January 2004 until June 2005. Also, the preparations for a new technology programme began in 2004. Tekes chose nanotechnology as one of its focus areas together with information and communication technology, biotechnology and material technology in 2005. The organization launched FinNano, a new technology programme extending from 2005 until 2009. Furthermore, nanotechnology has become established in the educational curricula at both undergraduate and PhD levels. Thus, it can be seen that the global hype and the “armament’s race” in nanotechnology has resulted in national pressure for Finland as a

nation to invest in this field in order to develop national competence and for the network the actors to create a cluster of activity around nanotechnology. As Mikko Paalanen stated:

“We have been laughing that this current nanowave [...] is like a tsunami has hit over us, and we have to run somewhere safe. [...] this nanowave is very strong. In every country and city you have local nanoinitiatives.”

Following the developments we have outlined above, the Finnish institutional base now includes many supportive elements for nanotechnology; a development which, in recent years, has also taken place in most industrialized countries.

4. FINDINGS

This section aims to answer the research question posed above: “What characterizes early institutional entrepreneurs and their bridging behavior, and how does such activity lead to field emergence?” Building our framework drawing on the literature on institutional entrepreneurship (DiMaggio, 1988; Lawrence and Phillips, 2004; Maguire et al., 2004), we have incorporated the notion of structural holes to this discussion (Burt, 1992; Burt, 1997). Combining these perspectives to investigate the role of active agents in field emergence indicated that cross-fertilization between institutional and social network theory is fruitful. By using two comparative longitudinal case studies, we were able to investigate in detail the interactions between the actors and emerging institutions in a specific institutional context. In the following, we present our findings divided at different levels of brokering in field emergence. In the end of this section, we present our framework for field emergence, and propose further interconnections between institutional and network approaches.

Individual level bridging activity. In both cholesterol-lowering functional foods and nanotechnology the early developments were highly dependent on individual scientists. Our interviews indicate that the early actors identified and participated in scientific research conducted in foreign institutions. The scientists established personal relationships to these institutions, and later draw on them in order to develop the scientific field domestically, also towards radically new directions. This development

took place according to local problems and needs, basing on the national competence base and existing institutions. Individuals involved in early development activities typically had strong ties to sectors that had previously been only weakly connected, and held a position, which enabled their bridging activities (DiMaggio, 1992; Burt, 2004). This favorable position in a social structure creates significant value, when combined with visionary ideas and long-term commitment for developing an identified issue. With their actions, the key individuals established the field, bridged the structural holes between different disciplines and industries and functional areas within firms, as well as geographical regions.

However, according to our findings, a central network position must be complemented with a strong subject position, which provides the necessary legitimacy for individual action. Our results suggest that the existing institutions define the source of legitimacy for a new field. This indicates that people associated with prominent institutions may more readily act as institutional entrepreneurs. In addition, by having an influential position in his or her organization or domain of interest, an individual has better chances in defining the goals and orientations of that organization. For example, to be a legitimate actor in functional foods in its early phase, it was necessary to be a prominent member of the medical community. Similarly, the strong dependency of nanotechnology on basic research required that the local entrepreneurs had an established reputation in the scientific research. This enabled the central individuals to introduce new concepts and further develop the embryonic field and its institutions. Our cases also suggest that the whole institutional context may be developed when a few individuals in managing positions in strong institutions decide to cooperate. Individual level brokering was facilitated by the small size of the country in terms of population, and the homogeneity of the institutional context, which enhanced networking and the emergence of communities of knowledge around both functional foods and nanotechnology.

Proposition Ia: Early institutional entrepreneurs in technological fields are typically scientists, who benefit firstly, from a central network position both locally and globally; secondly, from being a member of a prominent and strongly institutionalized organization; and thirdly, from having a strong subject position in his or her organization as well as in the domain of activity.

Proposition Ib: *These individuals act as early institutional entrepreneurs by introducing new concepts, and in their quest to promote and develop these concepts, they bridge structural holes between disciplines and across geographical spaces.*

Organizational level brokering. Organizational level adoption increases early activities to a new level of legitimation and visibility and results in organizational level brokering. Individual institutional entrepreneurs need to be successful in convincing their organizations that the cause they are promoting are worthy and important for the organizations. Such process is political and depends strongly of the subject position and power of the individual in the organization. Depending on their position, individual action may directly be adopted at the organizational level, which may have a major impact on the field emergence. This is particularly the case when an organization has a strong competence base on a related field. However, the emergence of a new field can also be held back by organizations that are overly incremental or conservative in developing their core activities, or for political or other reasons reject the innovative ideas. In such case, visionary individuals in the organization are unable to influence the organizational goals and priorities. Failures in individual brokerage may prevent or delay field emergence, and may also result in the failure of organizations. However, it may also be the case that the individual ideas become legitimized in organizations other than those where they work, and such recognition may result in increased support for new ideas within the focal organization.

The role of public and private organizations in promoting field emergence was different in the two cases. In nanotechnology, public sector organizations played a more important role, because in such early stage of emergence the predominant focus is on basic research. Furthermore, a gap in the public funding made it possible for the individuals in the two public sector organizations to bridge their activities and build new instruments to fund nanotechnology research activity. This changed the institutionalized positions of these major public funding organizations. Owing to the early stage of development, there was also a lot of confusion about what nanotechnology is and what it can be used for and, thus, private firms had little interest in adopting, funding or promoting these technologies. However, the cholesterol-lowering functional foods case suggests that in consumer-oriented fields final legitimation comes about through

consumer acceptance and in private firms, who have major commercial interests in creating the new field. Early pioneering individuals, organizations and innovations had visible positions even to the extent of becoming symbols representing the new field.

Organizations also play a strong role in deinstitutionalizing existing practices. In our cases deinstitutionalization processes played a much larger role in the local emergence of cholesterol-lowering functional foods than in nanotechnology. In cholesterol-lowering functional foods, the local health problem triggered the early collective theorization process, in which the solution was initially sought from changing institutionalized eating habits. Only after a relatively long period of deinstitutionalization did scientific and technical progress result in radically new foods. Since a major change in the perception of food by consumers and food manufacturers was required, it was natural that some failed brokerage attempts, and a period of competing institutions followed. In contrast, in nanotechnology the developments were, rather, dependent on the interests and acceptance of the research community at large. Changing leadership directed the orientations of some research institutes towards nanoelectronics. This was mainly considered as normal evolution within those organizations.

Proposition IIa: Science-based organizations followed by commercial organizations, adopt and legitimize the issues promoted by their influential members and incorporate them into the organizational agenda, which, when accumulated, contributes to field emergence.

Proposition IIb: Deinstitutionalization of existing practices may be required before organizational level adoption in science, but especially within industry may take place.

Global isomorphism and the emergence of field level structures. In addition to individual and organizational level activity, there are also local and global institutional level influences that shape the emerging field. Firstly, existing local institutions contributed strongly to the emergence in the cases of both cholesterol-lowering functional foods and nanotechnology. Both fields were strongly supported by multidisciplinary research programmes sponsored by public funding institutions. The involvement of the public sector had field level implications and the development of

what can be described as meta-programmes; where subsequent programmes were built on the earlier ones. These programmes provided platforms that bridged disconnected actors and enhanced local knowledge, sharing and mutual alignment. Through financial support these platforms created a stepping stone for smaller actors to enter the field. Consequently, institutionally created platforms have resulted in the emergence of new networks and, for both fields, both local and global institutional recognition. Strong external legitimation of the two fields was reflected in numerous industry forums, trade journals and the educational curricula of universities. Not surprisingly, such institutionalization is stronger in the more mature field of functional foods than in nanotechnology.

The global emergence of strong hype, or widely shared macro-cultural discourses (Berger and Luckmann, 1967; Lawrence and Phillips, 2004) around both functional foods and nanotechnology around the late 1990s and 2000s influenced strongly the emergence of local field level components. In the case of nanotechnology, this was particularly enabled by the strong global legitimation of the field of activity. In addition, similar to many other industrialized countries, both fields became recognized as nationally important, strategic fields. However, even if the global discourses strongly contributed to the legitimation of the fields, the form in which these concepts were adopted and developed further in Finland, was strongly dependent on the local issues, resources and competences (see also Lawrence and Phillips, 2004).

Proposition IIIa: Individual and organizational level institutional entrepreneurship results in changes in the local field level institutional environment.

Proposition IIIb: Field emergence is a global phenomenon, which is susceptible to global institutional isomorphism mediated by globally shared discourses, resulting in the imitation of innovations, national level practices, platforms and priority statements for the new field.

To summarize, brokering in field emergence is a complex process that takes place on multiple levels as illustrated in Figure 2. Our main argument is that field emergence is a process defined simultaneously by institutional and network determinants and mediated by institutional entrepreneurs. We propose that it is beneficial to analytically separate

three distinct but overlapping levels of brokering in field emergence: individual, organizational and field. Individual action is the basis of all change. As we have discussed, individuals identify emerging concepts and begin to promote them, and, hence, build bridges between hitherto unconnected actors. In addition, pioneering individuals lead the theorization process (Greenwood et al., 2002), which involves translation of the interests of diverse stakeholders into stable coalitions. The potential for theorization draws on the actors' subject position and their ability to apply political tactics such as bargaining, negotiation and compromise (Maguire et al., 2004), and results in the change of institutionalized understanding and power positions. However, organizational and field levels both constrain and enable (Giddens, 1984) individual action. Organizations legitimize the action of their members by adopting concepts promoted by strong internal groups and by leveraging organizational level networks and resources. This process is restricted by institutional factors such as organizational level isolating mechanisms, which come about from an organization's reluctance to imitate or acquire resources that do not match its cultural or political context (Oliver, 1997). Overall, the actions of individuals and organizations were rather unsystematic, and their strategies were highly emergent; an observation, which is in line with Lawrence and Phillips (2004). Further, organizations are embedded in institutionalized field-level networks. Even new organizations within an emerging field have so many social and economic interrelations and common dependencies that they give rise to pressures for conformity or isomorphism (DiMaggio and Powell, 1983; Zucker, 1983; Oliver, 1997). However, organizations active on the intersections of different fields are faced with conflicting institutional pressures. Agency in such a context may lead to change in both institutionalized environments.

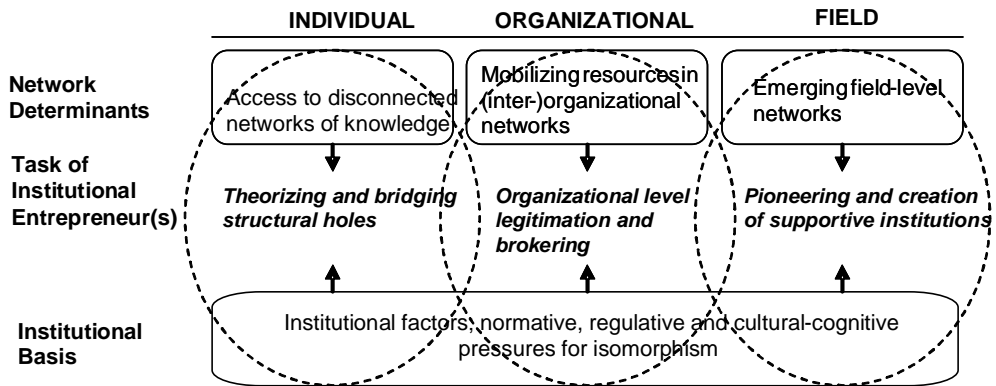


Figure 2: Conceptual framework of field emergence³⁴

These processes lead to the view that fields begin to take shape gradually as increasing numbers of actors identify themselves and each other as belonging to the same field of emerging activity. Hence, the emergence of new fields is a path-dependent process driven by overlapping institutional domains, and active agents shaping those domains through their own individual and organizational networks.

5. CONCLUSION

This paper extends the literature on institutional entrepreneurship by focusing attention to the characteristics and early brokerage attempts of entrepreneurial individuals and organizations. Such focus enables the bridging of the gap between institutional theory and social network theory, and may benefit both research traditions (Scott, 2001; Maguire et al., 2004). Our results suggest that institutional entrepreneurship literature builds a bridge between the institutional and the social network traditions by stressing the role of pioneering actors as the architects of new fields. Our cases show that the conceptual integration of structural hole with that of institutional entrepreneur helps to explain why and how certain actors are able act as institutional entrepreneurs in a new field. Hence, the paper proposes that we need to examine field emergence as a complex

³⁴ For this figure we are indebted to Oliver (1997)

interplay orchestrated by both individual, organizational level institutional entrepreneurs.

There are naturally limitations in this paper. Firstly, the endeavor to bring together parts of different theoretical traditions may be problematic. This paper does not take a standpoint regarding the ontological and epistemological assumptions in neoinstitutionalist and network approaches. Yet, although some underlying assumptions may conflict, paradigmatic boundaries are often fuzzy and to certain extent permeable (Willmott, 1993; Lewis and Grimes, 1999), enabling the linking of views created by different paradigms (Gioia and Pitre, 1990). Application of such meta-triangulation (Gioia and Pitre, 1990) helped us to uncover mechanisms leading to field emergence. Secondly, we studied field emergence mostly in the Finnish context, which restricts the applicability of the results to other institutional contexts. However, focus on a spatially and culturally limited setting provided an institutionally homogeneous environment for the investigation, and made it possible to investigate this complex topic. Hence, replication of the study in other institutional context would provide further external validity for the research results.

Our findings indicate that there is a need to elaborate further the conceptual connections between structural holes (Burt, 1992) and subject position (Foucault, 1972; Lawrence, 1999; Maguire et al., 2004) in analyzing field emergence, legitimacy and opportunity identification in general. Hence, we call for further investigations on the interplay between networks and institutions in emergence processes. We have also identified different roles for individuals and organizations as institutional entrepreneurs along the process of field emergence, which offers interesting avenues for further testing of our propositions. Creating more understanding on the institutional conditions, under which institutional entrepreneurship is likely to lead to the emergence of new fields, could be the important next step in the study of field emergence within the neoinstitutionalist tradition.

REFERENCES

- Berger, P. and Luckmann, T. (1967) *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*, London: Penguin Books.
- Bonow, R. O., Smaha, L. A., Smith Jr, S. C., Mensah, G. A. and Lenfant, C. 2002. World Heart Day 2002. The International Burden of Cardiovascular Disease: Responding to the Emerging Global Epidemic', *Circulation*, 106: 1602-05.
- Budworth, D. W. 1996. *Overview of activities on nanotechnology and related technologies*. City: Institute for Prospective Technological Studies of the European Commission, 68.
- Burt, R. S. 1992. The Social Structure of Competition, in Nohria, N. and Eccles, R. G. (Eds.) *Networks and Organizations*, 57-91. Cambridge, MA: Harvard University Press.
- Burt, R. S. 1997. The contingent value of social capital, *Administrative Science Quarterly*, 42 (2): 339-365.
- Burt, R. S. 2000. The network structure in social capital, in R.I. Sutton & B.M. Straw (eds.) *Research in Organizational Behavior*. Greenwich CT: JAI Press: 345-423.
- Burt, R. S. 2004. Structural Holes and Good Ideas, *American Journal of Sociology*, 110 (2): 349-399.
- Campbell, J. L. 2004. *Institutional change and globalization*, Princeton: Princeton University Press.
- Cox, J. W. & Hassard, J. 2005. 'Triangulation in organizational research: A representation', *Organization*, 12 (1): 109-133.
- Dacin, T., Goodstein, J. & Scott, W.R. 2002. Institutional theory and institutional change: Introduction to special research forum, *Academy of Management Journal*, 45 (1): 45-57.
- Datamonitor, 2004 *Global Nutraceuticals. Industry Profile*. Ref.code. 0199-0759'.
- Davis, G. F. and Greve, H. 1997. Corporate elite networks and governance changes in the 1980s, *American Journal of Sociology*, 103 1-37.
- Denzin, N. K. 1978. *The research act: a theoretical introduction to sociological methods*, New York: McGraw-Hill
- DiMaggio, P. 1988. Interest and agency in institutional theory, in Zucker, L. B. (ed.) *Institutional patterns and organizations: Culture and environment*, Cambridge, MA: Ballinger.
- DiMaggio, P. 1992. Nadal's Paradox Revisited: Relational and Cultural Aspects of Organizational Structure, in N. Nohria & R.G. Eccles (eds.) *Networks and Organizations: Structure, Form, and Action.*, 118-142. Boston: Harvard Business School Press.
- DiMaggio, P. and Powell, W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields, *American Sociological Review*, 48 (2): 147-160.
- DiMaggio, P.J. 1991. Constructing an Organizational Field as a Professional Project: U.S. Art Museums 1920-1940, in W.W. Powell & P.J. DiMaggio (eds.) *The New Institutionalism in Organizational Analysis*, Chicago: University of Chicago Press, Chicago.
- Diplock, A.T., Aggett, P.J., Ashwell, M., Bornet, F., Fern, E.B. and Roberfroid, M.B. 1999. *Scientific concepts of functional foods in Europe* - Consensus Document, *British Journal of Nutrition*, 81 (1): 1-27.

- Dyer, W. Gibb & Wilkins, A. L. 1991. Better stories, not better constructs, to generate better theory: a rejoinder to Eisenhardt, *Academy of Management Review*, 16 (3): 613-619.
- Eisenhardt, K. M. 1989. Building Theories from Case Study Research, *Academy of Management Review*, 14 (4): 532-550.
- European Commission. 2004. *Goal: European Nanotechnology Strategy* (in Finnish). City: European Commission, 28.
- Fligstein, N. 1991. The Structural transformation of American industry: An institutional account of the causes of diversification in the largest firms, 1919-1979, in W.W. Powell & P. DiMaggio (eds.) *The new institutionalism in organizational analysis*, Chicago: University of Chicago Press.
- Fligstein, N. 1996. Markets as politics: A political-cultural approach to market institutions, *American Sociological Review*, 161 (4): 656-673.
- Fligstein, N. 1997. Social skill and institutional theory, *American Behavioral Scientist*, 40 (4): 397-405.
- Foucault, M. 1972. *The archeology of knowledge*, London: Routledge.
- Galaskiewicz, J. 1991. 'Making Corporate Actors Accountable: Institution-Building in Minneapolis-St.Paul', in P.J. DiMaggio & W.W. Powell (eds.) *The New Institutionalism in Organizational Analysis*, Chicago: The University of Chicago Press.
- Garud, R., Jain, S. and Kumaraswamy, A. 2002. Institutional entrepreneurship in the sponsorship of common technological standards: The case of Sun Microsystems and Java, *Academy of Management Journal*, 45 (1): 196-214.
- Giddens, A. 1984. *The constitution of society*, Cambridge: Polity Press
- Gioia, D. A. and Pitre, E. 1990. Multiparadigm Perspectives on Theory Building, *Academy of Management Review*, 15 (4): 584-602.
- Granovetter, M. 1973. The Strength of Weak Ties, *American Journal of Sociology*, 78 (6): 1360-1380.
- Greenwood, Royston, Suddaby, Roy and Hinings, C. R. 2002. Theorizing change: The role of professional associations in the transformation of institutionalized fields, *Academy of Management Journal*, 45 (1): 58-80.
- Hargadon, Andrew and Sutton, Robert I. 1997. Technology Brokering and Innovation in a Product Development Firm, *Administrative Science Quarterly*, 42 (4): 716-749.
- Hoffman, A.J. 1999. Institutional evolution and change: Environmentalism and the U.S. chemical industry, *Academy of Management Journal*, 42 (4): 351-371.
- Jepperson, Ronald, L. 1991. Institutions, Institutional Effects, and Institutionalism ', in Powell, W. W. and DiMaggio, P. (Eds.) *The new institutionalism in organizational analysis*, Chicago: University of Chicago Press: 143-163.
- Kanter, Rosabeth Moss and Eccles, Robert G. 1992. Conclusion: Making Network Research Relevant to Practice, in Nohria, N. and Eccles, R. G. (eds.) *Networks and Organization. Structure, form, and action*, Boston: Harvard Business School Press: 521-527.
- Kenis, Patrick and Knoke, Patrick. 2002 How organizational field networks shape interorganizational tie-formation rates, *Academy of Management Review*, 37 (2): 275-293.
- Kilduff, Martin and Tsai, Wenpin. 2003. *Social networks and organizations*, London: Sage.
- Kogut, B. 2000. The Network as Knowledge: Generative Rules and the Emergence of Structure, *Strategic Management Journal*, 21 (3): 405-425.

- Lawrence, T. 1999. Institutional strategy, *Journal of Management*, 25 (2): 161-188.
- Lawrence, T. & Phillips, N. 2004. From Moby Dick to Free Willy: Macro-cultural discourse and institutional entrepreneurship in emerging institutional fields, *Organization*, 11 (5): 689-711.
- Leblebici, H. Salancik, G., Copay, A. and King, T. 1991. Institutional change and the transformation of interorganizational fields: An organizational history of the US radio broadcasting industry, *Administrative Science Quarterly*, 36: 333-363.
- Lewis, M. W. & Grimes, A. J. 1999. Metatriangulation: Building theory from multiple paradigms, *Academy of Management Review*, 24 (4): 672-690.
- Lounsbury, M., Ventresca, M. & Hirsch, P.M. 2003. Social movements, field frames and industry emergence: A cultural-political perspective on US recycling, *Socio-Economic Review*, 1: 71-104.
- Maguire, S., Hardy, C. and Lawrence, T. B. 2004. Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada, *Academy of Management Journal*, 47 (5): 657-679.
- Mellentini, J. 2005. Surprising winners and losers on the cholesterol-lowering roller coaster, *New Nutrition Business*, 11 (2): 1, 16-18.
- Meyer, J. W. and Rowan, B. 1977. Institutionalized Organizations: Formal Structure as Myth and Ceremony, *American Journal of Sociology*, 83 (2): 340-363.
- Munir, K. A. 2005. The social construction of events: A study of institutional change in the photographic field, *Organization Studies*, 26 (1): 93-112.
- Munir, K. A. and Phillips, N. 2005. The birth of the Kodak moment: Institutional entrepreneurship and the adoption of new technologies, *Organization Studies*, 26 (11): 1665-1687.
- Murtha, T., Lenway, S. A. and Hart, J. A. 2001. *Managing New Industry Creation: Global Knowledge Formation and Entrepreneurship in High Technology*, Boston: Stanford University Press
- Oakes, L.S., Townley, B. & Cooper, D.J. 1998. Business planning as a pedagogy: Language and control in changing institutional field, *Administrative Science Quarterly*, 43: 257-292.
- Oliver, C. 1997. Sustainable competitive advantage: combining institutional and resource-based views, *Strategic Management Journal*, 18 (9): 697-713.
- Owen-Smith, J. & Powell, W. W. 2004. Knowledge Networks as Channels and Conduits: The Effects of Spillovers in the Boston Biotechnology Community, *Organization Science*, 15 (1): 5-21.
- Palmer, D. & Barber, B. M. 2001. Challengers, elites, and owning families: A social class theory of corporate acquisitions in the 1960s', *Administrative Science Quarterly*, 46: 87-120.
- Parkhe, A. 1993. "Messy" Research, Methodological Predispositions, and Theory Development in International Joint Ventures, *Academy of Management Review*, 18 (2): 227-268.
- Podolny, J. M. 2001. Networks as the Pipes and Prisms of the Market, *American Journal of Sociology*, 107 (1): 33-60.
- Porter, K., Bunker Whittington, K. and Powell, W. W. 2005. The Institutional Embeddedness of High-Tech Regions: Relational Foundations of the Boston Biotechnology Community, in S. Breschi & F. Malerba (eds.) *Clusters, Networks, and Innovation*, London: Oxford University Press.
- Powell, W., Koput, K. W. and Smith-Doerr, L. 1996. Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology, *Administrative Science Quarterly*, 41: 116-145.

- Powell, W. W. 1990. Neither market nor hierarchy; network forms of organization, *Research in Organizational Behavior*, 12: 295-336.
- Puska, P. 2000. Nutrition and mortality: the Finnish experience, *Acta Cardiol*, 55: 213-220.
- Rao, H. 1998. Caveat emptor: The construction of non-profit consumer watchdog organizations, *American Journal of Sociology*, 103: 912-961.
- Rogers, E. M. 1962. *Diffusion of innovations*, New York: Free Press
- Scott, W.R. 2001. *Institutions and organizations*, (2nd edition). Thousand Oaks: Sage.
- Spencer, J. W. 2003. Global gatekeeping, representation, and network structure: a longitudinal analysis of regional and global knowledge-diffusion networks. *Journal of International Business Studies*, 34: 428-442.
- Sutton, R. I. 1997. The virtues of closet qualitative research, *Organization Science*, 8 (1): 97-106.
- Tolbert, P. S. & Zucker, L. G. 1996. Institutionalization of institutional theory, in S. Clegg, C. Hardy & K. Nord (eds.) *The handbook of organization studies*, Thousand Oakes, CA: Sage.
- Van de Ven, A. H. 1993. The development of an infrastructure for entrepreneurship, *Journal of Business Venturing*, 8: 211-230.
- Van de Ven, A. H. and Garud, R. 1993. Innovation and industry development: the case of cochlear implants, in R.A. Burgelman & R.S. Rosenbloom (eds.) *Research on technological innovation, management and policy*, Greenwich, Connecticut: JAI Press: 1-46.
- Wang, Z. L. 2004. What is nanotechnology? And how will this small wonder make a big change in manufacturing? *Industrial Engineer*, (January): 28-29.
- Willmott, H. 1993. Breaking the Paradigm Mentality, *Organization Studies*, 14 (5): 681-719.
- Yin, R. 2003. *Case study research: Design and methods*, Thousand Oaks, CA: Sage
- Zucker, L. 1983. Institutional theories of organizations, *Annual Review of Sociology*, 13: 443-464.
- Zucker, L. 1977. The role of institutionalization in cultural persistence, *American Sociological Review*, 42: 726-743.

ESSAY 3

Institutional Entrepreneurs as Mediators between Global Discourses and Local Institutions - Emergence of Functional Foods and Nanotechnology in Finland

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Abstract: Investigating the emergence of new fields at the intersection of local institutions and global influences is necessary for further development of the institutional entrepreneurship approach. We draw on complementary insights from the literature on institutional entrepreneurship and Scandinavian Institutionalism to study the activities of agents within and across localities. Building on a comparative case study on the emergence of functional foods and nanotechnology, we develop a framework suggesting that institutional entrepreneurs in science-based fields are actors who are able to operate across spatial scales, and who create and mobilize counter discourses to prevalent discourses and embed them locally. The paper concludes by emphasizing the need to further investigate the interaction between spatial scales and institutional agency in emergence of fields.

Keywords: Institutional entrepreneurship, science-based fields, translation, spatial scales, functional foods, nanotechnology

1. Introduction

The institutional entrepreneurship approach incorporates agency to the neoinstitutionalist tradition and investigates the role of active agents in shaping their institutional context (DiMaggio, 1988; Fligstein, 1997; Beckert, 1999). A particular focus has been on the emergence of novel fields, where scholars have studied, firstly, how the position and activities of institutional entrepreneurs contribute to the emergence (Maguire, Hardy & Lawrence, 2004; Perkmann & Spicer, 2007); secondly, how institutional entrepreneurs participate in the meaning making and shaping understandings of a field (Rao, 1998; Maguire et al., 2004; Munir & Phillips, 2005) and in the creation of novel standards, policies (Garud, Jain & Kumaraswamy, 2002; Wijen & Ansari, 2007) and practices (Lounsbury & Crumley, 2007); and thirdly, how macro-cultural discourses enable the activities of local actors to shape a new field (Lawrence & Phillips, 2004). Field refers to “a community of organizations that partakes of a common meaning system and whose participants interact more faithfully with one another than with actors outside the field” (Scott, 1995: 56). The literature on institutional entrepreneurship provides understanding on various aspects of the ways in which individual and organizational agency contribute to field emergence. However, besides omitting how early emergence unfolds as a process, previous studies tend to concentrate on narrow geographical settings, neglecting the interaction between the local and the global in the process (DiMaggio, 1991; Scott, 2001; Morrill, in press), and the role and activities of mediating agents in this context. Also, Lounsbury and Crumley (2007) suggest that the spatially dispersed nature of emergence accounts for the disregard for studying the early emergence of new practices.

A further gap in the institutional entrepreneurship literature is the curious neglect of science-based fields as objects of empirical inquiries. There is a scarce understanding of who the institutional entrepreneurs in science-based fields are, and through which activities they institute novel fields. Science-based fields are a particularly interesting case for the investigation of agency and mediation of influences between different spatial scales, which refer to a socially produced (Lefebvre, 1991), nested hierarchy of bounded spaces of differing size, such as the local, national and supranational (Leitner, 1997). In science-based fields actors form part of these scales through a variety of

epistemic communities, i.e. “groups of peers working explicitly on a common knowledge problem” (Amin, 2003, 119). It is often in epistemic communities where actors, such as scientists and public policy actors, are subject to counter discourses, which challenge the institutionalized macro-cultural discourses, or “broad discourses and associated sets of institutions that extend beyond the boundaries of an institutional field and are widely understood and broadly accepted in a society” (Lawrence & Phillips, 2004: 691; also Berger & Luckmann, 1966). According to Lawrence and Phillips (2004), macro-cultural discourses enable local emergence but the creation of novel institutional components is always tied to local institutional environments and active agents crafting them. Whereas these authors have created a good foundation for the discussion on how discourses enable institutional entrepreneurship in local contexts, their study did not investigate how institutional entrepreneurs act as mediating agents of discourses between different institutional contexts, or how they participate in their creation.

Consequently, the research question that motivates this study is *How do institutional entrepreneurs in science-based fields mediate between globally circulating discourses and the local institutions and competencies?* For such an investigation, we develop the institutional entrepreneurship approach by merging conceptual ideas from the streams of literature stressing the role of cross-spatial links in institutional change and emergence. These include the theory of translation in Scandinavian Institutionalism (Czarniawska & Sevón, 1996, 2005), the literature on spatial scales (Lefebvre, 1991; Leitner, 1997), and the concept of macro-cultural discourse. We conceptualize institutional entrepreneurs as translating agents, who bridge spatial scales and are central actors in the identification and theorizing of local issues to which these discourses then become embedded. Empirically, we examine the emergence of two science-based fields in Finland in a comparative case setting. Cholesterol-lowering functional foods represents a field, in the development of which Finnish researchers and commercial actors were the global pioneers and have significantly influenced the forms and functions of the field globally. Nanotechnology, on the other hand, was already established as a domain of activity in some countries before it became institutionalized in Finland, though the Finnish actors were among the early adopters and established a pioneering technology program on nanotechnology. In the local construction of the nanotechnology field the Finnish agents were able to draw legitimacy from other

institutional contexts, whereas in functional foods they had to build both the credibility and understanding of the field from scratch. Finland provides us with both an institutionally bounded and technologically advanced “laboratory” for such an investigation.

Our findings contribute in several ways to management and organization literature, and above all, to the institutional entrepreneurship approach. Firstly, the study complements the understandings on the interaction between macro level emergence and micro level agency by discussing how local agents contribute to the macro-cultural discourses rather than merely use them as a resource. Secondly, we develop the institutional entrepreneurship approach by investigating agency across spatial scales to address a weakness of this literature, namely the concentration on geographically distinct and delimited areas. Thirdly, our comparative setting as such is a contribution, as is our particular focus to study the emergence of science-based fields, which are curiously understudied contexts for institutional entrepreneurship. The remainder of the paper begins with a discussion on macro-cultural and counter discourses as means to mediate influences across spatial scales, after which it elaborates the activities of institutional entrepreneurs to bridge these scales and embed the influences in local contexts. After having presented the methodology, we put forward the comparative case study, followed by an analytical discussion on the key findings and contributions as well as ideas for further inquiries.

2. Macro-cultural discourses as mediators of influences globally

The inclusion of discourse (Lawrence & Phillips, 2004; Phillips, Lawrence & Hardy, 2004; Hardy, Lawrence & Grant, 2005) to institutional accounts has provided novel means to tackle change and emergence. These approaches discuss how new discourses become institutionalized, and how they change the existing institutions and institutional logics that shape the actors’ frameworks for reason and belief. According to Phillips et al. (2004), institutional theorists have tended to define the concept of institutions in terms of patterns of action. However, action *per se* does not travel over distance and shape the beliefs and attitudes of others, whereas texts and discourse do (Phillips et al., 2004). Consequently, Phillips et al. (2004: 635) argue that “institutions can be understood as products of the discursive activity that influence actions”.

The highest level at which such influences circulate is macro-cultural discourse (Berger & Luckmann, 1966; Lawrence & Phillips, 2004). Examples of such discourses are portraying killer whales with human-like sympathetic characters in the press and popular media (Lawrence & Phillips, 2004); or labelling genetically modified food as 'Frankenfood'. Both of these have implications to the wider institutionalization and activity within the domain of whale-watching or genetically modified organisms. Zilber (2007) divides discourses into well-accepted macro-cultural discourses (Lawrence & Phillips, 2004) and competing discourses (Maguire et al., 2004; Zilber, 2007). The media in particular plays a central role in transmitting and legitimating various discourses by shaping understandings and opinions, which influence the emergence and adoption of global trends that are products of macro-cultural discourses. According to Gamson and Wolfsfeld (1993), the media regulates which actors are given standing, and which ideas and language are presented, journalists and editors being the major gatekeepers (Rao, Monin & Durand, 2003). The media voices issues that individuals and organizations promote or disagree over and, hence, plays a strong role in creating 'public opinions', which become embedded in macro-cultural discourses.

In science-based fields counter discourses typically have origins in epistemic communities (Amin, 2003) that are subject to global influence and action (Boli & Thomas, 1997; Meyer, Drori & Hwang, 2006). Science is conceptualized as a means for producing texts to build new institutions (Maguire & Hardy, 2006); or as a cultural resource challenging old practices by undermining them through new analytical theories and tools, which then institutionalize a new practice (Lounsbury & Ventresca, 2002; Greenwood & Suddaby, 2006; Lounsbury & Crumley, 2007). While epistemic communities typically emerge in local contexts, over time they tend to become transnational as the community's ideas spread through conferences, journals, research collaboration and informal communications (Haas, 1992). As epistemic communities stretch across time and place (Bunnell & Coe, 2001), and scientific discourse is global by nature, we argue that epistemic communities create a mediating layer between local institutions and global discourses. Scientists draw from the trends and discourses present in their epistemic communities, and embed them locally through their research, teaching, and policy activities. Further, intergovernmental organizations (IGOs) and international non-governmental organizations (INGOs) (Boli & Thomas, 1997; Inoue &

Drori, 2006; Meyer et al., 2006) function in a similar manner to epistemic communities, as people are brought together either by their formal position or interest in a specific issue. IGOs and INGOs create and mediate discourses across sciences, industries, states and localities, and may create cultural frames integrating local and global levels of activity (Boli & Thomas, 1997).

From the above discussion on macro-cultural and counter discourses and their mediation to local contexts we come to our first research question:

***Question 1:** Through which processes do macro-cultural and counter discourses enable the local emergence of science-based fields?*

3. Institutional entrepreneurs as translators across spatial scales

As discussed above, the literature on macro-cultural discourses casts light on the emergence of fields and the dissemination of novel frames of action. However, it gives few implications on the role and activities of mediating actors. Scandinavian Institutionalism with its notion of translation (Czarniawska & Joerges, 1996; Czarniawska & Sevón, 1996, 2005; Lindberg & Czarniawska, 2006), on the other hand, has produced detailed narratives on adaptations of foreign ideas and institutions to local contexts. Embedding an idea or macro-cultural discourse requires local agency, as ideas or discourses need to be translated into a locally meaningful form. As a result, the form ideas take is different from forms elsewhere as they reflect specific local institutions (Lawrence & Phillips, 2004) and issues. According to Hoffman (1999: 352), a field is formed “around issues that bring together various field constituents with disparate purposes”. In science-based fields such issues may be construed in the intersection of breakthroughs in science and the social and political aims present in the local science policy. Translating agents, often scientists and public policy actors, localize ideas by strategically and collectively reframing novel ideas to fit local circumstances to facilitate resource mobilization, implementation and transfer (Boxenbaum, 2006).

In line with this discussion, we argue that issue construction begins by framing an issue, which refers to an “active, processual phenomenon that implies agency and contention at the level of reality construction” (Benford & Snow, 2000: 614). Framing is

characterized by competition and a clashing of interpretive frames promoted by different actors and communities (Benford & Snow, 2000), but also cooperation motivated by shared identity and interests (Ansell, 1997). Institutional entrepreneurs also engage in *theorization* (Greenwood, Suddaby & Hinings, 2002; Maguire et al., 2004), referring to a process where agents construct the significance, scope and relevance of events (Munir, 2005) or discourses that justify an issue and enable the emergence of a field. Whereas translation refers to the adaptation of a foreign idea or institution into a different context (Sewell, 1992; Czarniawska & Joerges, 1996), framing induces the local creation of new meanings, and theorization shapes those meanings so that they reflect the needs and perceptions of a wider group of stakeholders, and make them persistent. According to Lippi (2000), the role and influence of these socializing agents, who locate at local rather than at macro level, are perhaps more important than the actual idea to be transposed.

By shaping and creating institutions, actors contribute to the particular and disparate development of new fields locally. In this task, the ability of scientists in particular to carry knowledge (Bunnell & Coe, 2001; Amin & Cohendet, 2004) and articulate discourses (Spicer, 2006) from one space or scale to another is crucial. Spicer (2006) discusses how actors rescale struggles on certain issues within a spatial scale by connecting them to discourses on the same, lower or higher scales. In a similar manner, actors in epistemic communities are subject to discourses applicable to different scales, and may rescale them to address the local context and issues. The interaction between agents and macro-cultural discourses across spatial scales remains an understudied area in the institutional entrepreneurship approach. Theory advancement necessitates a profound understanding of how field-level characteristics affect such mediating and rescaling processes. Hence, this study puts forward a comparative setting of agency in two fields that depend to a varying extent on local issues and global discourses and represent a varying scope of institutional change required. The above presented conceptual approaches cast light on how the local embedding takes place, but have more or less taken for granted where the idea or discourse originates from and, more importantly, how it is mediated to the local context. Also, so far the Scandinavian Institutionalism has neglected the comparisons of translation in different types of local fields. From here we come to our second research question:

Question 2: How do translation processes and media employed by institutional entrepreneurs differ in pioneering and adopting science-based fields?

4. Methods and data

Lawrence et al. (2002) recommend qualitative approaches for examining the localized dynamics of field level institutional change. Understanding the interaction between local and global in field emergence necessitates detailed, interpretive analyses taking into account the specific contexts in which the interaction occurs (cf. Garud et al., 2002; Maguire et al., 2004). To do this, we have adopted the case study approach (Eisenhardt, 1989; Yin, 2003). According to Stake (2005), the case study is not a choice of method but a choice of what is studied, allowing the use of various sources of real time and retrospective data (Yin, 2003). We studied emergence as it unfolded over time employing the idea of systematic combining (Dubois & Gadde, 2002), where theoretical framework, empirical framework and case analysis coevolve. Our research setting responds to recent calls for comparative case studies to build “an adequate theory on institutional entrepreneurship and a more complete understanding of the paradox of embedded agency” (Greenwood & Suddaby 2006: 44; also Seo & Creed 2002; Dorado 2005). It also complements earlier single industry studies of field emergence (Van de Ven & Garud, 1993; Powell, Koput & Smith-Doerr, 1996; Murtha, Lenway & Hart, 2001; Garud et al., 2002).

4.1 Data sources and data collection

Both cases are longitudinal and draw mostly from retrospective data, as our study extends until the year 2000, the end of the first technology programs. Altogether 89 interviews form the key source of the empirical data: 32 for functional foods and 57 for nanotechnology. Interviews lasted between 30 minutes and four hours, the median being 1.5 hours. The interviews were recorded, transcribed and coded in NVivo before the analysis. Informants for both cases included top researchers from universities, representatives of public agencies, informants from small start-ups and large multinational firms, and private financiers such as angel investors and venture capitalists. In nanotechnology the interviews were conducted in four countries: Finland, Sweden, Denmark and the U.S., and in functional foods in Finland and the U.S. While

the interviews conducted in Finland provided information of local emergence, the other interviews offered important contextual information of the respective processes in other countries. The identified institutional entrepreneurs were asked to describe in detail in what activities they engaged, and what type of mediators in their view connect the different spaces to enable the local emergence. For identifying an institutional entrepreneur we followed Garud et al. (2007: 962) who argue, “to qualify as an institutional entrepreneur an individual must break with existing rules and practices associated with the dominant institutional logic(s) and institutionalize the alternative rules, practices or logics they are championing.” Empirically, institutional entrepreneurs were individuals, who were considered by a wider group of informants as central to setting the emergence in motion. Also, a range of actors other than institutional entrepreneurs were interviewed in order to investigate the “institutional work” (Lawrence & Suddaby, 2006) in which they participated. For both cases also a variety of public and non-public documents were used, such as final reports of the technology programs, articles in academic journals, and news stories in the press and trade journals.

4.2 Data analysis

The data analysis is comprised of four main stages. First, we traced the development of the fields both globally as well as in the local context. Table 1 provides chronologies of the main events characterizing the emergence of both fields in Finland and elsewhere. This first stage of analysis was conducted by collecting such events from the primary (interviews) and secondary (documents) data that triggered issue construction. Events were considered as discrete units which are unique, time bound, enacted and context-bound (Pauwels & Matthyssens, 2004). In the second stage, we identified the key actors who mediated between spatial scales in the local emergence process and investigated possible mediators used by them. Third, we conducted a cross-case pattern search between case similarities and differences (Eisenhardt, 1989). In comparing the cases, events, macro-cultural discourses, and mediating actors and activities between spatial scales formed our units of analysis. In the fourth stage, these categories formed the building blocks for our theorized storyline (Golden-Biddle & Locke, 2006) on the interaction between macro-cultural discourse, institutional entrepreneurs and spatial scales in the emergence of science-based fields. Such contextualist analysis of emergence stresses how the context is a product of action and action produces the

context, and where change is neither linear or singular but takes place at multiple interconnected levels (Pettigrew, 1990; also Seo & Creed, 2002). In the following we present the synopses of empirical cases, and in the next section we discuss the actions and events in further detail through comparative analysis of the functional foods and nanotechnology cases.

Year	Functional Foods Events	Year	Nanotechnology Events
G L O B A L			
1950s	Link between dietary fats and heart disease identified	1959	Feynman's speech There is Plenty of Room at the Bottom
1953	Relationship between the use of sterols and reduced serum cholesterol-level proved (Pollak 1953)	1978	Launch of supramolecular chemistry
1958	Seven Countries Study on the epidemiology and causes of coronary heart disease begin at the Minnesota University	1981	Invention of scanning tunneling microscope by IBM in Swizerland
1969	US White House Conference on Food, Nutrition and Health draws public attention to diet-disease link	1986	Drexler publishes Engines of Creation, the Coming Era of Nanotechnology, and establishes Foresight Institute
1970s	Sitosterol esterified with fatty acids to fatsoluble form by the researchers of Procter and Gamble Inc.	1987	Launch of the first single electron transistor at Bell Laboratory; establishment of MEMS as a field
		1990	The first academic journal Nanotechnology
		1992–	Joint Research Center for Atom
		2001	Technology program on meso scale physics in Japan
		1994–	Transnational research projects on
		2002	nanotechnology in EU
F I N L A N D			
1972	Community level intervention (North-Karelia Project) initiated to reduce the high heart disease mortality rate	1980s	Research reaching into atomic and molecular scale in e.g. physics, chemistry, material sciences and biology
1986	Medical inquiry and search for the possible applications for sitosterol started	1992	Introduction of nanoelectronics as a research area in University of Jyväskylä
1988	Great Fat Debate begun at the main Finnish newspaper Helsingin Sanomat	1995	Identification of the gap in public funding structures
1989	Technological breakthrough in converting plant stanols into a fat-soluble form by Wester at Raisio Margarine	1996	ESPRIT workshop on Long-term research Benchmarking to Japan
1991	Patent application for sitostanol ester filed at the Finnish Patent Office by Raisio Margarine	1997–	Nanotechnology Research Program by
1995	Launch of Benecol margarine by Raisio	1999	Tekes
1997–	Technology program on foods by Tekes		
2000			
G L O B A L			
1991	Early experiments with Benecol released at the scientific meeting of the American Heart Association	2000	Clinton announces the National Nanotechnology Initiative (NNI) in the USA
1995	New England Journal of Medicine publishes results that Benecol lowers blood (LDL) cholesterol by 14%	2002	Establishment of Nanotechnology as a strategic priority area in EU
1999	Launch of Benecol and Unilever's competing plant sterol ester margarine in the USA		

Table 1: Chronology of the key events in functional foods and nanotechnology

4.3 Research settings

The data for the comparative case study were collected in two separate research projects focusing on investigating the dynamics of the emergence of science-based fields. The comparative setting is justified by the important theoretical and empirical differences between the cases. Yet, they are similar enough to make the comparison worthwhile. Functional foods and nanotechnology in Finland are both science-based fields by virtue of their origins. Interestingly, these fields draw rather differently from local issues versus global macro-cultural discourses, and also have different feedback loops to the global emergence of the respective fields. In the cholesterol-lowering functional foods, the Finnish actors were the pioneers who shaped and also created the forms and functions of the field globally, and had a major impact on the discourses on food and health. In the local construction of nanotechnology, the Finnish agents were able to draw legitimacy from other institutional contexts for establishing the local form of the field. These differences enabled us to uncover the means and activities of institutional entrepreneurs in mediating influences across spatial scales, and embedding them into the Finnish context in both fields. Finland, an institutionally homogeneous Nordic country with 5.3 million inhabitants commands the ‘avant-garde’ role in both fields in terms of science or technology, pioneering either in technology development or institutional templates around these concepts. Focus on a distinctive spatial setting is necessary for investigating mediators and mechanisms of translation in the emergence of science-based fields. Table 2 presents quotes from the interviews illustrating the various processes of mediation of influences across the spatial scales.

The ancient “food as medicine” philosophy of Hippocrates underlies the concept of functional foods, which refers to a broad category of foods with a positive health effect. In the 1950s a research agenda on the relationship between nutrition and degenerative disease was established. Forty years later in the 1990s, an equally ground-breaking nutrition agenda on functional foods came about (Heasman & Mellentin, 2001). The emergence of functional foods required strong institutional entrepreneurship in addition to scientific and technological advancement. The concept is controversial in that it suggests that food can have medicinal effects and be used to prevent and to some degree also treat degenerative diseases. Our case concentrates on functional foods that aim to combat high blood cholesterol, the major causal risk factor for heart disease

which is the leading cause of death both in high and low income countries (WHO, 2007). Cholesterol-lowering functional foods contain plant sterols that block the absorption of cholesterol in the intestine. The pioneering Benecol margarine was developed and launched in Finland in 1995 as a part of the public health initiative called the North Karelia Project, which aimed to lower the cholesterol levels in the nation. Professor Pekka Puska, Director General of Finland's National Public Health Institute describes Benecol as the 'pearl in the crown'³⁵ of the initiative. The launch of Benecol triggered the creation of a number of similar types of concepts (e.g. Flora/Becel pro.activ, HeartWise). By the turn of the millennium, Finland was considered the world leader in the development of health-enhancing foods and was called "the Silicon Valley of Functional Foods".

Nanotechnology has been defined by Wang (2004, 28) as "the construction and use of functional structures designed from an atomic or molecular scale with at least one characteristic dimension measured in nanometers", i.e. on a size scale between 0.1 and 100 nanometers (Budworth, 1996; European Commission, 2004). The roots of nanotechnology are twofold. Nanotechnology is driven by scientific and technological development, which enables the manipulation of individual atoms and the investigation of phenomena revealed by the "nanoscale" size scale. Miniaturization in science is widely considered to have its inspiration in the 1959 speech of a Nobel Prize winner, physicist Richard Feynman, who stated "there is plenty of room at the bottom". The first major steps toward "nanotechnology" were the establishment of the field of supramolecular chemistry in 1978, and the launch of tools such as the scanning tunneling microscope in 1981 and atomic force microscope in 1986. Further, the development of microelectromechanical systems was a hot domain in the late 1980s in all industrialized countries. In Finland in the 1980s and early 1990s there was research reaching into the nano-scale in electronics, materials, processes and tools, and biotechnology. However, almost none of this research was labeled as nanotechnology before the local technology program on nanotechnology began in 1997. Consequently, in addition to the developments in science and technology, nanotechnology draws from the emergence of the very concept, as will be discussed in more detail in the comparative case analysis.

³⁵ <http://www.benecol.co.uk/new/benecol-history.htm>

	Functional foods quotations	Mediators across scales	Nanotechnology quotations	Mediators across scales
Translation and mediation to local context	<p>I worked for the Rockefeller Institute during 1963-65 and it was there where the research [on plant sterols] was primarily done. – <i>Emeritus Professor in Medicine</i></p> <p>We've been working with the guru of innovation-diffusion theory Rogers over the years. I visited Stanford with him and he visited our cottage and we wrote together about the use of lay opinion leaders (Puska et al. 1986). – <i>Director General of the National Public Health Institute</i></p> <p>The sterol representing Benecol was synthesized only in the mid-70s by the Japanese, but those experiments were made only with rats and chickens, none with man. – <i>Emeritus Professor in Medicine</i></p>	<p>Migrating scientists</p> <p>Scientific publications</p>	<p>The research on nanostructures at VTT Microelectronics Centre [...] was initiated in 1991 by sending a visiting researcher to Japan to join a group at NEC in this field. [...] This work was continued in Finland in 1993. – <i>Jouni Ahopelto [in the Final Report of the Technology Programme]</i></p> <p>What happens in Finland is mainstreams. We follow what happens elsewhere. How much we can do things ourselves depends on the situation. – <i>Professor of Applied Physics</i></p> <p>We organized a networking visit to Japan in 1996. [...] At the time they didn't talk about nano but it was mesoscale physics or something. Nano was a bit of an ugly word, due to Drexler perhaps. – <i>Senior Technology Expert at Tekes</i></p>	<p>Migrating scientists</p> <p>Trends, mainstream</p> <p>Benchmarking</p>
Translation from local to global	<p>We conducted the security tests in the best international research institutes...Every country has its own protocols and legislation. – <i>MNC Director Asia & Oceania</i></p> <p>We released the first clinical tests in an enormous meeting of the American Heart Association in 1991 – and ever since the sales and production of plant sterol have diffused and grown exponentially. – <i>Emeritus Professor in Medicine</i></p> <p>It is even amusing sometimes when I listen to ministers from the [most distant] countries at the WHO meetings talk about the North-Karelia Project. – <i>Director General of the National Public Health Institute</i></p>	<p>Clinical tests</p> <p>Conference presentations</p> <p>Evangelizing public policy actors</p>	<p>Even though it wasn't an enormous program on the global scale, it was one of the first organized as a program in the whole world. In addition for it to be recognized in Finland, it was also recognized elsewhere. Especially Oiva [Knuutila] [...] traveled even more than usual just to tell about nano. It brought into global knowledge what we were doing in an entirely different manner than without the program. – <i>Technology Expert at Tekes</i></p> <p>The international visibility was achieved in a sense that [...] during [2001] I was continuously asked to travel all across Europe to tell about the Finnish nanotechnology program in various panels, what should be done where, participate in think tanks and the like. – <i>Senior Technology Expert at Tekes</i></p>	<p>Evangelizing public policy actors</p> <p>Object of translation: institutional arrangement</p>

Table 2: Illustrations of the interview data on mediating actors, activities and artefacts

5. Comparative case analysis

5.1 Scientific and popular discourses and epistemic communities in science

In both functional foods and nanotechnology macro-cultural discourses played a central role in the construction of novel cognitive frames that enabled the emergence. These macro-level developments are described below.

Functional foods. After the food shortages of World War II, dietary habits and values favoured foods high in saturated fat. However, the scientific and policy discourse on the link between dietary intake of fat and heart disease was initiated in the U.S. in the 1950s, which challenged such values. Within the medical community Professor Ancel Keys at the University of Minnesota started the Seven Countries Study in 1958 to investigate cross-country variation in epidemiology and causes of coronary heart disease. A decade later President Nixon convened the landmark Conference on Food, Nutrition and Health. The conference stressed the role of consumer protection and education programs and prompted the introduction of dietary guidelines for certain classes of food. Identification of the relationship between dietary intake of fat and occurrence of heart disease enabled two decades later the “interstitial emergence” (Morrill, in press) of cholesterol-lowering functional foods in the transitory area between foods and pharmaceuticals. Functional foods have aroused considerable public and policy interest. Functional foods have been framed either positively as an opportunity to maintain national competitiveness of food manufacturers in the rapidly globalizing food industry and a way to reduce health care costs of ageing western populations; or the concept has evoked public concern over the safety of functional foods which are often associated with genetically modified food. A more specific discourse on cholesterol-lowering functional foods emerged in Finland in the 1990s, along with the development of the world’s first cholesterol-lowering functional food, the margarine called Benecol®. The relationship between dietary fat and heart disease rose to the top of the local political agenda along with the study of Professor Keys, which showed that men living in North Karelia in Eastern Finland suffered from world’s highest heart disease mortality rate. As discussed, the North Karelia Project, coordinated by the National Public Health Institute and the World Health Organization (WHO), was launched in 1972. During the period of its existence, 1972-1997, the

project was led by Professor Pekka Puska. His team challenged the eating habits of the farming region (rich in dairy fats and salt) and the opinion of the conservative medical community where some members considered heart disease as a “*normal age related phenomenon, which can’t nor even should be tackled*”, as recalled by a Research Professor who was at the time a member of the project team. The relationship between dairy fat and the risk of heart disease was strongly contested, and the backlash of the previously dominant discourse in form of “the great fat debate” took place in the leading Finnish newspaper Helsingin Sanomat in 1988, resembling an “institutional war” (Hoffman, 1999). Even though this debate was initiated as an open attack against the relationship between dietary fats and heart disease, the outcome was a rapid increase of cholesterol awareness by the general public.

Nanotechnology. As stated above, the trend of miniaturization in science is widely considered to have its inspiration from Feynman’s words “there is plenty of room at the bottom”. In the technology domain, the so-called Moore’s Law has become a powerful guideline for the IT industry, suggesting that the number of chips on a transistor doubles every year. The size of the smallest components in computers already reaches into the nanoscale. Yet, probably none of the science and technology would be called nanotechnology if it had not been for futurist Dr. Eric Drexler. Inspired by miniaturization in science, combined with his enthusiasm for science fiction, Drexler introduced the novel concept of nanotechnology in his book “*Engines of Creation: the Coming Era of Nanotechnology*” in 1986. The book gained a lot of attention due to the provocative claims about molecular machines that create minuscule copies of themselves. Compelling visions inspired many and generated a considerable following for Drexler’s ideas among futurists. The rhetoric became adopted and embedded especially in the cyber punk genre of science fiction in the U.S.³⁶ by the early 1990s. As a result, the concept “nanotechnology” became initially regarded as science fiction by the scientific community. However, despite, or owing to, the discursive embeddedness of nanotechnology in science fiction, the concept was able to capture the attention of science lobbyists and political decision-makers toward the mid-1990s in the U.S. In

³⁶ The books with reference to nanotechnology include *Science Fiction in the Real World*, *Great Mambo Chicken and the Transhuman Condition*, *Summer Queen*, *Aristoi*, *Virtual Light*, *Terminal Café*, *Queen City Jazz*, *The Diamond Age*, *Idoru*, *Distress*, *Slant*, *A King of Infinite Space*, *The Hacker Crackdown*, *Clone*, *Brown Girl in the Ring*, *Bloom*, *All Tomorrow’s Parties*; and movies *Virtuosity* and *Infinity*.

Europe the concept was plagued less by the connotations to science fiction though Drexlerian ideas were also known. Common to both continents, nanotechnology was used as a means for tilting the balance of public funding from biotechnology and medical sciences to physical sciences and engineering. Consequently, by the mid 1990s the notion of nanotechnology had begun to gain significant ground also in scientific discourses, through which it became disseminated to Finland, along with the popular cultural “Drexlerian” discourses. Interestingly, the key innovations were relabeled as ‘nanotechnology’ in science and media only after Drexler had introduced the concept, and even more so after the legitimation by public policy makers and scientists, although stripped - as much as possible - from its Drexlerian meaning. By 2002, nanotechnology had been framed as a strategic domain of research in most industrialized countries.

Comparative remarks. Both fields benefited from the emergence of new discourses in global epistemic communities, which challenged or complemented certain institutionalized frames of understanding. For the case of cholesterol-lowering functional foods the concept emerged as a kind of counter discourse to the prevailing discourse stressing taste and pleasure of traditional foods. Changing such views clearly lies beneath the emergence of functional foods as a field. In the nanotechnology case, the creation of the concept, on the other hand, directed the imagination of a wider public to technology development on a very small size scale. First established in science fiction, science lobbyists and policy makers later mobilized counter discourses, which aimed to abolish such connotations. This change of frames enabled the creation of national technology programs, such as the one, among the first, in Finland. In both cases, certain field-related activities pre-existed these discourses, such as rigorous medical studies of the diet-disease link in functional foods, and miniaturization in research and technology in nanotechnology, which triggered and enabled the emergence of the novel discourses in epistemic communities.

There are also several differences between the cases. Counter discourses in functional foods represented such a fundamental change in conventional understanding on food and health that the institutionalization of these discourses was a major task and posed a challenge, or even threat, to many existing organizations. As a result, the link between heart health and consumption of dairy fat was later contested by individuals, organizations and various activist groups. Mobilization of the novel discourse required

a grass-roots level change of attitudes, and the involvement of a variety of communities. However, the nanotechnology discourse in science fiction interestingly created opportunities for actors in science and policy domains to gain access to new resources, and did not require such a major change in the existing institutionalized discourses within the scientific community. The communities the discourses affected were few and represented the scientific elite. The major threat for organizations was not to be included in the nano-domain and the new resources it offered, which resulted in opportunism in the form of ‘nano-labeling’ of research and development activities in the 2000s.

5.2 Migrating scientists and local translation of ideas and technology

As is typical for science-based fields, migrating scientists played crucial roles in building local competences that enabled the identification and adoption of the novel concepts. The main task of the central scientists, but also of public policy actors, was to translate the scientific discourse within epistemic communities into issues that were understood and accepted by other stakeholders in the local context. While we cannot describe these links from global to local exhaustively, we give some examples of some of the most important connections below.

Functional foods. In the 1950s and 1960s Finnish researchers were active in international research collaboration particularly with U.S. scientists. Within the North Karelia Project, the migration of scientists and the transfer and translation of existing theories to health promotion was crucial. Most importantly, the project team applied the innovation-diffusion model by Everett M. Rogers, the key member of the project team (see also Rogers, 2003), to translate the novel understandings of risk-reducing lifestyles present in the research community to individuals through normal community networks. Reciprocal research visits and co-authoring took place between Rogers and Puska in Finland and Stanford, U.S. during the project. Later in 2000, a co-principal investigator of the project, Professor Erkki Vartiainen, spent one year in Scotland to implement a similar heart disease prevention scheme. Likewise, migration and the import of the state-of-the-art medical science were central in developing the pioneering cholesterol-lowering functional foods concept in Finland. The leading scientist of the human lipid metabolism, Professor Tatu A. Miettinen from the Helsinki University Central Hospital

in Finland, had worked for the prestigious Rockefeller Institute for Medical Research in New York during 1963-65. The competence that Miettinen imported from the pioneering research institute on plant sterols to Finland became central in the development of the plant stanol ester used in Benecol.

Nanotechnology. There were many scientists in various domains of science studying atomic and molecular scale phenomena in the 1980s and early 1990s. However, very few of them were politically active in promoting the concept of nanotechnology. The most central actor among the scientists was arguably Professor Mikko Paalanen. After gaining his PhD from the renowned Low Temperature Laboratory (LTL) at Helsinki University of Technology in the mid-1970s, he worked for 15 years at Bell Laboratories in the U.S. At Bell, Paalanen was involved in the research of single electron transistors (SET)³⁷. In 1992, he returned to Finland and became Professor of Applied Physics at the University of Jyväskylä, where the first Finnish SET was produced in 1993. In the mid-1990s, as the Director of LTL he, along with his team, extended the existing competences around a sensitive magnetometer called SQUID (Superconducting Quantum Interference Device), which had interesting similarities of application to SET. During the early 1990s in the domain of nanoelectronics, other migrating researchers included Jukka Pekola visiting the University of California in Berkeley; Jouni Ahopelto visiting at NEC in Japan; and Olli Ikkala who in general was an internationally known researcher in the domain of self-organized polymer nanostructures. However, Paalanen was the one among the scientists of all domains of nanotechnology, who recognized the need to actively promote nanotechnology in the wider academic and political arenas in Finland and participated in the translation of nanotechnology as a science into nanotechnology as a policy.

Comparative remarks. The migrating scientists were important embodiments and carriers of novel research into the Finnish context, and acted as central mediators between spatial scales. These scientists imported competencies and novel discourses but, most significantly, engaged in the local translation of new concepts, both scientifically and politically. There are two levels of activity in which agents are embedded and from which they draw: the scientific development and discourses; and

³⁷ An important innovation in the development of nanoelectronics based on Coulomb blockade and quantum tunneling.

the popular discourses. Both functional foods and nanotechnology fields were strongly embedded in scientific research during their early stage of emergence. However, popular trends and discourses sensitized scientists and actors in public funding organizations to interpret the science through a novel lens, which enabled the local emergence of these science-based fields. For functional foods, what started as a local public health initiative, ended as a specific cholesterol lowering product aimed for the global market place. In the case of nanotechnology, the emergence took place by directing the focus of existing institutions to nanotechnology and developing the related technology and competence base. However, the cases differed from one another to the extent of the field being a product of local creation versus local translation. In the functional foods case the local agents merged research results from their epistemic communities with local scientific and technological competences and raw materials to solve a serious health issue. In this process they significantly shaped and developed the concept and created a central innovation in the domain. In nanotechnology, the ideas were imported to and adopted in science in a fairly similar form to what was already happening elsewhere, but embedding them into the individual and local competence base resulted also in modified foci of research. In the next section we discuss the local translation and embedding in more detail.

5.3 Legitimizing organizations and links back to global development of the fields

In both cases, the agency of certain individuals, enabled and enforced by their formal organizations, formed the basis for the local emergence of the fields. Also, in their dissemination from Finland to other countries, various organizations played an important role, especially so in the functional foods case.

Functional foods. While the severe local health issue and the high level competence in cholesterol metabolism were important in the local development of the pioneering plant sterol margarine, the actual trigger for developing the Benecol concept came from a Finnish forest products company that was at the time searching for buyers for sitosterol, a surplus by-product of its milling process. After a potential application area was identified from scientific publications, where the cholesterol-lowering property of plant sterols was known since the 1950s (Peterson, 1951; Pollack, 1953), Professor Miettinen was contacted. He suggested the use of fat soluble sitostanol ester in food products to

Raisio Margarine, the leading Finnish vegetable-fat producer. The positive results of the early experiments with Benecol were released at the American Heart Association Scientific meeting in 1991. This resulted in a radical change in the way of thinking about the potential of plant sterols both in Finland and in foreign research laboratories, reflected in patenting and scientific publication activity around sitostanols. Even though Benecol was ready for a launch in 1992, the management of Raisio requested long-term clinical trials. The delay of the market launch was probably the right decision also due to the view of the medical community at that time that low blood cholesterol level may be linked to violent behaviour. An extensive clinical trial with Benecol was thereafter carried out within the North Karelia Project which already had an internationally recognized system for clinical trials. The trial documented a 14 percent reduction in the 'bad' cholesterol level (low-density-lipoprotein, LDL) and was published in 1995 in the flagship journal *New England Journal of Medicine*, the same day Benecol was launched in Finland. Later, the involvement of Professors Puska and Miettinen in the marketing of Benecol built a sound base for negotiations with regulative authorities and the marketing of Benecol both nationally and internationally.

In sum, both the local heart disease prevention program in North Karelia and the concept of cholesterol-lowering functional foods were pioneers in the endeavor to find the connection between nutrition and heart health. The ideas behind these innovations have circulated globally through scientific articles and patents. The success of the North Karelia Project (by 2002 the age-adjusted coronary heart disease mortality rate had fallen over 80 percent in North Karelia from the pre-program years) is documented in over 400 international medical articles and the project is frequently cited as the model for other national and international prevention trials. Since the early 80s, up to 2,000 guests from more than 100 countries have participated an "International Visitors' Programme" organized twice a year in Finland. Also developing countries, which are today struggling under the dual burden of both chronic and infectious diseases, are launching similar types of projects, the North Karelia Project being the "spiritual father" of the later projects. Professor Puska became recognized for his local achievements and was invited to build the WHO Global Strategy on Diet, Physical Activity and Health (2001-2003) and was appointed as President Elect of the non-governmental organization World Heart Federation in 2006. Hence, a wide range of organizational actors from local heart associations and other NGOs to rather global

MNCs, IGOs and INGOs have participated in constructing the heart-health issue and in legitimating the cholesterol-lowering functional foods.

Nanotechnology. Regardless of the research competence present in Finland during the early 1990s, the reason why one of the first nanotechnology programs in the world was established there lies in the agency and competence of a handful of individuals in public policy organizations. Tekes, the Finnish Funding Agency for Technology and Innovations, had typically financed projects forming part of the strategic activity to ensure the adoption of new technologies, which are close to commercialization and important to Finnish industries. The task of the Academy of Finland has traditionally been the funding of projects in basic research. However, the division of labor between the funding organizations was not clear-cut, and a need for cooperation existed. In the autumn of 1995, Oiva Knuuttila, a technology expert of Tekes, discussed with his colleagues, Juha Vapaavuori and Jussi Kivikoski, the importance of the organization to allow long-term investments on emerging fields, such as nanotechnology, without an immediate expectation for commercialization. Knuuttila had a background in nuclear physics, and Vapaavuori and Kivikoski were chemists by education. Their task in Tekes was to identify new potential areas of applied research and commercial development. Their education made them able to see both the scientific and political opportunities provided by nanotechnology, and their tasks in the organization offered a true leverage on the technology policy issues. These discussions within Tekes coincided with the ESPRIT Workshop “Long Term Research” organized in Finland by the European Commission. The focus was on “Future Emerging Technologies”, which also touched upon nanotechnology. The workshop encouraged a small group of individuals within Tekes to investigate further the prospects for establishing a program around nanotechnology. As a result, a delegation including Oiva Knuuttila from Tekes, Juhani Keinonen, the Head of the Research Council for Natural Sciences from the Academy of Finland, and Professor Paalanen, visited Japan in 1996 to benchmark³⁸.

With the lead of Jorma Hattula, the new Director of Research at The Academy of Finland, and Oiva Knuuttila, the gap in the Finnish science funding structures was construed into an issue which, together with encouragement from the ESPRIT

³⁸ Japan had started in 1992 with a 10-year technology program on “meso scale physics”, a more legitimate concept at the time representing, however, a significant investment to nano-related research.

workshop and the benchmarking exercise, enabled the founding of the Nanotechnology Research Programme in cooperation with the two institutions. The program, lasting from 1997 to 1999, was among the first nanotechnology research initiatives in the world to be organized in the form of a program and also to employ the concept of nanotechnology. The timing of the program was interesting: by the ‘hype year’ 2000, Finland had become a benchmarking case for many countries in Europe that were about to establish their first nanotechnology programs. After the program was finished, the central actors and researchers contributing to it became the promoters of the institutionalization of nanotechnology in the European context. For example, Oiva Knuutila was invited to a number of conferences and seminars in Europe to advise on and discuss various nanotechnology programs. Consequently, the Finnish actors contributed to the construction of nanotechnology as a field of activity also in the European context.

Comparative remarks. In both emergence paths *kairos* or “right or opportune moment”³⁹ played an important role as the favorable timing of the market launch of Benecol and the Finnish nanotechnology program indicated. Moreover, in both cases high status organizations acted as legitimators of the activities of the central agents, and the public financing channeled for instance through Tekes was crucial for both fields. However, the legitimizing organizations and media were different across the cases. In functional foods, the involvement and commitment of commercial firms, as well as health related NGOs and INGOs in the later legitimation were necessary. In the relevant epistemic communities, scientific publications and patents were used both to protect intellectual property as well as to evangelize and legitimize the novel concepts. As functional food represents a more fundamental institutional change, a greater variety of organizations was necessary in its legitimation. In the nanotechnology case, emergence was a far more contained process addressing but a few scientific elites, and the major roles were played by the local research and public policy organizations. The central actors greatly benefited from a suitable education for recognizing nanotechnology as an interesting area of public investment, as well as from their task in a formal public organization to identify potential local seeds for nationally important technologies. Consequently, their actions were supported by their work tasks and organization. Since

³⁹ [<http://en.wikipedia.org/wiki/Kairos>]

nanotechnology hardly existed in the national policy agendas at the time of the launch of the program, the legitimation from the European Commission and benchmarking from Japan were crucial for starting a local program. As a result, the timing of the launch of the Benecol ingredient and the Finnish nanotechnology program resulted in their becoming benchmarking cases for other countries initiating similar activities.

6. Findings and discussion

6.1 Macro-cultural discourses and institutional entrepreneurship

In our first question we asked, *Through which processes do macro-cultural and counter discourses enable the local emergence of science-based fields?* The notion of macro-cultural discourses has scarcely been developed in the institutional entrepreneurship literature and in the context of field emergence. For this discussion our study gives two contributions. Firstly, our cases not only show the enabling property of macro-cultural discourses (Lawrence & Phillips, 2004), but highlight that parallel and counter discourses fundamentally underlie institutional entrepreneurship. Agency is needed to change the prevalent discourses. If institutions are characterized “as products of discursive activity that influence actions” (Phillips et al., 2004: 635), then institutional entrepreneurs must be such actors who create and disseminate parallel and counter discourses. Hence, contributing to the work of Lawrence and Phillips (2004), institutional entrepreneurs participate in the creation of entirely new discourses, rather than merely capitalize on existing macro-cultural discourses.

***Proposition 1:** Institutional entrepreneurs are agents who are active in identifying, creating and mobilizing parallel and counter discourses to prevailing institutionalized discourses.*

Our second contribution to the discussion on macro-cultural discourse in field emergence concerns the special nature of science-based fields and the types of discourses and activities present in their construction. The empirical study showed that the developments in science need to be translated across spatial scales, as well as popularized, which is another form of translation, across community boundaries in

order for a local field to emerge. This process is regulated by the local public and policy institutions as well as ‘public opinions’. For such a task the identification and construction of a local issue, which is important from the public policy point of view, was crucial in both cases.

***Proposition 2a:** Local construction of a scientific discourse requires the identification of an issue which is significant from the local policy point of view, and is supported by a critical mass of significant communities.*

***Proposition 2b:** The more profound the institutional change required and the more and greater variety of communities involved, the more fundamental the construed issue and better justified the accompanying discourses need to be.*

6.2 Institutional Entrepreneurs Translating across Spatial Scales

Our second research question was, *How do translation processes and media employed by institutional entrepreneurs differ in pioneering and adopting science-based fields?* Besides suggesting answers to this question, our empirical data contribute to discussing the common and divergent aspects of institutional entrepreneurship across spatial scales in field emergence.

The empirical study suggests that the capacity of actors to operate across spatial scales, and link local institutions and global discourses to one another, may in fact be one important capability that defines the possibilities for institutional entrepreneurship in science-based fields. The role of this capability is naturally emphasized in the context of a small and open society, where scientific communities are rarely self-sustaining. Scientists are by their formal training and activities particularly capable of working across spatial scales, and linking a global body of research into local competences and funding institutions by acting as local legitimators and lobbyists. Such activity is backed by both their personal status in the research community and the prestige of their current and previous organizations. Public policy actors, on the other hand, are gate keepers to what is financed by policy institutions. In the empirical cases, public policy actors enacted locally the trends that were identifiable in global epistemic and policy communities, built funding schemes and regulation around them, and hence, played an

important role in institutional innovation. The study casts light on mediating activities and artefacts between local institutions and macro-cultural discourses, to which Lawrence and Phillips (2004) give some early implications. Our focus on migrating scientists complements the idea that membership of a transnational community (Portes, 1996) or international technical community (Saxenian & Hsu, 2005) may act as a mediator between otherwise disconnected knowledge bases. Moreover, our findings extend the discussion of Spicer (2006) on spatial scales by elaborating the ways in which institutional entrepreneurs participate in the local production of capital accumulation, discourses and regulation. As a result, the study addresses what we consider to be one of the central weaknesses of the current institutional entrepreneurship literature, namely that of concentration on projective agency (Dorado, 2005) within a limited spatial scale.

***Proposition 3:** In science-based fields, the capacity of an actor to capitalize on, create and translate material and discursive practices across spatial scales defines his/her possibilities for institutional entrepreneurship.*

The third contribution to the embedding agency discussion addresses the second research question on how agency and translation differs depending on the nature of the field. Timing, or *kairos*, largely defined the extent to which local projects became noticed in global communities. Timing was also reflected in the extent of change and mobilization which the agents needed to induce. Functional foods in the cholesterol-lowering category represents a truly *pioneering* field. Our study shows that even in pioneering science-based fields, the seeds for activity are present in discourses of global epistemic communities, from which they are translated and sometimes greatly modified to address local issues. The task of local actors was to articulate and mobilize counter-discourses to the prevailing institutionalized understandings of the link between dairy fats and heart health based on ground-breaking research results. This was a project of creating cognitive legitimacy for a novel conception of food, and to engage in profound cultural change. Consequently, pioneers of new fields have an important role in building templates and counter discourse locally and later disseminating them by theorizing the local successes across national boundaries within their epistemic communities, also reaching toward other audiences. Though pioneering is tied to a specific institutional context, in science-based fields the necessary legitimation and

institution building takes place at the level of global communities, as pioneering is typically characterized by references to certain scientific publications and patents. These present one type of feedback loop between local institutions and global discourses.

***Proposition 4:** In pioneering science-based fields, high status individuals and organizations act as institutional entrepreneurs by creating and mobilizing novel discourses locally, and legitimize them in the global epistemic community through publishing, patenting and evangelizing.*

The emergence of nanotechnology in Finland, on the other hand, represents an *adopting* field. Similar to functional foods, the emergence of nanotechnology was enabled by developments in science and macro-cultural discourses elsewhere. When ‘nanotechnology’ started to gain momentum in science and political discourse, it was construed as means for changing the existing division of tasks between established funding institutions in Finland. The novel technology program was legitimated through benchmarking and referencing activities in relation to the pioneers in the domain. Hence, rather than mobilizing counter discourses, the main task of the local institutional entrepreneurs was to modify the discourses and practices from a different institutional environment suitable to the local context, and construct the need for local activity. However, the local form, a nanotechnology program, was new at least in the European context, and became a template for other institutional actors in the later stages.

***Proposition 5:** In adopting science-based fields, institutional entrepreneurs draw from somewhat institutionalized discourses and benchmark existing templates present elsewhere, and through theorizing and mobilizing create local versions of them.*

Figure 1 summarizes the conceptual and empirical discussion and presents the framework for institutional entrepreneurs as mediating and translating agents at the intersection of global discourses and local institutions. These actors form part of various communities and organizations through which they are able to modify the prevalent macro-cultural discourses. On the other hand, institutional entrepreneurs are aware of and hold some power over local resources, competences, issues and actors. To

conclude, our study strongly suggests that institutional entrepreneurs play a central role in the local embedding of novel fields.

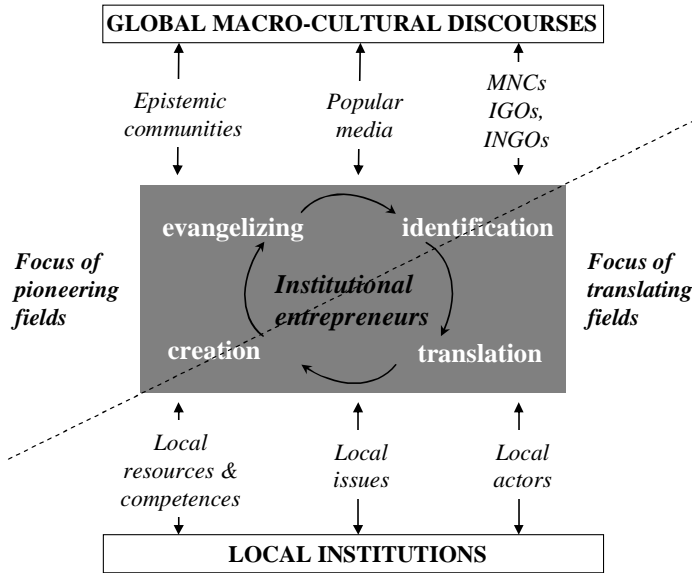


Figure 1: Institutional entrepreneurs as the mediators between local institutions and global influences in the emergence of science-based fields

7. Conclusions

In this study, we investigate the role and the ways in which institutional entrepreneurs utilize macro-cultural discourses in building or redirecting local institutions, and thereby contribute to the local emergence of a new field. While the institutional entrepreneurship approach brought focus to the role of the ground breaking activities of individual actors in bounded spatial localities (Lawrence & Phillips, 2004; Maguire et al., 2004), Scandinavian Institutionalism stressed imitation as a motor of agency and translation as a vehicle to appreciate spatial differences (Czarniawska & Sevón, 2005). The notion of spatial scales (Spicer, 2006) focused further attention into interactions across the geographic scales.

Empirically the study drew from two cases, functional foods representing the global pioneer and nanotechnology a local adopter. Through such a comparative setting we were able to contrast the activities of the central actors in constructing local fields. The focus on the complex interaction between macro-cultural discourses and institutional entrepreneurship across spatial scales both conceptually and empirically allows this study to make several contributions to the literature on field emergence. Firstly, it complements the work of Lawrence and Phillips (2004) by discussing how micro-level agency may contribute to macro-cultural discourses, rather than merely using them as a resource. Secondly, our study finds that, depending on the field, translation may result in such a great modification of the original idea that a novel, pioneering innovation may be the result. This finding brings Scandinavian Institutionalism into interaction with innovation literature by suggesting that local translations are important seeds for local technological and institutional innovation, which creates a further link to the literature on the social construction of technology (Constant, 1980; Bijker, Hughes & Pinch, 1987; Garud & Karnoe, 2003). Thirdly, we identify that a major task for institutional entrepreneurs in the emergence of institutions is to create parallel and counter discourses to prevalent institutionalized discourses, representing a contribution to Phillips et al. (2004). Thus, the study advances a view according to which institutionalization is not only a top-down phenomenon of institutional isomorphism, but rather, it works also from the micro to the macro, from the local to the global (Barley & Tolbert, 1997; Lippi, 2000).

Naturally, the study has several limitations. The division to local agents and institutions and global macro-cultural discourses is analytic at best. Local and global influences are intertwined in complex ways across the various phases of field emergence and it is very difficult to track in detail the role of the individual agency in connecting between these levels. Also, our cases can hardly be generalized to other fields and, consequently, more studies are called for on the role of the individual agency in different kinds of emerging fields in multiple contexts. Whereas our research setting offers a novel perspective to study field emergence, it also raises some further topics to be covered. Firstly, the effects and implications of macro-cultural discourses and agency to field emergence require further investigation. For example, language presents barriers for the dissemination of macro-cultural discourses, and investigating the development and influences of macro-cultural discourses to field emergence across different language

areas might provide a fruitful path for further research. Secondly, the relationship between individual relational embeddedness and organizational formal status as an enabler for the creation and mobilization of novel macro-cultural discourses is another interesting topic to cover. Finally, more investigation on how cultural and social movements and consumer behavior promote or inhibit the emergence of new fields would also contribute to understanding their dynamics.

REFERENCES

- Amin, A. (2003). Spaces of corporate learning. In J. Peck and H. W.-c. Yeung (Eds.), *Remaking the Global Economy* (pp. 114-129). London: Sage Publications.
- Amin, A. & Cohendet, P. (2004). *Architectures of Knowledge: Firms, Capabilities and Communities*. Oxford: Oxford University Press.
- Ansell, C. K. (1997). Symbolic networks: The Realignment of the French Working Class, 1887-1894, *American Journal of Sociology*, 103 (2), 359-390.
- Barley, S. R. & Tolbert, P. S. (1997). Institutionalization and structuration: Studying the links between action and institution, *Organization Studies*, 18 (1), 93-117.
- Beckert, J. (1999). Agency, entrepreneurs, and institutional change: The role of strategic choice and institutionalized practices in organizations, *Organization Studies*, 20 (5), 777-799.
- Benford, R. D. & Snow, D. A. (2000). Framing processes and social movements: An overview and assessment, *Annual Review of Sociology*, 26 611-639.
- Berger, P. & Luckmann, T. (1966). *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. London: Penguin Books.
- Bijker, W., Hughes, T. & Pinch, T., (Eds) (1987). *The Social Construction of Technological Systems*. Cambridge: MIT Press.
- Boli, J. & Thomas, G. M. (1997). World culture in the world polity: A century of international non-governmental organization, *American Sociological Review*, 62 171-190.
- Boxenbaum, E. (2006). Lost in translation: The making of Danish diversity management, *American Behavioral Scientist*, 49 (7), 939-948.
- Budworth, D. W. (1996). *Overview of Activities on Nanotechnology and Related Technologies*. City: Institute for Prospective Technological Studies of the European Commission.
- Bunnell, T. G. & Coe, N. M. (2001). Spaces and scales of innovation, *Progress in Human Geography*, 25 (4), 569-589.
- Constant, E. W. (1980). *The Origins of the Turbojet Revolution*. Baltimore: John Hopkins University Press.
- Czarniawska, B. & Joerges, B. (1996). Travels of ideas. In B. Czarniawska and G. Sevón (Eds.), *Translating Organizational Change* (pp. 13-48). Berlin: Walter de Gruyter.

- Czarniawska, B. & Sevón, G., (Eds) (1996). *Translating Organizational Change*. Berlin: Walter de Gruyter.
- Czarniawska, B. & Sevón, G., (Eds) (2005). *Global Ideas. How Ideas, Objects and Practices Travel in the Global Economy*. Malmö: Liber & Copenhagen Business School Press.
- DiMaggio, P. (1988). Interest and agency in institutional theory. In L. B. Zucker (Eds.), *Institutional Patterns and Organizations: Culture and Environment* (pp. 3-21). Cambridge, MA: Ballinger.
- DiMaggio, P. J. (1991). Constructing an organizational field as a professional project: U.S. art museums 1920-1940. In W. W. Powell and P. J. DiMaggio (Eds.), *The New Institutionalism in Organizational Analysis* (pp. 267-292). Chicago: University of Chicago Press, Chicago.
- Dorado, S. (2005). Institutional entrepreneurship, partaking, and convening, *Organization Studies*, 26 (3), 385-414.
- Dubois, A. & Gadde, L.-E. (2002). Systematic combining: an abductive approach to case research, *Journal of Business Research*, 55 553-560.
- Eisenhardt, K. M. (1989). Building theories from case study research, *Academy of Management Review*, 14 (4), 532-550.
- European Commission (2004). *Goal: European Nanotechnology Strategy* (in Finnish). City: European Commission.
- Fligstein, N. (1997). Social skill and institutional theory, *American Behavioral Scientist*, 40 (4), 397-405.
- Gamson, W. A. & Wolfsfeld, G. (1993). Movements and media as interacting systems, *Annals of the American Academy of Political and Social Science*, 528 (114-125),
- Garud, R., Hardy, C. & Maguire, S. (2007). Institutional entrepreneurship as embedded agency: An introduction to the special issue, *Organization Studies*, 28 (7), 957-969.
- Garud, R., Jain, S. & Kumaraswamy, A. (2002). Institutional entrepreneurship in the sponsorship of common technological standards: The case of Sun Microsystems and Java, *Academy of Management Journal*, 45 (1), 196-214.
- Garud, R. & Karnoe, P. (2003). Bricolage versus breakthrough: Distributed and embedded agency in technology entrepreneurship, *Research Policy*, 32 277-300.
- Golden-Biddle, K. & Locke, K. D. (2006). *Composing Qualitative Research*. London: Sage.
- Greenwood, R. & Suddaby, R. (2006). Institutional entrepreneurship in mature fields: The big five accounting firms, *Academy of Management Journal*, 49 (1), 27-48.
- Greenwood, R., Suddaby, R. & Hinings, C. R. (2002). Theorizing change: The role of professional associations in the transformation of institutionalized fields, *Academy of Management Journal*, 45 (1), 58-80.
- Haas, P. M. (1992). Introduction: Epistemic communities and international policy coordination, *International Organization*, 46 (1), 1-35.
- Hardy, C., Lawrence, T. B. & Grant, D. (2005). Discourse and collaboration: the role of conversations and collective identity, *Academy of Management Review*, 30 (1), 58-77.
- Heasman, M. & Mellentin, J. (2001). *The Functional Foods Revolution. Healthy People, Healthy Profits?* Sterling, VA: Earthscan.
- Hoffman, A. J. (1999). Institutional evolution and change: environmentalism and the U.S. chemical industry, *Academy of Management Journal*, 42 (4), 351-371.

- Inoue, K. & Drori, G. S. (2006). The global institutionalization of health as a social concern: Organizational and discursive trends, *International Sociology*, 21 (2), 199-219.
- Lawrence, T. B., Hardy, C. & Phillips, N. (2002). Institutional effects of interorganizational collaboration: The emergence of proto-institutions, *Academy of Management Journal*, 45 (1), 281-290.
- Lawrence, T. B. & Phillips, N. (2004). From Moby Dick to Free Willy: Macro-cultural discourse and institutional entrepreneurship in emerging institutional fields, *Organization*, 11 (5), 689-711.
- Lawrence, T. B. & Suddaby, R. (2006). Institutions and institutional work. In S. Clegg, C. Hardy, W. Nord and T. Lawrence (Eds.), *Handbook of Organization Studies* (pp. 215-254). London: Sage.
- Lefebvre, H. (1991). *The Production of Space*. Oxford: Blackwell.
- Leitner, H. (1997). Reconfiguring the spatiality of power: The construction of a supranational migration framework for the European Union, *Political Geography*, 16 (2), 123-143.
- Lindberg, K. & Czarniawska, B. (2006). Knotting the action net, or organizing between organizations, *Scandinavian Journal of Management*, 22 292-306.
- Lippi, A. (2000). One theory, many practices. Institutional allomorphism in the managerialist reorganization of Italian local governments, *Scandinavian Journal of Management*, 16 455-477.
- Lounsbury, M. & Crumley, E. T. (2007). New practice creation: An institutional perspective on innovation, *Organization Studies*, 28 (7), 993-1012.
- Lounsbury, M. & Ventresca, M. (2002). Social structure and organizations revisited, *Research in the Sociology of Organizations*, 19 3-36.
- Maguire, S. & Hardy, C. (2006). The emergence of new global institutions: A discursive perspective, *Organization Studies*, 27 (1), 7-29.
- Maguire, S., Hardy, C. & Lawrence, T. B. (2004). Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada, *Academy of Management Journal*, 47 (5), 657-679.
- Meyer, J. W., Drori, G. S. & Hwang, H. (2006). World society and the proliferation of formal organization. In G. S. Drori, J. W. Meyer and H. Hwang (Eds.), *Globalization and Organization* (pp. 25-49). Oxford: Oxford University Press.
- Morrill, C. (in press). Institutional change and interstitial emergence: The growth of alternative dispute resolution in American law, 1965-95. In W. W. Powell and D. L. Jones (Eds.), *How Institutions Change*. Chicago: University of Chicago Press.
- Munir, K. A. (2005). The social construction of events: A study of institutional change in the photographic field, *Organization Studies*, 26 (1), 93-112.
- Munir, K. A. & Phillips, N. (2005). The birth of the Kodak moment: Institutional entrepreneurship and the adoption of new technologies, *Organization Studies*, 26 (11), 1665-1687.
- Murtha, T., Lenway, S. A. & Hart, J. A. (2001). *Managing New Industry Creation: Global Knowledge Formation and Entrepreneurship in High Technology*. Boston: Stanford University Press.
- Pauwels, P. & Matthyssens, P. (2004). The architecture of multiple case study research in international business. In R. Marschan-Piekkari and C. Welch (Eds.), *Handbook of Qualitative Research Methods for International Business* (pp. 125-143). Cheltenham, UK: Edward Elgar.

- Perkmann, M. & Spicer, A. (2007). 'Healing the scars of history': Projects, skills and field strategies in institutional entrepreneurship, *Organization Studies*, 28 (7), 1101-1122.
- Peterson, D. W. (1951). Effect of Soybean Sterols in the Diet on Plasma and Liver Cholesterol in Chicks, *Experimental Biology and Medicine*, 78 143-147.
- Pettigrew, A. (1990). Longitudinal field research on change: Theory and practice, *Organization Science*, 1 (3), 267-292.
- Phillips, N., Lawrence, T. B. & Hardy, C. (2004). Discourse and institutions, *Academy of Management Journal*, 29 (4), 635-652.
- Pollack, O. J. (1953). Reduction of Blood Cholesterol in Man, *Circulation*, 7 702-706.
- Portes, A. (1996). Global villagers: the rise of transnational communities, *American Prospect*, (March-April), 74-77.
- Powell, W., Koput, K. W. & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology, *Administrative Science Quarterly*, 41 116-145.
- Rao, H. (1998). Caveat emptor: The construction of non-profit consumer watchdog organizations, *American Journal of Sociology*, 103 912-961.
- Rao, H., Monin, P. & Durand, R. (2003). Institutional Change in Toque Ville: Nouvelle Cuisine as an Identity Movement in French Gastronomy, *American Journal of Sociology*, 108 (4), 795-843.
- Rogers, E. M. (2003). *Diffusion of Innovations*. 5th edition. New York: Free Press.
- Saxenian, A.-L. & Hsu, J.-Y. (2005). The Silicon Valley-Hsinchu Connection: Technical Communities and Industrial Upgrading. In S. Breschi and F. Malerba (Eds.), *Clusters, networks, and innovation* (pp. 235-260). Oxford: Oxford University Press.
- Scott, W. R. (1995). *Institutions and Organizations*. First edition. London: Sage.
- Scott, W. R. (2001). *Institutions and Organizations*. Second edition. Thousand Oaks: Sage.
- Seo, M.-G. & Creed, W. E. D. (2002). Institutional contradictions, praxis, and institutional change: A dialectical perspective, *Academy of Management Review*, 27 (2), 222-247.
- Sewell, W. F. (1992). A Theory of Structure: Duality, Agency, and Transformation, *American Journal of Sociology*, 98 (1), 1-29.
- Spicer, A. (2006). Beyond the convergence-divergence debate: The role of spatial scales in transforming organizational logic, *Organization Studies*, 27 (10), 1467-1483.
- Stake, R. E. (2005). Qualitative case studies. In N. K. Denzin and Y. S. Lincoln (Eds.), *The Sage Handbook of Qualitative Research* (pp. 443-466). Thousand Oaks, CA: Sage.
- Van de Ven, A. H. & Garud, R. (1993). Innovation and industry development: the case of cochlear implants. In R. A. Burgelman and R. S. Rosenbloom (Eds.), *Research on Technological Innovation, Management and Policy* (pp. 1-46). Greenwich, Connecticut: JAI Press Inc.
- Wang, Z. L. (2004). What is nanotechnology? And how will this small wonder make a big change in manufacturing? *Industrial Engineer*, (January), 28-29.
- WHO (2007). *The ten leading causes of death by broad income group 2002*, Fact sheet No 310/February 2007.

- Wijen, F. & Ansari, S. (2007). Overcoming inaction through collective institutional entrepreneurship: Insights from regime theory, *Organization Studies*, 28 (7), 1079-1100.
- Yin, R. (2003). *Case Study Research: Design and Methods*. Thousand Oaks: Sage.
- Zilber, T. (2007). Stories and the discursive dynamics of institutional entrepreneurship: The case of Israeli high-tech after the bubble, *Organization Studies*, 28 (7), 1035-1054.

ESSAY 4

Industry Level Institutional Distance and the Cross-Border Transferability of a New Consumer Concept

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Abstract: I examine the cross-border transferability of a new consumer concept. By building on the recent developments in neoinstitutional theory and international business research, I propose a novel concept of industry institutional distance. The concept complements traditional distance measures by offering an analytical tool for considering the industry-specific dynamics central in emerging fields and industries. The concept is operationalised on the basis of a longitudinal case study on the emergence of cholesterol-lowering functional foods in Europe and the U.S. The results imply the importance of normative and cognitive institutions mediated by inter-industry pressures for a successful field emergence.

Keywords: Institutional distance, field emergence, industry legitimacy, functional foods

INTRODUCTION

International business (IB) research is living through a ‘renaissance of institutions’, which is reflected in the increasing use of neoinstitutional theory in international business research (Dahan et al. 2006). The new fascination with institutions is partly a result of the proliferation and power of institutional actors such as international non-governmental organisations and intergovernmental organisations, acting as builders and carriers of transnational institutions. The emergence of ‘global institutions’ is, however, counterbalanced by the immobility of institutions (Mudambi & Navarra 2002). Institutional forces are powerfully present in managing in emerging fields characterised by rapid change, high uncertainty and ambiguity.

A fundamental managerial problem in the early stages of field emergence is the building of legitimacy (Aldrich & Fiol 1994; Dacin et al. 2002). Pioneering organisations must be seen as proper in order to enable resource acquisition and to justify their right to provide specific products (Baum & Oliver 1996; DiMaggio & Powell 1991; Oliver 1991; Pfeffer & Salancik 1978). Hence, legitimacy is the key intangible resource needed in emerging fields. Besides conceptually rich legitimacy studies (Oliver 1991; Suchman 1995; Zimmerman & Zeitz 2002) there are only a few empirical investigations on legitimacy in nascent fields and industries (Lounsbury et al. 2003; Rao 1994; Santos & Eisenhardt 2006). Further, the extant empirical studies tend to concentrate on a single institutional environment, while there are hardly any studies which would investigate multiple legitimacy environments in a specified industry context. This reflects the typical bias of neoinstitutionalist research towards single-dimensional definitions of institutional contexts (Sanders & Tuschke 2007).

On the other hand, IB theorists take cross-border differences at the centre of their analyses, although they have not fully utilised the recent developments in institutional theory in their empirical studies (Orr & Scott 2005). Nevertheless, recent IB research does capture the multifaced nature of institutional distance between countries including regulative, normative and cognitive dimensions (Kostova 1999; Kostova & Roth 2002). The previous research has, however, downplayed the role of industry influences and dynamics in institutional distance, reflecting the typical bias towards cross-sectional studies in IB research. Since various dimensions of distance are likely

to affect industries differently (cf. e.g. Dow & Karunaratna 2006; Ricart et al. 2004), the use of macro-level distance measures may result in wrong strategic decisions.

In this paper I address these theoretical and practical concerns and aim to answer the following research question: *How can industry specific institutional distance be assessed in emerging fields?* With the concept of (organisational) field I refer to a collection of varying types of organisations, their suppliers, customers, and regulators that are formed around a common issue (DiMaggio & Powell 1991; Hoffman 1999; Scott 2006). The concept of field builds on the more conventional concept of industry but includes organisations such as regulators that critically influence the emergence of a new field. A field approach is suitable for the study of market and industry dynamics that emphasize concrete interactions in the context of broader belief systems (Lounsbury et al. 2003). I examine the emergence of the field for cholesterol-lowering functional foods in a comparative setting between Europe and the U.S.. Cholesterol-lowering functional foods block the absorption of cholesterol in the intestine, thereby reducing the risk of heart disease, the leading cause of death in both high and low-income countries (WHO 2007). This case is selected as it dramatically demonstrates the difficulty of transferring a new consumer concept across institutional environments.

This paper makes several contributions to existing literature. First, the paper provides a multi-institutional investigation of field emergence in which it underlines the role of professions and consumers in institutional change. Second, by building on the concept of institutional distance (Kostova 1999; Kostova & Zaheer 1999; Kostova & Roth 2002), I provide a dynamic and industry specific distance concept to complement the traditional, relatively static macro-level distance concepts used within IB literature. The proposed concept of *industry institutional distance* enables a richer understanding of distance relevant at the level of a particular industry or a field. Hence, I capitalise on industry contextuality, i.e. why do industries differ? (Ricart et al. 2004) suggested as a fundamental 'big question' (Buckley 2002) in international strategy literature. In this paper I also extend the use of the concept of institutional distance to explain the nonspread of innovations (Ferlie et al. 2005) to consumer driven fields.

The remainder of this paper is organised as follows. In the first part of the paper, I start from the key theoretical concepts and then build the argument concerning the need for an industry level distance measure. Thereafter, I craft a ‘theorized storyline’ (Golden-Biddle & Locke 2006) on the emergence of cholesterol-lowering functional foods in the cross-regional research setting. Based on the empirical evidence I propose measures for operationalising the concept of industry institutional distance and discuss the semi-global (Ghemawat 2003) nature of field emergence. Finally, the contributions of the study are discussed and fruitful avenues for future research are suggested.

THEORY DEVELOPMENT

Legitimacy in Neoinstitutional Theory

Legitimacy refers to “[...] a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman 1995:574). Hence, legitimacy is contextual, tied to specific social structures and mechanisms of order. Scott (1995, 2006) argues for “the value of parsing the broad concept of institutions” into three domains and bases of legitimacy: regulative, normative and cognitive. Regulative institutions consist of formal regulations and rules of governing behaviour (North 1990), where the mechanisms of control is coercive (DiMaggio & Powell 1991). Besides nation states, provincial and local regimes, and transnational authorities may also create and maintain regulation and sanction deviators (Orr & Scott 2005). Normative institutions, on their part, introduce a prescriptive, evaluative, and obligatory dimension into social life, including values and norms specifying how things should be done (Scott 1995). Normative institutions also include standards, accreditation agencies, trade and professional associations and professions themselves (Grewal & Dharwadkar 2002). Cognitive institutions are culturally supported habits where legitimation includes taken-for-granted assumptions, scripts, and schema about the way the world functions (Scott 1995). In emerging fields cognitive legitimation can be assessed by measuring the level of public knowledge about a new activity or product (Aldrich & Fiol 1994). Even though institutional scholars commonly differentiate between cognitive and

normative legitimacy, empirically distinguishing between the two types of legitimacy is difficult (Zimmerman & Zeitz 2002). Indeed, scholars increasingly argue that the three pillars are overlapping and interconnected (Campbell 2004; Hirsch 1997) rather than analytically and operationally distinct (Scott 1995). Altogether institutions lead to more modest and evolutionary change than globalisation theory expects (Campbell 2004).

Since regulative and normative institutions are the *products* of human design, they are more disposed to deviance and contestation than cognitive institutions which are the *result* of human activity (DiMaggio & Powell 1991; Hirsch 1997). Supporting this argument, based on his empirical study on environmentalism in the U.S. chemical industry, Andrew Hoffman (1999) proposes that during the evolution of an industry, institutional change follows a sequential pattern of questioning of prior institutional beliefs, a regulative institution, a normative institution and a cognitive institution. Instead of passive conformance, institutional scholars increasingly argue for the ability of actors to strategically manipulate existing institutions or create new institutions (Oliver 1991; Suchman 1995; Zimmerman & Zeitz 2002).

An additional complexity in legitimacy building in emerging field is that organisational legitimacy translates only partially to industry legitimacy. Building on the earlier insights that entire industries may possess more or less legitimacy than presented by the firms operating within them (Aldrich & Fiol 1994; Suchman 1995) Zimmerman and Zeitz (2002) suggest a fourth type of legitimacy they term *industry legitimacy*. An industry's legitimacy is affected by the variety of actions and consequences caused by the collective action of industry members (*ibid.*). However, in nascent fields there may not be established legitimacy bases; pioneers therefore need to act as institutional entrepreneurs (DiMaggio 1988) to infuse awareness and positive beliefs into the new concept. Aldrich and Fiol (1994) discuss in depth the legitimacy deficit faced by early ventures in a field. One of the key tasks of institutional entrepreneurs in emerging fields is the starting of renegotiations of meaning in social contexts which both constrain and enable (Giddens 1984) entrepreneurial action. Such renegotiations of meaning take place at multiple levels: organisational, intra-industry, inter-industry and institutional (Aldrich & Fiol 1994). Indeed, the emergence and growth of a field is partly dependent on the severity of attacks from established industries and the ability of the actors involved to defend. Ashforth and Gibbs (1990) contend that field constituents are

particularly likely to scrutinise an organisation when its means or ends are disputed by part of society. Strong resistance may be found in traditional industries providing substitute products for an emerging field. Legitimacy may therefore be pursued through negotiating and compromising with adjacent industries (Aldrich & Fiol 1994). Despite offering an analytically rich multilevel approach to understanding field emergence as a process of increasing legitimation, Aldrich and Fiol (1994) are silent about the role of general public, a key stakeholder group in the emergence of consumer-oriented fields. Further, in the earlier legitimacy literature no explicit focus is given in considering how the legitimating environment affects the range of possible actions, implicitly suggesting that institutional response strategies are universal.

In summary, there are three industry-specific overlapping domains of legitimacy which develop in different speed during a field emergence. Institutional entrepreneurs possess key roles in building legitimacy for an emerging field and in responding to attacks from affected interests. Moreover, field emergence is a multi-local phenomenon where actors need to recombine multiple legitimacy requirements of host countries (Westney 1993), meaning that pioneers must simultaneously deal with high uncertainty of the innovation itself and how it will be received in differing institutional environments shaping the beliefs of individuals (Kostova & Roth 2002).

Legitimacy and Field Emergence in Multiple Institutional Environments

Since a field emerges simultaneously in multiple locations, a distance measure supporting managerial decision making is needed. Traditionally, Hofstede's (1980) cultural value dimensions, i.e. power distance, individualism, masculinity, and uncertainty avoidance, are used in investigating international management decisions (for a recent review see Kirkman et al. 2006). For instance, Kogut and Singh (1988) formed a composite index for analyzing the effect of national culture on entry mode choice. However, besides being unable to produce consistent results (Shenkar 2001) cultural distance neglects the impact of other societal institutions (Xu et al. 2004) and marks out the richness of differences within institutional environments. In order to grasp complex legitimation environments, Kostova (Kostova 1999; Kostova & Zaheer 1999) develops the construct of *institutional distance* referring to the extent of similarity or dissimilarity between the regulatory, cognitive, and normative institutions between two countries. When institutional distance widens it becomes more difficult to understand and adjust to

the legitimacy requirements of a host country (Kostova & Zaheer 1999). Institutional distance is proposed as issue-specific (ibid.) and has been studied empirically, mostly in the context of organisational practices (Kostova & Roth 2002; Xu et al. 2004; Floyd et al. 2005; Ramsey 2005). Even though making significant theoretical contributions, earlier studies on institutional distance have downplayed the role of industry influences and dynamics in institutional distance. Since the various dimensions of distance are very likely to affect industries in different ways (Dow & Karunaratna 2006; Ghemawat 2001, 2003; Ricart et al. 2004), I argue that implications of distance should be assessed at industry level. Indeed, the recent study by Tempel et al. (2006) found that a country level institutional distance alone is not able to explain the different legitimacy pressures faced by subsidiaries which vary not only between countries but also between sectors and organisations. In order to account for industry specificity and to unlock the ‘stability illusion of distance’ (Dow & Karunaratna 2006; Shenkar 2001), I propose merging of the concepts of institutional distance and industry legitimacy to build a novel concept of ‘*industry institutional distance*’ defined as the extent of similarity between the regulatory, cognitive, and normative institutions of two countries or regions within a specific industry or field. This concept enables studying the nature and dynamics of industry specific institutional environments by taking into account possible differing amounts and bases of legitimacy for a new industry or field in different host country environments.

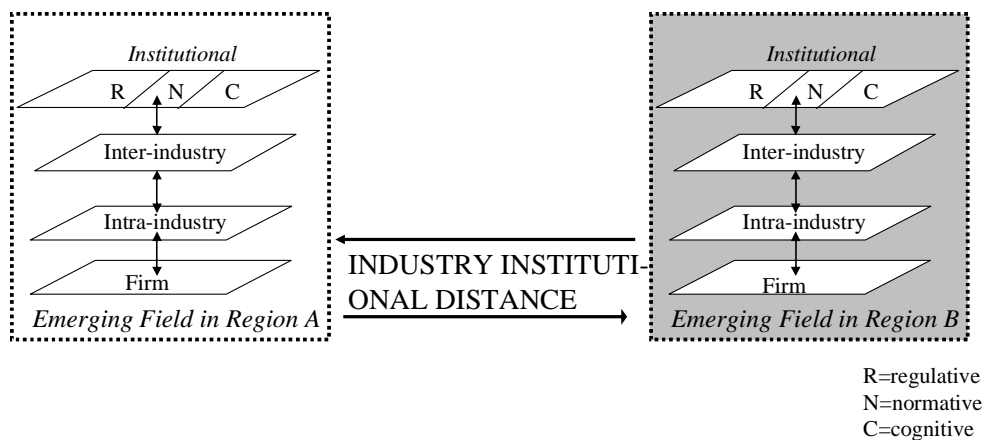


FIGURE 1 Analytical Framework for Industry Institutional Distance

The model visualises two spatially distinct emerging systems where firms are embedded in industry specific institutional environments consisting of regulative, normative and cognitive institutions. In order for an emerging field to possess legitimacy at the institutional level, organisations have to work their way through the resistance of established industries, at both intra and inter-industry level as maintained by Aldrich and Fiol (1994). As argued by the neoinstitutional theory, institutions are stable and create isomorphic behaviour among organisations; the upper layers therefore put pressure for conformance on the elements below, but actors may try to actively manipulate existing institutions or create new ones (Oliver 1991). This is depicted by the two-way arrows in the figure. The *industry institutional distance* is determined between two countries (or regions) depending on *the similarity of the three industry or field specific domains of institutions*. These regulative, normative and cognitive components of industry institutional distance are *moderated by the relative strength of adjacent industries*. The proposed concept is inherently dynamic since different domains are not frozen, they instead change during the emergence of a new field.

The proposed concept operates at the level of established industries as well as emerging fields. The case when a field emerges at the intersection of established industries represents the most complex context for field emergence and measurement of industry institutional distance. In such a case, the emerging institutions of a field are likely to draw from multiple, often competing institutions and are subject to wide resistance from the industries affected. Then, industry institutional distance is strongly moderated by the collective action of the emerging field members at the intra-industry level, and power and the severity of attacks from the established industries at the inter-industry level.

RESEARCH STRATEGY AND METHODS

Research Setting

To capture the role of industry-level institutional distance in the transferability of a new consumer concept, I studied the emergence of the cholesterol-lowering functional foods field. Functional foods refer to a broad category of foods with a positive health effect. Foods based on plant sterols and its stanol derivatives have shown in a number of clinical studies lower cholesterol level by blocking absorption of cholesterol in the intestine (e.g. Katan et al 2003; Miettinen et al. 1995). This field provided a complex and interesting case for examining the role of institutional factors due to its location at the intersection of the institutional logics (Friedland & Alford 1991) of the foods and pharmaceuticals industries. Besides being affected by cultural eating habits, functional foods are preventive innovations, i.e. they “lower the probability of some unwanted future event”, and tend to have a slow rate of adoption because people have difficulties in perceiving their relative advantage (Rogers 2003). Further, the tendency of waiting for a negative health incident before taking any corrective measures appears to be culturally bound. Field emergence was studied in a comparative setting between Europe and the U.S. These regions were selected because in many European countries the emergence has been enormously successful while in the U.S. the field has suffered from the lack of legitimacy reflected in the market growth.

Method and Empirical Data

The phenomenon under investigation dictates the way it should be explored (Leonard-Barton 1990). Due to the aim of theory building, i.e. generation, testing, and refining coherent description and explanation (Gioia & Pitre 1990) on the complex, dynamic and relatively little researched phenomenon, an embedded case study design (Yin 2003) was followed. The case was the whole emerging field, which was studied at the level of organisations, innovations, and existing and emerging institutions. I used metatriangulation where paradigmatic boundaries are perceived to be conceptually permeable in ‘transition zones’ (Gioia & Pitre 1990). The methodological version I used was a highly iterative dialogue between the data and the proposed distance measure. The followed research design responds to the increasing scholarly calls for qualitative,

longitudinal research approaches in both neoinstitutional and international business research (Hardy et al. 2003; Buckley 2004; Marschan-Piekkari & Welch 2004). Since the emergence of this field is both a history of past and present sensemaking and strategising, both retrospective and real-time data were used.

Interview Data

The interview data were collected through 32 interviews carried out in Europe and the U.S between late 2004 and early 2007. The interviewees consisted of university professors (medicine, nutrition, and pharmacology), national public health authorities and representatives of public research institutes, managers of smaller start-up businesses and MNCs and other field participants (pharmaceutical MNCs, a legislative authority, a trade and professional association, a heart association and external consultants). The companies include the Finnish MultiBene Group, Raisio Group, Teriaka Ltd (Paulig Group), and Fazer Bakeries and the Anglo-Dutch Unilever. These firms form a heterogeneous group of small innovative actors and large MNCs operating worldwide. Raisio is the pioneer of the field and together with Unilever dominate the market.

In depth, semi-structured interviews were used to uncover the institutional hurdles that actors have faced in different environments. Interviews were conducted in the native languages of the interviewees either in Finnish or English (British and American participants). Interviews were conducted face-to-face (except one telephone interview), recorded and transcribed before actual analysis. They lasted between one and three hours, the median being approximately two hours, which altogether makes over 50 hours of interview tapes. In this research, industry institutional distance is investigated from the perspective of European firms. This decision was motivated by the theoretical interest in early emergence, putting pioneering European actors at the forefront of the field more relevant for the purposes of the study. Such a focus also complements the traditional extension approach of environmental analysis in international marketing, which take the US as their domestic counterpart for cross-country comparisons (Cavusgil et al. 2005).

Secondary Data

Besides interview data, an important body of evidence was provided by secondary data, including trade journals, industry reports, legislative proposals and websites of the EU and U.S. food safety authorities. Further, the United States Patent and Trademark Office's (USPTO) online search engine and esp@cenet, the worldwide database of the European Patent Office (EPO), were used in investigating the number of patents filed. Due to different classification systems, a major effort was put into building and cross-checking the databases for ensuring data consistency.

<i>Issue</i>	<i>Measures</i>	<i>Key Data Sources</i>
Innovation spread	-Number of patents granted	-esp@cenet/ EPO -USPTO online search engine
	-Market size	-trade journals -company interviews -companies' s webpages
Regulative institutions	-Laws, rules, and regulations -Number of novel foods applications and approvals	-Websites of national and the European Food Safety (EFSA) authorities -European Commission website -U.S.Food and Drug Administration website -interviews with companies and legislators/regulators -trade journals
Normative institutions	-Values and norms related to food and health	-Interviews with companies, nutritional and medical community, and public health authorities -trade journals, survey data
Cognitive institutions	-Awareness of nutrition-disease link and of functional foods -Culturally supported habits	-Interviews with companies, nutritional and medical community, and public health authorities -trade journals, survey data

TABLE 1 Summary of Data Sources

The independent sources of evidence enabled collection of complementary data. While the secondary sources enabled collection of relatively accurate retrospective data, interviews provided information on the respondents' sensemaking (Weick 1995) of earlier events and a window to their real-time strategising.

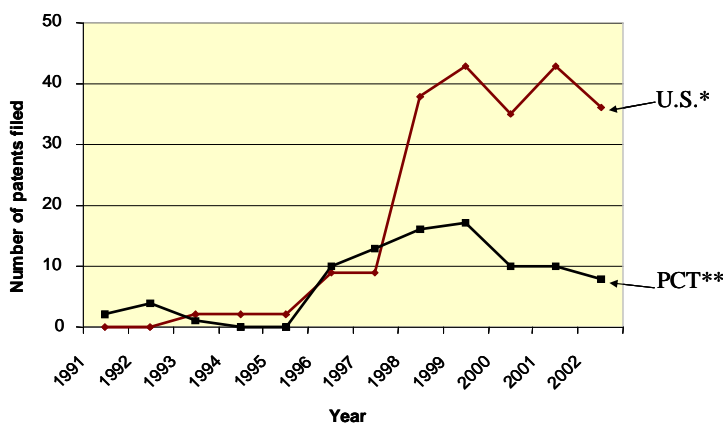
Data analysis

Transcribed interviews were coded in NVivo (QSR 2), in order to help classification and familiarising with the data. I conducted the data analysis in four stages. First, I identified and classified central institutional hurdles that actors have faced in different regions and time periods. Second, I verified the identified central issues by using secondary data sources. Third, I analysed the data to find possible measures of the industry-level effects of institutions and iterated between these and existing theory. Fourth, I examined the dynamics of the proposed measures and finally linked the conducted analysis to the observations of the emergence of the field at a rather global level (see Figure 3). Following this process of analysis, I crafted a theorized storyline (Golden-Biddle & Locke 2006) where I sought to provide both theoretically and practically as complete a view as possible of interaction between industry-level institutional distance and the emergence of a new field. Such methodological logic contributes to tight coupling between the empirical data and the emerging theoretical insights.

Since the resulting interpretation is necessarily shaped by my socially and culturally conditioned knowledge and disciplinary background (Moisander & Valtonen 2006), I have combined data triangulation with respondent validation where the key informants have reviewed and validated the empirical analysis. Respondent validation was done in a stepwise manner where the persons whose quotations were used were given the opportunity to comment on the analyses before other interviewees. This procedure increases the plausibility of the data and analyses.

CASE ANALYSIS

In twenty-first century, 'the society of abundance' is being challenged by the increased cost of health care, caused by the ageing population. Cholesterol-lowering functional foods open up a disease prevention alternative to the treatment of heart disease, the single largest killer of Americans, with 32 percent of all deaths (American Heart Association 2006). The patent application for sitostanol ester, which later became the benchmark for numerous cholesterol-lowering functional foods concepts, was filed at the National Board of Patens and Registration of Finland in 1991 by Raisio Margarine. Thereafter, a significant number of patents on the use of plant sterols and stanols in lowering blood cholesterol levels have been applied for as portrayed in Figure 2. The data are collected from the databases of the European and U.S. patent offices. European countries do not have a common database from which national patents of each Member States could be accessed. However, the magnitude of the U.S. patents versus multinational patents may be assessed.



* Inventions patented by the United States Patent and Trademark Office (USPTO). Source: USPTO online search engine.

** Inventions patented under the international Patent Co-operation (PCT) treaty in several countries. Source: esp@cenet search engine of the European Patent Office (excluding USPTO patents).

Search terms: 'sitostanol or stanol' and 'sterol and cholesterol-lowering'

FIGURE 2 Yearly Number of Patent Applications (incl. applications with a granted patent)

Patenting activity has later been remarkably high in the U.S., reflecting high belief of actors in the market potential. However, it has been argued by some actors that protecting the inventions quickly and cost-effectively is relatively easy in the U.S. Further, a U.S. patent may also be a useful tool in negotiating with possible patent

infringers in other countries. Yet, despite the high mortality figures from heart disease the cholesterol-lowering functional foods market in the U.S. is still in its infancy. Estimations of the U.S. market size for sterols-based cholesterol-lowering products was a bit over 60 million euros, while the market size estimations in Europe exceed 500 million euros at 2005 retail prices⁴⁰. Managers acknowledge this paradox of ‘need without demand’ by noting the following:

“[...] The U.S. has been a little surprise to us and certainly to everybody- there is a huge cholesterol problem and a big need for doing something, but these products don’t sell.” -*Managing director of a small start-up*

“None of these concepts be it margarine, grain, orange juice, gourmet or low price have taken off there, and there certainly is the best marketing wisdom along with Coca Cola, Quaker Oats, Johnson & Johnson, Unilever...” -*MNC manager*

In the following, the proposed concept of industry institutional distance is applied as a conceptual lens to examine the possible explanatory factors for the market size discrepancy.

Regulative Industry Distance

The key regulative issues for functional foods concern the pre-market approvals and health claims in product packing, i.e. “any representation that states, suggests or implies that a relationship exists between a food or nutrient or other substances contained in a food and a disease or health-related condition” (Codex Alimentarius Commission 2004). Health claims build legitimacy for the marketing of functional foods and are typically mentioned as a prerequisite for extensive investments in R&D by firms. Thus, pre-market approvals and allowed health claims may be used to evaluate field level regulative institutional distance and its dynamics.

Europe. The EU Novel Foods and Novel Food Ingredients Regulation was adopted in 1997 to apply to all foods that do not have a history of significant consumption in Europe prior to 1997. The pioneering plant-sterol based cholesterol-lowering food product Benecol was launched in Finland, i.e. within the EU, in 1995 before enforcement of the regulation. Hence, it was not subject to the novel legislation. Unilever’s Flora pro.activ margarine was the first cholesterol-lowering food of its type approved within the EU in 2000. The novel foods approval process is described as being

⁴⁰ IRI and AC Nielsen data and industry estimates by New Nutrition Business 2006 Vol.11 No.2

complex, sluggish and political. Out of 71 applications made between May 1997 and October 2006, only 26 novel foods were approved for commercialization⁴¹. Indeed, occasionally waiting processes of up to four years for approvals have resulted in situations where products have no home markets, as they cannot be launched in the EU. The approval process is described as being connected to normative institutions:

“Even though I’ve been long in the field it was a surprise to me how conservative Europe is after all...The border between food and medicine is thin in the eastern intellectual world...Surely there is also politics involved with different member states’ representatives with different values...” *-Managing director of a start-up on the difficulty of launching products within the EU*

Novel foods or food ingredients may, however, follow a simplified notification process if a national food assessment body considers them to be ‘substantially equivalent’ (e.g. composition, nutritional value) to existing foods or ingredients. By January 24, 2007, in total 56 notifications were made merely relating to plant sterols.⁴² This means, that late adopters may launch their competitive products immediately after pioneering approval as ‘substantially equivalent’ has been obtained. (See appendices 1 and 2).

Concerning health claims, a novel EU-level regulation shall apply from the beginning of July 2007. Before, there was no harmonized health claims legislation in the EU except that the EU food law prohibited medicinal and disease claims such as ‘prevents, treats, or cures a disease’. According to the new regulation, claims referring to the reduction of disease risk and to children’s development and health will have to go through a claim specific approval process. Concerning nutrition claims, a register of health claims is to be compiled allowing manufacturers who wish to introduce a product with a particular claim such as ‘helps to maintain healthy cholesterol’ to simply consult the register held by the European Food Safety Authority (EFSA). To synthesise, the earlier national regulations in Europe have evolved into a relatively tightly coupled supranational regulative system.

U.S. In the U.S. legal system, foods are regulated under the Federal Food, Drug and Cosmetics Act (FFDCA). Under the FFDCA the Food and Drug Administration (FDA) oversees safety and labelling of foods. Manufacturers are required to obtain pre-market approval by filing a food additives petition or by demonstrating that the ingredient is

⁴¹ http://ec.europa.eu/food/food/biotechnology/novelfood/index_en.htmh

⁴² http://ec.europa.eu/food/food/biotechnology/novelfood/notif_list_en.pdf#page=42

“Generally Recognized as Safe” (GRAS). To date, over 3000 ingredients have GRAS status (Burdock et al. 2006). In the Nutrition Labelling and Education Act of 1990 the FDA was authorized to allow certain health claims in food labelling. Currently, the FDA has approved 14 health claims, one of which is “Plant sterol/stanol esters “may” or “might” reduce the risk of coronary heart disease” (FDA 2006). Another route involves submitting the product as a dietary supplement under the Dietary Supplement & Health Education Act, hence, bypassing the approval requirements needed for food additives. This route enables a ‘structure-function claim’ such as “maintains healthy cholesterol” but may not imply that the product helps to treat a disease. Raisio’s commercialisation partner McNeil took a significant regulatory risk and tried to launch Benecol through the dietary supplement route, resulting in the FDA to stop what they considered as food being launched as a dietary supplement. Meanwhile, launched by Unilever in April 1999, Take Control margarine was the first plant sterol-based cholesterol lowering product in the U.S.

In conclusion, since the enforcement of the EU Novel Foods Regulation, the U.S. regulative framework has clearly been more supportive in terms of the transparency of the regulations, market access, as well as the ability to make health claims.⁴³ Hence, the regulative industry institutional distance increased drastically to favour the U.S. in 1997, even though more recently the regulative distance has started to decrease. The more favourable U.S. regulative framework is seen in the interview quotes of Table 2, and in the descriptions of respondents regarding how they initially considered the U.S. as the strategically most important market. This suggests:

Proposition 1. The transfer of a concept from a region A into a region B is positively associated with regulative distance favoring region B.

In contrast to what might be expected, however, the EU market growth has remained high despite the regulative hurdles, suggesting that informal institutions are more central in field emergence (Kostova & Roth 2002).

⁴³ The difficulties in gaining market access in the EU may have resulted in the increased number of patent applications in the US after 1997 (see Figure 2).

Normative and Cognitive Industry Distance

Norms and values related to food are highly embedded in culture (Korthals 2002). The acceptance of functional foods also varies across food cultures. Previous studies have connected the acceptance of functional foods with uncertainty avoidance reflected as risk perceptions of diseases and processing technologies (Frewer 2003) as well as socioeconomic variables and family health history (Verbeke 2005). The cognitive industry distance, on the other hand, may be conceptualised as a function of the awareness of the nutrition-disease link and of the role of functional foods in such an equation. Health promotion and disease prevention campaigns orchestrated by public health authorities are crucial mechanisms for building life-style awareness. Despite inter-regional differences, it should be stressed that a significant range of intra-regional variation in the acceptance and awareness of functional foods is also present in both Europe and the U.S.

Europe. Besides having different health systems, European countries have different genetics and health problems, which may account for different acceptance and awareness of functional foods. On a general level, the Central and Northern European countries have been more interested in functional foods than the Mediterranean countries (Menrad 2003). One respondent illustrates this: “*France is very difficult [to develop business], they just believe in their own cheeses*”. Yet, the acceptance of functional foods varies significantly between close countries. For historical reasons both acceptance and awareness is particularly high in Finland, while Denmark’s position towards functional foods is perhaps the most negative (Bech-Larsen & Grunert 2003). This difference is reflected in the market size of the functional foods of the respective countries. The foundations for high acceptance and awareness in Finland were created in the 1970s when a publicly led demonstration programme for coronary heart disease prevention started in the province of North Karelia, which at the time suffered from the world’s highest heart disease mortality rate. However, some of the European countries that have historically been less knowledgeable about the food-disease relationship, such as the UK, have also started to take active government-led measures to build consumer awareness and industry commitments towards healthier food.

U.S. Like Europe, the U.S. is a dispersed market with more developed functional foods markets in the higher socioeconomic markets of the Northeast and California. Less-educated, lower-income consumers, the young, men, blacks and Hispanics tend to have the lowest awareness of the diet-disease relationship (Variyam 1999). The U.S. Department of Agriculture is one of the leading agencies providing information to Americans in the form of Dietary Guidelines. Also, the American Heart Association, the Centers for Disease Control and Prevention, and the National Cholesterol Education Program play central educational roles in furthering heart health, the top concern of consumers in the U.S. Since 2002, the Health's expert panel of the U.S. National Institutes of Health has recommended the use of sterols for people with high LDL cholesterol. Yet, despite numerous public efforts and educational investments by firms there are significant barriers to transferring such knowledge to awareness both among consumers and in the medical community. In summary, even though both regions have made significant education campaigns to increase the heart health awareness, the U.S. tends to lag behind Europe in this respect. It is noteworthy, however, that there is significant variation within regions, and for instance in the U.S. a portion of the consumers are highly aware of nutrition related matters. However, an American nutrition scientist explains that the transferability of the cholesterol-lowering concept is challenging even to the most knowledgeable consumers due to different understandings on what is healthful:

“A lot of these people who are on the edge of nutritional thinking don't want an industrialised product. They don't want oil that is produced as a by-product of the paper industry [pine sterol ingredient used as a cholesterol-lowering agent]- that's not what they want to consume.”

Yet, at the general level, the normative and cognitive distances between Europe and the U.S. have stayed relatively constant across time. This leads to the following combinatory proposition:

Proposition 2. The success of the transfer of a concept from a region A to a region B is positively associated with the degree of compatibility between the normative and cognitive components of industry level institutional distance.

Inter-industry Pressures in Field Emergence

Aldrich and Fiol (1994) argued that the nature of relations between industries, whether competing or cooperating, affects the viability of emerging fields. In functional foods, the foods and pharmaceuticals philosophies merge as reflected in Hippocrate's utterance over 2000 years ago: "Let food be thy medicine and medicine be thy food".

Europe. Based on the empirical data the relationship between the strength of the pharmaceutical industry and functional foods in Europe is inconclusive and unclear. Even though there is some anecdotal evidence that the stronger the pharmaceutical industry in a specific country the weaker the role of functional foods, there are also other views saying that the stronger the pharmaceuticals industry, the greater the cholesterol-awareness of the population. Higher awareness would also support the growth of cholesterol-lowering functional foods. Further, cooperation across the established industries also takes place. For instance, Unilever has temporary co-operation with health insurers in France and in Holland where insurers have been reimbursed for the use of margarines and milk products containing plant sterols and with Pfizer Global Pharmaceuticals in Finland to increase cholesterol awareness. Insurance companies subsidising food rather than medicine may well be a sign of legitimacy for the emerging field.

U.S. It is often claimed that the U.S. culture and health care system supports disease treatment or 'sick care' as a field expert expresses. Some respondents of this study call the US a 'very medicated society', which is reflected in pharmacy channel purchases by wholesalers and manufacturers of medicine, which amounted to US \$190 414 million (12 months to July 2006, IMS Health 2006). The figure for the five largest EU countries (Germany, France, Italy, UK, Spain) was altogether \$92 376 million, although their combined population is approximately equal to the U.S. (ibid.)⁴⁴. An interesting detail for this research is that the world's best selling drug was the cholesterol-lowering medication Lipitor with over \$11.58 billion sales (ibid.). In the September 2006 issue of *Functional Foods & Nutraceuticals*, Anthony Almada, president of the US food industry consultancy AIMGINutrition, provokes debate by arguing the following: "*Doctors love Lipitor and statins in general; I've heard physicians say it should be added to the*

⁴⁴ Besides volume, this difference also reflects the higher prices of medicine in the US.

drinking water.” Even though being provocative and an obvious overstatement, it is likely to reflect the socialization of medical institutions (Floyd, Kramer, & Born 2005) by many medical doctors in the U.S. today. Moreover, Americans are better informed about the latest medicines as direct-to-consumer (DTC) prescription drug advertising is approved by the FDA. The strict rules on DTC marketing were relaxed in 1997, and some argue that they have disempowered the doctor-patient relationship; patients increasingly press doctors to prescribe a certain medicine (Abramson 2005). To conclude, emerging fields which lack a wide support base depend highly on their power position vis-à-vis established industries. This suggests the following:

Proposition 3. The less the amount of inter-industry pressures, and the greater the amount of inter-industry collaboration in region B, the more successful the transfer of a concept from a region A to a region B.

Overall, the empirical evidence of this study strongly suggests that the normative and cognitive institutions are far more resistant to change, and explain a large portion of the market size discrepancy and success of the field emergence. Thus, in summary:

Proposition 4. Normative and cognitive components, mediated by inter-industry pressures, are more important than the regulative component of institutional distance for a successful field emergence.

Operationalisation of Industry Institutional Distance

I have so far argued that the differences between the regulative, normative and cognitive components of distance together with inter-industry pressures have explanatory value when analysing the cross-border transferability of a novel consumer concept in emerging fields. Table 2 provides measures for operationalising the proposed distance concept and aims to complement the earlier used country level (Xu et al. 2004)⁴⁵ and issue specific scores (Kostova & Roth 2002).

⁴⁵ Country level composite indexes may be used as a background or complementary data. Hence, these measures are complementary rather than competitive.

Insti- tution	Representative Quotes	Proposed Distance Measures	Change in distance measure (Δ)
R E G U L A T I V E	<p>“[...]..The Novel Foods Process is complicated, it’s long, it’s political” (UK manager on the EU regulation)</p> <p>“[...] if something kills the competitiveness of the EU in the future, it is the inaccessibility of SMEs to the EU markets.” (Finnish managing director of a start-up on the difficulty of launching products within the EU)</p> <p>“The U.S. has this list on pre-approved health claims, meaning that if I have this kind of a product, I don’t have to guess what I can say about it” (Finnish chairman of the board of a start-up on health claims)</p>	<p>The average period of time:</p> <ol style="list-style-type: none"> 1. between filing and granting of patent or other IPR 2. to get a pre-market approval <p>The amount of:</p> <ol style="list-style-type: none"> 3. applications made/approvals granted 4. regulations concerning marketing 	$\Delta=R1^{A-B}_{t1}-R1^{A-B}_{t0}$ $\Delta=R2^{A-B}_{t1}-R2^{A-B}_{t0}$ $\Delta=R3^{A-B}_{t1}-R3^{A-B}_{t0}$ $\Delta=R4^{A-B}_{t1}-R4^{A-B}_{t0}$
N O R M A T I V E	<p>“Americans don’t like anyone to know anything about their health. That is a very important fact to know. Americans protect their health information more than they protect their credit card numbers.” (American manager on the intimacy of health related matters)</p> <p>“The large tentacles of pharmaceuticals industry in that society [the U.S.] are so much stronger, and have shaped people’s minds so that the message of healthy food doesn’t go through but people consult doctors who offer medication...It is a strongly medicated society.” (Finnish manager on inter-industry pressures)</p> <p>“[...] Americans don’t respond until there is an incident, they’re crisis oriented- they’ve also been raised in a pharmaceutical driven industry, where the solution is not to go out and exercise every day, the solution is ‘take a pill’.” (American manger)</p>	<ol style="list-style-type: none"> 1. Acceptance rate <p>The amount of:</p> <ol style="list-style-type: none"> 2. field specific standards 3. trade and professional associations 	$\Delta=N1^{A-B}_{t1}-N1^{A-B}_{t0}$ $\Delta=N2^{A-B}_{t1}-N2^{A-B}_{t0}$ $\Delta=N3^{A-B}_{t1}-N3^{A-B}_{t0}$
C O G N I T I V E	<p>“[...] seven out of ten people have high cholesterol, and only 20% know that they do... that [awareness] varies a lot between countries, Finland is one of the highest, UK is one of the lowest.” (UK manager)</p> <p>“The American medical profession teaches perhaps one class on nutrition to medical students, and once they become doctors, they are inundated with the pharmaceutical perspective”. (Keenan 2005)</p> <p>“A sort of general paradigm in thinking about food, dietary consumption and health outcomes is that very few like MDs [medical doctors] in America will think that diet is related to health outcome...If you go to a clinic in America and you have a problem they’re much more likely to tell you about a drug than they are about a diet.” (American nutrition scientist)</p>	<ol style="list-style-type: none"> 1. Awareness rate <p>The amount of:</p> <ol style="list-style-type: none"> 2. Educational curricula 3. Trade journals 4. Conferences/ trade fairs 5. Press articles 	$\Delta=C1^{A-B}_{t1}-C1^{A-B}_{t0}$ $\Delta=C2^{A-B}_{t1}-C2^{A-B}_{t0}$ $\Delta=C3^{A-B}_{t1}-C3^{A-B}_{t0}$ $\Delta=C4^{A-B}_{t1}-C4^{A-B}_{t0}$ $\Delta=C5^{A-B}_{t1}-C5^{A-B}_{t0}$

TABLE 2 Operationalisation of Industry Institutional Distance

For the regulative component of industry institutional distance, the quotes of managers reflect the general criticism of the European food industry regarding the EU regulative framework. Based on the quotes and secondary evidence, several mostly time-related measures of regulative distance are proposed. Due to the discussed changes in the regulations, there are significant dynamics in the regulative component of industry institutional distance. The last column suggests that once a proposed quantitative measure is collected from two different points of time (t_0 and t_1), the dynamics of distance measures may be assessed. Based on these measures, composite measures for different distance components (R=regulative, N=normative, C=cognitive) may be formed and finally the dynamics of the overall industry institutional distance may be assessed. In the formulas, the letter A stands for the market region A and B for the market region B. However, it should be stressed that in the early stage of field emergence it is very likely that it is impossible to collect specific quantitative data on different components of industry institutional distance. The assessment of distance must then rely on the qualitative assessments.

A Model of Semi-global Field Emergence

Regardless of the existence of major institutional differences, there are universal layers in institutions which support more global emergence of the field. Concerning regulation, the requirements on safety and efficacy of functional foods are universally applicable. Codex Alimentarius Commission, created by the World Health Organization and Food and Agriculture Organization of the United Nations, provides guidelines for health claims. Also, the normative and cognitive components of industry institutional distance may be narrowing, as heart health is increasingly considered a global issue (Drori 2005), which again triggers education campaigns. Further, professions such as the medical, nutritional and public health communities with common educational backgrounds tend to share professional guidelines and values and connect the emerging field. For instance, the medical community is loosely coupled through 'Cholesterol Guidelines', which make recommendations for treating elevated cholesterol-levels. These guidelines originate from the U.S. and diffuse within Europe through the European Society of Cardiology to national societies and associations. Further, global media and the existence of a cross-cultural customer segment with a universal need for

food to prevent health problems are among the key consolidating forces in field emergence (Bech-Larsen & Grunert 2003).

Despite the connective layers, the existence of institutional differences may lead to only “semi-global” (Ghemawat 2003) field emergence. This means that there is incomplete cross-border transferability of a novel concept or a field level idea. Besides scope and scale benefits, such industry specific institutional differences may explain the existence of ‘regional multinationals’ (Rugman 2005) i.e. MNCs that focus primarily on their home region. Further, I argue that the semi-global nature of field emergence in functional foods is partly an outcome of the inability of the base of the economic pyramid in the developing world (Ricart et al. 2004) to participate in the creation and use of these types of products. The major links between the proposed concept of industry institutional distance and semi-global field emergence are visualised in Figure 3.

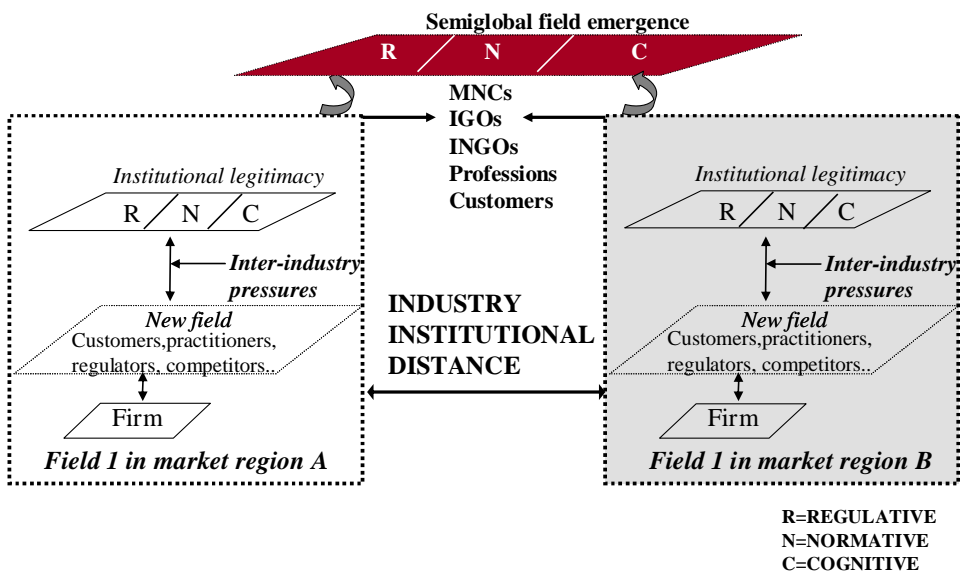


FIGURE 3 Model of Semi-global Field Emergence

The figure proposes a model of semi-global field emergence. Individual firms participate in building up the market and the common field level identity with other key actors such as customers, practitioners, regulators and competitors. The strength of

adjacent industries appears to have a strong indirect or moderating effect on field emergence as visualised by the intersecting arrows. Notwithstanding institutional differences, regions are not insulated from outside influences in field emergence, but are instead interdependent. Multinational organisations, professions and customers act as multi-institutional actors and a 'glue' between different spatial systems, and hence form a countervailing force to institutional distance as depicted by the opposite arrows. In the model, I propose that industry institutional distance and semi-global field emergence are dynamic and interdependent phenomena: when industry institutional distance narrows, there is increasing common ground for more global field emergence. In conclusion, following the initial idea of Kostova (Kostova 1999; Kostova & Zaheer 1999) that institutional distance is issue-specific, the model stresses the impact of industry level differences and implications for the cross-border transferability of novel concepts around which a totally new field may emergence.

CONCLUSIONS

In this paper I have reframed the concept of distance by building on the concepts of institutional distance (Kostova 1999; Kostova & Zaheer 1999; Kostova & Roth 2002) and industry legitimacy (Zimmerman & Zeitz 2002). In this both theoretical and empirical endeavour I have complemented earlier literature by arguing that distance between countries or regions should be assessed at the level of industries or emerging fields. The findings of this study have several theoretical and managerial implications.

To specify, in contrast to recent studies (Busenitz et al. 2000; Kostova & Roth 2002; Xu et al. 2004) an argument is put forward that since specific issues emerge and shape particular industrial contexts, the concept of institutional distance should be assessed at the industry level. The course taken in this research, therefore, responds to the increasing scholarly calls for bringing industry specificity into IB research (Dow & Karunaratna 2006; Ghemawat 2001, 2003; Ricart et al. 2004). Industry specific institutional distance, I argue, is one viable explanatory factor for the semi-global nature of field emergence. Indeed, besides strong social and cognitive boundaries between different professions (Ferlie et al. 2005), industry institutional distance may partly explain the "nonspread" of innovations. Hence, the new distance concept complements

the traditional distance measures used in IB research where distance is assumed to operate at the country level and to stay relatively constant across time. Further, by using a longitudinal research design the study adds to recent theorising on institutional distance which typically uses cross-sectional research methodology.

This study also has several implications for neoinstitutional theory. First, rather than single industry legitimacy (Zimmerman & Zeitz 2002), I propose that there are several industry or field legitimacies, as the empirical analysis showed that the emerging field has high legitimacy in Europe, while suffering from a legitimacy deficit in the U.S. This implies that the stages of institutional change (Greenwood et al. 2002) may be markedly different at field level depending on the host region's institutional environment. Second, the findings also shed new light on the role of practitioners and customers in institutional change, thereby bringing actorhood to the center of institutional analysis. In health-related matters consumers proved highly dependent on the treatment decisions of medical doctors. Further, it was found that due to the different socialisations of medical institutions, treatment decisions may vary across countries or regions. This idea suggests that professional boundaries are not constant across space, complementing the findings of Ferlie et al. (2005). Third, by focusing on the cross-border transferability of a novel field level idea, the study provides a complementary view on typical studies on institutional change which tend to focus on agency within a limited spatial setting. Moreover, the discussion on the role of power position of emerging fields vis-à-vis established industries contributes to neoinstitutional theory which tends to one-sidedly emphasise the role of legitimacy in institutional dynamics (Beckert 1999).

In sum, the central role given to institutions indicates clear limits for pioneers acting in nascent fields and calls for further research on the interaction between institutions, geographical space and agency. In particular, this research questions the possibility and the degree to which entrepreneurs may co-construct the boundaries of nascent markets (cf. Santos & Eisenhardt 2006) in those fields that reflect unique heritages of countries such as food (Meyer 2000). Altogether, this research suggests a potential new transition zone (Gioia & Pitre 1990) between the international entrepreneurship and institutional entrepreneurship approaches which both stress the proactive, path-breaking approach of active agents. Some European actors selecting the U.S. as their entry and strategically

most important market due to the regulative hurdles faced in the EU reflected such entrepreneurial behaviour.

Managerially, emerging fields provide complex strategic decision-making and risk management tasks. This study discussed the major difficulties that one specific field faced when trying to get established in a different institutional environment. With the use of traditional country-level distance measures such difficulties could not have been anticipated. Besides assessing the industry level institutional distance, the scenario planning of alternative paths for institutional development appears crucial for planning suitable institutional response strategies such as awareness building among opinion leaders and formers or strategically affecting emergent regulations.

This study is subject to limitations. It is restricted to a particular field and two regions with a high rate of internal variation and special historical circumstances, such as the EU integration. Hence, research findings have to be interpreted with caution. Further, it may not be possible to apply all suggested distance measures across time, space and industries. For that reason, the research should be replicated in other emerging contexts to substantiate and complement claims and propositions made. Further, testing the proposed measures with quantitative data collected at different points of time as suggested would help in a further understanding of dynamics in institutional distance. The concept of industry institutional distance is still in the making. I hope that this paper stimulates further theoretical and empirical endeavours to dig deeper into the relationship between institutions, industry, and distance.

REFERENCES

- Abramson, J. 2005. *Overdo\$ed America. The broken promise of American medicine*. NY, USA: Harper Perennial.
- Aldrich, H. E., & Fiol, C. M. 1994. Fools rush in? The institutional context of industry creation. *Academy of Management Review*, 19(4): 645-670.
- American Heart Association. 2006. *Heart disease and stroke statistics- 2006 update*. Dallas, Texas: American Heart Association.
- Ashforth, B. E., & Gibbs, B. W. 1990. The double-edge of organizational legitimation. *Organization Science*, 1(2): 177-194.
- Baum, J. & Oliver, C. 1996. Toward an institutional ecology of organizational founding. *Academy of Management Journal*, 39(5): 1378.
- Bech-Larsen, T. & Grunert, K. G. 2003. The perceived healthiness of functional foods. A conjoint study of Danish, Finnish and American consumers' perception of functional foods. *Appetite*, 40(1): 9-14.
- Beckert, J. 1999. Agency, entrepreneurs, and institutional change. The role of strategic choice and institutionalized practices in organizations. *Organization Studies (Walter de Gruyter GmbH & Co.KG.)*, 20(5): 777-799.
- Buckley, P.J. 2004. Foreword. In R. Marschan-Piekkari & C. Welch (eds.), *Handbook of qualitative research methods in international business*. Cheltenham, UK: Edward Elgar.
- Buckley, P. J. 2002. Is the international business research agenda running out of steam? *Journal of International Business Studies*, 33(2): 365-373.
- Burdock, G. A., Carabin, I. G., & Griffiths, J. C. 2006. The importance of GRAS to the functional food and nutraceutical industries. *Toxicology*, 221(1): 17-27.
- Busenitz, L. W., Gómez, C. & Spencer, J. W. 2000. Country institutional profiles: Unlocking entrepreneurial phenomena. *Academy of Management Journal*, 43(5): 994-1003.
- Campbell, J.L. 2004. *Institutional change and globalization*. Princeton: Princeton University Press.
- Cavusgil, S. T., Deligonul, S. & Yaprak, A. 2005. International marketing as a field of study: A critical assessment of earlier development and a look forward, 13(4).
- Codex Alimentarius Commission. 2004. *Guidelines for use of nutrition and health claims* (CAC/GL 23-1997, Rev. 1-2004 ed.).
- Dacin, M. T., Goodstein, J. & Scott, W. R. 2002. Institutional theory and institutional change: Introduction to the special research forum. *Academy of Management Journal*, 45: 45-56.
- Dahan, N., Doh, J. Guay, T. The role of multinational corporations in transnational institution building: A policy network perspective. *Human Relations*, 59 (11): 1571-1600.
- DiMaggio, P. 1988. Interest and agency in institutional theory. In *Institutional patterns and culture*. Cambridge, MA: Ballinger.
- DiMaggio, P. J. & Powell, W. W. 1991. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. In P.J. DiMaggio & Powell W.W. (eds.), *The new institutionalism in organizational analysis*: 63-82. Chicago: The University of Chicago Press.

- Dow, D. & Karunaratna, A. 2006. Developing a multidimensional instrument to measure psychic distance stimuli. *Journal of International Business Studies*, 37(5): 578-602.
- Drori, G. S. 2005. United Nations' dedications. A world culture in making. *International Sociology*, 20(2): 175-199.
- Ferlie, E., Fitzgerald, L., Wood, M. & Hawkins, C. 2005. The nonspread of innovations: The mediating role of professionals. *Academy of Management Journal*, 48: 117-134.
- Floyd, S.W., Kramer, J. A. & Born, P. H. 2005. Institutional forces in the acceptance of managed care practices by physicians. *Health care management review*, 30(3): 237.
- Frewer, L. 2003. Consumer acceptance of functional foods: Issues for the future. *British Food Journal*, 105(10): 714-731.
- Friedland, R. & Alford, R.R. 1991. Bringing society back in: Symbols, practices, and institutional contradictions. In W.W. Powell & P.J. DiMaggio (Ed.), *The new institutionalism in organizational analysis*: 232-266. Chicago: The University of Chicago Press.
- Ghemawat, P. 2001. Distance still matters. the hard reality of global expansion. *Harvard business review*, 79(8): 137-147.
- Ghemawat, P. 2003. Semiglobalization and international business strategy. *Journal of International Business Studies*, 34(2): 138-152.
- Giddens, A. 1984. *The constitution of society. outline of the theory of structuration*. Cambridge, UK: Polity Press.
- Gioia, D.A. & Pitre, E. 1990. Multiparadigm perspectives on theory building. *Academy of Management Review*, 15(4): 584.
- Golden-Biddle, K. & Locke, K. 2006. *Composing qualitative research* (second ed.). Thousand Oaks, CA: Sage.
- Grewal, R. & Dharwadkar, R. 2002. The role of the institutional environment in marketing channels. *Journal of Marketing*, 66(3): 82-97.
- Hardy, C., Phillips, N. & Lawrence, T. B. 2003. Resources, knowledge and influence: The organizational effects of interorganizational collaboration. *Journal of Management Studies*, 40(2): 321-347.
- Hirsch, P. M. 1997. Sociology without social structure: Neoinstitutional theory meets brave new world. *American Journal of Sociology*: 1702-23.
- Hoffman, A. J. 1999. Institutional evolution and change: Environmentalism and the U.S. chemical industry. *Academy of Management Journal*, 42(4): 351-371.
- Hofstede, G. 1980. *Culture's consequences: International differences in work-related values*. London: Sage.
- IMS Health. 2006. Tracking 13 key global pharma markets: 12 month to July 2006. *Retail DrugMonitor*. (http://www.imshealth.com/vgn/images/portal/cit_40000873/16/21/78948150Drug_%20Monitor_July2006.pdf)
- Katan, M. B., Grundy, S. M., Jones, P., Law, M., Miettinen, T. & Paoletti, R. 2003. Efficacy and safety of plant stanols and sterols in the management of blood cholesterol levels. *Mayo Clin Proc*, 78(8): 965-978.
- Keenan, J. 2005. Sterols reaching the mainstream. *Functional Foods & Nutraceuticals*, November.
- Kirkman, B. L., Lowe, K. B. & Gibson, C. B. 2006. A quarter century of culture's consequences: A review of empirical research incorporating Hofstede's cultural values framework. *Journal of International Business Studies*, 37: 285-320.

- Kogut, B. & Singh, H. 1988. The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 19(3): 411-432.
- Korthals, M. L. 2002. The struggle over functional foods: Justice and the social meaning of functional foods. *Journal of Agricultural and Environmental Ethics*, 15(3): 313-324.
- Kostova, T. 1999. Transnational transfer of strategic organizational practices: A contextual perspective. *Academy of Management Review*, 24(2): 308.
- Kostova, T. & Roth, K. 2002. Adoption of an organizational practice by subsidiaries of multinational corporations: Institutional and relational effects. *Academy of Management Journal*, 45(1): 215-233.
- Kostova, T. & Zaheer, S. 1999. Organizational legitimacy under conditions of complexity: The case of the multinational enterprise. *Academy of Management Review*, 24(1): 64-81.
- Lounsbury, M., Ventresca, M. & Hirsch, P. M. 2003. Social movements, field frames and industry emergence: A cultural-political perspective on US recycling. *Socio-Economic Review*, 1(1): 71-104.
- Marschan-Piekkari, R. & Welch, C. 2004. Qualitative research methods in international business: The state of the art. In R. Marchan-Piekkari & C. Welch (eds.), *Handbook of qualitative research methods for international business*. Chettenham, UK: Edward Elgar.
- Menrad, K. 2003. Market and marketing of functional food in Europe. *Journal of Food Engineering*, 56(2): 181-188.
- Miettinen, T. A., Puska, P., Gylling, H., Vanhanen, H., & Vartiainen, E. 1995. Reduction of serum cholesterol with sitostanol-ester margarine in a mildly hypercholesterolemic population. *The New England Journal of Medicine*, 333(20): 1308-1312.
- Moisander, J. & Valtonen, A. 2006. *Qualitative marketing research- A cultural approach*. (1st ed.). Thousand Oaks, CA: Sage.
- Mudambi, R. & Navarra, P. 2002. Institutions and international business: A theoretical overview. *International Business Review*, 11(6): 635.
- North, D. C. 1990. *Institutions, institutional change and economic performance*. Cambridge, UK: Cambridge University Press.
- Oliver, C. 1991. Strategic responses to institutional processes. *Academy of Management Review*, 16(1): 145.
- Orr, R., J. & Scott, R. 2005. *Institutional exceptions on global projects: Ignorance, sensemaking and response*. Unpublished paper. Collaboratory for Research on Global Projects.
- Pfeffer, J. & Salancik, G.R. 1978. *The external control of organizations*. New York, NY: Harper & Row.
- Ramsey, J.R. 2005. The role of other orientation on the relationship between institutional distance and expatriate adjustment. *Journal of International Management*, 11: 377-396.
- Rao, H. 1994. The social construction of reputation: Certification contests, legitimation, and the survival of organizations in the American automobile industry: 1895-1912. *Strategic Management Journal*, 15(8): 29-44.
- Ricart, J. E., Enright, M. J., Ghemawat, P., Hart, S. L. & Khanna, T. 2004. New frontiers in international strategy. *Journal of International Business Studies*, 35(3): 175-200.
- Rogers, E. M. 2003. *Diffusion of innovations* (5th edition). New York, NY: Free Press.

- Rugman, A.M. 2005. *The regional multinationals: MNEs and 'Global' strategic management*. Cambridge, UK: Cambridge University Press.
- Sanders, W. M. G. & Tuschke, A. 2007. The adoption of institutionally contested organizational practices: The emergence of stock option pay in Germany. *Academy of Management Journal*, 50: 33-56.
- Santos, F. N. & Eisenhardt, K. M. 2006. *Constructing markets and organizing boundaries: Entrepreneurial action in nascent fields*. Working paper: INSEAD.
- Scott, R.W. 1995. *Institutions and organizations* (1st ed.). Thousand Oaks, CA: SAGE Publications Inc.
- Scott, W. R. 2006. Ad astra per aspera: A journey from the periphery. *Organization Studies*, 27(6): 877-897.
- Shenkar, O. 2001. Cultural distance revisited: Towards a more rigorous conceptualization and measurement of cultural differences. *Journal of International Business Studies*, 32(3): 519.
- Soupas, L. 2006. *Oxidative stability of phytosterols in food models and foods*. Academic Dissertation. EKT-series 1370. Helsinki: University of Helsinki.
- Suchman, M. C. 1995. Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3): 571-610.
- Tempel, A., Edwards, T., Ferner, A., Muller-Camen, M. & Wächter, H. 2006. Subsidiary responses to institutional duality: Collective representation practices of US multinationals in Britain and Germany. *Human Relations*, 59(11): 1543-1570.
- Variyam, J. N. 1999. Role of demographics, knowledge, and attitudes. fats and cholesterol. *Agriculture Information Bulletin* (AIB-750): 281.
- Verbeke, W. 2005. Consumer acceptance of functional foods: Socio-demographic, cognitive and attitudinal determinants. 16,(1), 2005, pp. 45-57. *Food quality and preference*, 16(1): 45-57.
- Weick, K.E. 1995. *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- WHO. 2007. *The ten leading causes of death by broad income group 2002. fact sheet no 310/February 2007*. (<http://www.who.int/mediacentre/factsheets/fs310.pdf>. ed.).
- Xu, D.P., Yigang, P. & Beamish, P. W. 2004. The effect of regulative and normative distances on MNE ownership and expatriate strategies. *Management International Review*, 44(3): 285.
- Yin, R.K. 2003. *Case study research. design and methods* (third ed.). Thousand Oaks, CA: Sage.
- Zimmerman, M. A. & Zeitz, G. J. 2002. Beyond survival: Achieving new venture growth by building legitimacy. *Academy of Management Review*, 27(3): 414-431.

APPENDIX 1 Plant Sterol and Plant Stanol Ingredients Approved by the European Commission

Brand name/ Manufacturer (Home Country)	Active Component/ Source	Food Application	Comission Decision
Benecol®/ Raisio Plc. (FIN)	Phytostanol esters/ tall oil, vegetable oils	Yellow fat spreads	Launched prior to reg. (EC) No 258/97
Pro.activ®/ Unilever U.K. (UK-NL)	Phytosterol esters/ vegetable oils	Yellow fat spreads (a range of products)	2000/500/EC, (2004/335/EC)
Cardioaid®/ Archer Daniels Midland (ADM) (US)	Phytosterols, phytosterol esters/ vegetable oils	Yellow fat spreads, salad dressings, milk and femented milk and cheese type products, soya drinks	2004/333/EC
MultiBene®/ Pharmaconsult Oy (FIN)	Phytosterols, phytostanols	Yellow fat spreads, milk type products, yogurt type products, spicy sauces, (rye bread)	2004/334/EC (2006/58/EC)
Diminicol®/ Teriaka Ltd. (FIN)	Phytosterols/ tall oil, vegetable oils	Yellow fat spreads, milk based fruit drinks, yogurt and cheese type products	2004/336/EC
Reducol®/ Forbes Medi-Tech Inc. (CAN)	Phytosterols, plant stanols/ tall oil	Milk- based beverages	2004/845/EC
Ruisihme/ Karl Fazer Ltd. (FIN)	Phytosterols, phytostanols/ (MultiBene ingredient)	Rye bread	2006/59/EC

Source: compiled by the author from

http://ec.europa.eu/food/food/biotechnology/novelfood/index_en.htm

in January 30, 2007, and from the companies' Internet home pages & Soupas (2007).

**APPENDIX 2 Notifications Pursuant to Article 5 of Regulation (EC) 258/97
(on 'Substantial Equivalence')**

Brand name/ Manufacturer (Home Country)	Active Component/ Source	Food Application	Comission Decision/ Notification Filed With
Danacol®/Danone (FR)	Phytosterols, phytostanols	Yoghurt, fermented milk type products	8/2004 NFB
Vegapure®/ Cognis (US)	Phytosterols, phytosterol esters	Milk and yogurt type products, (yellow fat spreads) [rye bread]	8/2004 FSA (6/2005) [6/2006] NFB
Dairygold Heart/ Dairygold (IRL)	Phytosterols	Yellow fat spreads	9/2004 FSAI
Corowise®/ Cargill (US)	Phytosterols	Yellow fat spreads, salad dressings, milk type products, cheese (rye bread)	10/2004, NFB (9/2006) NFB
Reduacol®/ Forbes Medi-Tech Inc. (CAN)	Phytosterols, phytostanols	Yellow fat spreads, salad dressings, fermented milk and cheese type products, soya drinks, yogurt, (rye bread), [cheese products]	6/2005 NFB (8/2006) NFB [11/2006] NFB
Prolocol/Granarolo S.p.a. (IT)	Phytosterols/ soy and tall oil	Fermented milk (yoghurt) type products	8/2005 FSA
Kerry Foods (IRL)	Phytosterols	Yellow fat spreads	7/2005 FSAI
Cholestatin®/Degussa Food Ingredients GmbH (GER)	Phytosterols (Cargill)	Milk type products, (cheese, rye bread)	10/2005 NFB
Prolocol/Triple Crown AB (SWE)	Phytosterols	Yellow fat spreads, salad dressings etc. Milk and yoghurt type products (low fat soft cheese)	12/2005 ACNFP (11/2006) NFB
Yoplait Essence /Glanbia (IRL)	Phytosterols (MultiBene)	Yogurt type products	2/2006 FSAI
Vitasterol®/Vitae-Caps S.A. (E)	Phytosterols	Yellow fat spreads, milk and yogurt type products (salad dressings, spicy sauces, rye bread)	2/2006 AESA (9&11/2006) AESA
Prima Pharm B.V. (NL)	Phytosterols/tall oil	Yellow fat spreads, milk and yogurt type products	2/2006 ACNFP
AS-2®/ Arboris LLC (US)	Phytosterols/tall oil	Yellow fat spreads, milk, cheese and yogurt type products, soya drinks, salad dressing, spicy sauces	4/2006 NFB
Nutraphyl®/ DDO Processing LLC (US)	Phytosterols	Milk and fermented milk type products, soya drinks	7/2006 ACNFP
Inpharma SA (S)	Phytosterols	salad dressings, spicy sauces Milk and fermented milk, yogurt , cheese type products	7/2006 DPSVNSA
Cholevel®/Fenchem (CH)	Phytosterols	Yellow fat spreads, milk and fermented milk type products	11/2006 NFB

ACNFP=Advisory Committee on Novel Foods and Processes (UK)

AESA=Agencial espaniola de seguridad alimentaria (E)

FSA=Food Standards Agency (UK)

DPSVNSA=Ministerio della Salute-Dipartimento per la Sanità Pubblica veterinaria, la Nutrizione e la Sicurezza degli Alimenti (I)

NFB= Novel Foods Board (FIN)

Source: compiled by the author from

http://ec.europa.eu/food/food/biotechnology/novelfood/index_en.htm

in January 30, 2007, and from the companies' Internet home pages.

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