

**ON THE GOVERNANCE OF REGIONAL INNOVATION SYSTEMS**

**CASE STUDIES FROM FOUR CITY-REGIONS WITHIN THE  
GERMAN FEDERAL STATE OF NORTH RHINE-WESTPHALIA:  
AACHEN, DORTMUND, DUISBURG AND DÜSSELDORF**

**by**

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A thesis submitted to  
the Faculty of Commerce and Social Science of  
The University of Birmingham  
for the degree of  
DOCTOR OF PHILOSOPHY

Centre for Urban and Regional Studies  
Birmingham Business School  
The University of Birmingham  
April 2009

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## **ABSTRACT**

This thesis investigates the governance of so-called regional innovation systems. It studies regional and sub-regional dynamics in building institutional environments conducive to innovation. The research employs a qualitative research methodology that comprises semi-structured interviews with 47 policy-makers, practitioners and academics in four case studies of city-regions within the German Federal State of North Rhine-Westphalia: Aachen, Dortmund, Duisburg and Düsseldorf.

It identifies factors influencing the systemic-ness of business and innovation support, particularly within the triple helix of university-industry-government relations. It argues that important sub-regional governance dynamics are neglected by many contemporary regional conceptualisations and proposes considering local innovation systems as an alternative. Hence, it scrutinises the appropriateness of the current academic conceptualisations and, in particular, criticises their value in terms of operational guidance.

The thesis argues that certain regional innovation policies and governance dynamics fail to constitute a regional innovation system and calls for organisational innovation in the framework structure to revive or maintain inter-institutional dynamics and cooperative relationships towards achieving a coherent, holistic and strategic policy approach.

This thesis aims to contribute to the understanding of how to make a regional innovation system work and what important aspects are to be considered for implementing innovation policy – including cluster policy – successfully.

*Key words:* regional innovation systems; cluster; networks; innovation policy; technology policy; cluster policy; industrial policy; economic development policy; business support organisations; institutions; governance; government; industry; university; academia; triple helix; systemic-ness; cooperation; region; city-region; city; Germany; North Rhine-Westphalia; Aachen; Dortmund, Duisburg; Düsseldorf

*Subject/JEL Codes:* B52; D7; L3; L53; O18; R58; Y4; Z13; *see*

<http://econpapers.repec.org/scripts/jelsearch.pl> *and* <http://netec.mcc.ac.uk/WoPEc/data/JEL>

## PREFACE

Why do some industries continue their successful legacies, while others fail and decline over time? Why do some industries relocate, leaving their regions of origin struggling with structural change? And what can be done to address this? These questions of economic change and development have fascinated me for a long time, and have accompanied me during my studies of business administration and economics at the Universities of Wuppertal and Birmingham. I greatly enjoyed lectures on production economics and strategic management, which influenced the choice of my MBA dissertation project (Schierenbeck, 1999) at the Birmingham Business School. I used Michael Porter's popular diamond models to investigate the competitive advantage of the New Town *Telford* in the West Midlands and it is thus not surprising that cluster policies and building regional innovation systems are at the core of this thesis.

### **Acknowledgements**

During the work on my MBA thesis, I established links with the Centre for Urban and Regional Studies (CURS) of the School of Public Policy, based also at the University of Birmingham. I was fortunate enough to receive the CURS European Research Studentship in support of my Doctoral Research, which comprised a year's placement at *West Midlands in Europe* in Brussels. I would like to thank the University of Birmingham for the indispensable financial support I have received from the PhD scholarship and for the great opportunity the university provided with this interesting integrated placement. The year in Brussels fuelled an already keen interest in EU affairs and influenced the direction of this research. The placement provided a great source of information and contacts and enabled me to bring a European perspective to my research. Furthermore, it contributed to the thesis' focus on innovation. Inasmuch, I am very thankful to the staff at West Midlands in Europe, and in

particular to Ms Glynis Whiting, the head of the office, for entrusting me with the responsibility for the Innovation Policy Portfolio during the year.

The realisation of this research project would not have been possible without the precious support of a number of people at CURS. First of all, I am especially grateful for the invaluable conversations and extremely enduring guiding assistance of my supervisor, Gill Bentley, who even gave up Christmas Day on the final stretch to enable me to complete the thesis on time. For all the helpful comments and recommendations from my research panel and staff, I would like to thank Dr. Stewart MacNeill, Dr. John Gibney, Dr. Margareta Dahlström, Chris Watson, Dr. Alex Burfitt, Chris Collinge and Dr. Alan Srbljanin. In addition, I wish to thank the CURS staff, Ms Sue Truman, Ms Jane Simpson and Mr. William (Bill) Firth, for their readiness to help and their administrative and technical support.

I am very appreciative for the opportunity I had at CURS to gain some practical experience as a Teaching Assistant with a series of lectures in 2003 on EU Regional Policy for the MSc (Economic Development Policy) course as well as to participate in a number of interesting research and consultancy projects (Burfitt, Gibney, MacNeill, & Schierenbeck, 2003; Burfitt, Gibney, & Schierenbeck, 2002; Collinge & Schierenbeck, 2004; MacNeill et al., 2003; MacNeill, Burfitt, Ferrari, & Schierenbeck, 2004; Schierenbeck & Bentley, 2002; Schierenbeck, MacNeill, & Bentley, 2004). Not only were these welcomed distractions from my PhD but they also enabled me to work with and learn from the experienced staff at CURS.

I am also very grateful for the constructive comments from Professor David Charles, which have helped greatly in focussing the thesis.

Although I have not made use here of the results of research into German data from the Community Innovation Survey (CIS), I am thankful for the hospitality of the Centre for European Economic Research (ZEW) in Mannheim, Germany, which allowed me to occupy their guest facilities for a week in 2003 to investigate the data. In particular, I would like to thank Norbert Janz and Dr. Georg Licht for giving me this opportunity and great thanks belong to Sandra Gottschalk for her assistance and valuable comments.

A special thanks is extended to all those policy-makers, practitioners and academics who agreed to be interviewed for the thesis. It is only because of their willingness to sacrifice their precious time and to retrieve information that the thesis was possible. Furthermore, I would like to express thanks to Ms Claudia Schneider and Ms Corinna Wolfgarten for their help with transcribing tape recordings.

Finally, I want to thank my partner, my parents, my relatives and my friends for their understanding, moral support and acceptance of my social hibernation during the course of the writing-up process. Thanks to my fellow research friends - Wing (Dr. Lam), Richard (Dr. Conlin), and Mark (Dr. Smith) – to whom I am very grateful for their continuous encouragement and helpful advice. Thanks to Ria and Stefan Dr. Frank, who were there for me when I needed them and who took a constant interest in my progress. Thanks to Pat and Torsten, for their ongoing support. Thanks to my mother and father for their eternal love and support, without which I would have not been able to complete this study. Thanks especially to Nadia, for all your love, support and care over the years. I will always remember.

### **A final note to the reader**

I am very grateful for the financial support that I received from the University of Birmingham for this present study as well as by the Darlehenskasse der Studentenwerke im Land NRW e.V. (DAKA) for my previous studies. Nevertheless, this research remained fully independent. No funding that I have received for my studies or parallel publications was in any way linked to restrictions towards the topic or content.

I made every effort to list all references but apologise for a few cases where this was not fully possible. I owe thanks to the work of my fellow academics, who provided inspiration to my work.

Concerning the style of this thesis, the author has sought advice in cases of uncertainty from the very useful MHRA Style Guide (Modern Humanities Research Association, 2002), which the author want to recommend to other research students.<sup>1</sup>

I have provided a more detailed page numbering to references than normally found in the Harvard, or author-date, referencing system in the standard Anglo-Saxon literature. This, together with a frequent and perhaps indulgent use of footnotes, may distract some readers. Yet, it is hoped that this is more than balanced by the possible ease with which readers may find explanations and relevant reference sections for their background and follow-up reading.

Finally, a note to the reader: thank you for your interest and for taking the time to read this work. If you have liked or disliked this thesis, I would appreciate hearing about it at [advantage@competitive.de](mailto:advantage@competitive.de)

Carsten Schierenbeck

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<sup>1</sup> The Style Guide is available online at [www.mhra.org.uk](http://www.mhra.org.uk) .



## **The basic law from the Rhine**

### **Article 1**

It is as it is

### **Article 2**

It comes as it comes

### **Article 3**

It has always turned out all right

### **Article 4**

What's gone, is gone  
(the disposal article from the Rhine)

### **Subarticle 4a**

Don't know it, don't need it, put it away!

### **Article 5**

What's all this nonsense in aid of then!  
(the universal law from the Rhine)

Source: Own, free translation from Langenhuisen & Voogt (2002).

## **Das Rheinische Grundgesetz**

### **Artikel 1**

Et es, wie't es

### **Artikel 2**

Et kütt, wie't kütt

### **Artikel 3**

Et hätt noch immer jot jejange

### **Artikel 4**

Watt fott es, es fott  
(der rheinische Entsorgungsartikel)

### **Unterartikel 4a**

Kenne mr nit, bruchemr nit, fott domet!

### **Artikel 5**

Watt soll dä Quatsch!  
(das rheinische Universalgesetz)

Quelle: Langenhuisen & Voogt (2002).

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# CHAPTER 1

## INTRODUCTION

Innovation has become a mantra of economic development policies. This is what most policy strategies claim to concentrate on. Many governments have attempted to gear their policies towards innovativeness in order for their economies to remain competitive. ‘Boosting innovation’ has for some time been a conceptual focus at the OECD (Organisation for Economic Co-operation and Development, 1997a, 1997b, 1999b, 2002a, 1999c, 2001) as well as a supranational policy focus at the European Union with a litany of communications with regards to innovation since the influential Green Paper on innovation ([European Commission], 2002; European Commission, 1995, 1996, 1999a, 1999c, 2000a, 2000b, 2000c, 2002a, 2002f, 2002g, 2002h, 2002i, 2002j, 2003b, 2003c, 2003d, 2003h, 2003i, 2003j, 2004c, 2004d, 2004f, 2004k, 2005f, 2005i, 2005l, 2005p, 2006a, 2006b, 2006d, 2006e; European Communities, 2004).<sup>2</sup> Furthermore, at the European Council Summit of the Portuguese Presidency in March 2000, the European Union gave itself the ambitious so-called ‘*Lisbon Objective*’ of becoming ‘the most competitive and dynamic knowledge-based economy in the world’ (Council of the European Union, 2000, paragraph 5). The subsequent ‘Lisbon strategy’ focuses on ensuring the necessary support for research and technological development and on providing the appropriate framework conditions for the successful exploitation of innovation by businesses - as endorsed by the March 2002 European Council in Barcelona (Council of the European Union, 2002a, paragraph 47 on p. 20).

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<sup>2</sup> *Green Papers* published by the European Commission are key discussion documents on a specific policy area that present a range of ideas for public debate and consultation, while *White Papers* are documents containing an official set of proposals for Community action in specific policy areas - that sometimes (but not necessarily) follow upon a Green Paper.

This new innovation policy paradigm is based on the understanding that individual, organisational, and systemic competences and innovation activities are, indeed, the key drivers of globalised competition in an era of an emerging 24-hour knowledge-based economy. The empirical phenomena of spatial economic concentration and specialisation are thus seen as outcomes of specific business support environments that are conducive to innovation and to certain specialised competences and skills. Indeed, there is an abundance of success stories of industrial districts or clusters of industries to be found in the literature, which comprise narrations such as the widely reported and known case of Silicon Valley, but also the Italian region of Emilia-Romagna or the German State of Baden-Württemberg, to name just a few.

Businesses constantly re-evaluate and compare their localised competitive environment to others, with the effect that often entire mature industries relocate to lower-cost production locations. This implies continuous structural economic changes with the effect that locations seek to develop unique competitive assets in order to keep, to attract and to incubate businesses. Consequently, providing an environment that is favourable to innovation appears to be the sole feasible and sustainable competitive strategy for businesses and locations alike, especially within advanced and highly competitive countries.

The quest for economic growth thus turns into the question of how to become an innovative location. Despite the abundance of success stories, fully fledged cases of innovation production systems appear to be much rarer. Many governments have tried through economic development policies to copy Silicon Valley-type blueprints, or followed the hype in aiming to attract or breed the next new or future growth industry, and largely failed. Instead,



developing and implementing innovation policy emerges as a much more meticulous task, that faces significant obstacles. It is a task of importance to all regions but of particular relevance to less-favoured locations, which are already lagging behind in terms of presence of innovative firms and supporting institutional framework.

More contemporary approaches of innovation policy-making have advanced from earlier industrial (subsidising) policies and incorporated a more strategic and holistic approach. They widely follow the new, systemic view of innovation, which renounces the traditional, linear understanding of the creation of innovation (i.e. stringently evolving from research to invention, innovation, and diffusion) by considering a broader range of influences. This New Institutionalism is reflected in the emergence of concepts of innovation systems, which consider the role of interactions within the wider collective institutional framework (cf. Nelson & Rosenberg, 1993, p. 4). An emphasis is placed on cooperation to complement competition as drivers of economic development (cf. Lagendijk, 1997b, pp. 18-19). This in effect means an increasing appreciation of the local environment, in which networked firms are located (Le Galès & Voelzkow, 2001, p. 3).

More recent evolutionary ‘territorial innovation models’ (cf. Moulaert & Sekia, 2003) combine this institutionalist perspective with a new spatially downsized perspective. These approaches have been linked to the label of ‘New Regionalism’ (Barter, 2000; Keating, 1998; Lagendijk, 1997b; Lovering, 1999) since they imply favouring economic development policies driven by, or to taking place, at the regional level. The regional innovation systems strand has been regarded as being the ‘apex’ or ‘culmination of the New Regionalism discourse’ (Lagendijk, 1997b, pp. 20 and 23). Although contested (Lovering, 1999), the ‘New

Regionalism' (for an overview see Barter, 2000) provides several democratic and functional arguments for the 'hierarchy of regions' (Hassink, 1992, p. 11), which were informed by the 'geographical turn' (Martin, 1999, p. 67) of the conceptualisations of the New Economic Geography.

This thesis looks into the quest for successful strategies to develop innovative learning regions. Its argument is that most contemporary academic models are under-operationalised. The reason for this lies in the belief that a proposition of any one-size-fits-all best-practice model will fail to address the peculiarities of reality and policy practice. While many studies identify certain success factors and describe successful cases of economic development, less attention has been placed on policy failures and the struggles of less-favoured regions (e.g. with the exceptions of Morgan & Nauwelaers, 1999c; S. A. Rosenfeld, 2002). Accordingly, current theories generally imply what policies should focus on with little to say on how to implement them practically and achieve their objectives. Similarly, there is widespread recognition in certain strands of the literature that 'institutions matter' but without sufficient investigation into why they matter and how they can make a difference.

While the difficulties in terms of effective policy-making are noted by some (e.g. Bentley & Gibney, 2000; Nauwelaers & Morgan, 1999; Shutt, 2000; Stiglitz, 1998), they are believed to be underestimated still by many others.

### **Aim of this thesis**

Hence, overall this thesis *aims* to contribute to the understanding of how to build a regional policy and business support environment conducive to innovation or, in simpler words, what

are the ways to make a regional innovation system work and what important aspects are to be considered for implementing innovation policy – such as cluster policy – successfully. This entails asking the question how and why systemic governance is, or is not, achieved.

The *hypothesis* is that certain regional innovation policies and governance dynamics fail to constitute a regional innovation system. It is thereby argued that conceptualisations of regional innovation systems do not adequately capture the regional and, in particular, the sub-regional governance dynamics – i.e. the structures and relationships between the innovation actors – and thus are of little operational guidance to innovation policy-making.

Correspondingly, these concepts are seen to insufficiently address the obstacles and pitfalls for policy-making and thus for achieving the *systemic-ness* of the institutional governance framework, which is defined here as strategic and effective governance which encompasses a ‘well connected and functioning’ status of the structure and relationships between innovation actors that goes beyond its mere existence of an institutional business support and governance superstructure. Insofar, it is supposed to actively facilitate the clustering or ‘clusteredness’ of the business dimension of a regional innovation system. Certain conditions (or incentives) are assumed to be needed to constitute the ‘well connectedness and functioning’ of an innovation system, such as that key actors are being generally cooperative and coherent in an overall strategic approach which must be present.

In order to analyse the governance dynamics, a set of intangible *success factors of systemic-ness*, which are thought to characterise the dynamics and structures of the governance system, was derived from theory (cf. also Brosza, 1993, p. 89; European Spatial Planning Observation

Network, 2005, p. 73). These factors serve as *analytical criteria* and were used to analyse and compare the fieldwork results, and to explain differences. The factors that are thought to signify evidence of systemic-ness include the following:<sup>3</sup>

1. whether there is a strategic and theory-informed policy orientation;
2. whether there is organisational connectedness, cooperation and coherence;
3. the extent of inclusiveness;
4. the extent of participatory and an open policy-making process, and support for coordination; and finally
5. the extent of opportunism.

### *Definitions*

Innovation is seen here as the ‘conversion of new knowledge into economic and social benefits’ – now acknowledged to take place as the result of complex long-term interactions between many players in an innovation system. This understanding of innovation has superseded the previous perspective of the over-simplified and now largely discredited ‘linear model’ of innovation of simple transfer of specific technologies from the research base to industry (European Commission, 2002e, p. 22) by recognising the systemic dimension of

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<sup>3</sup> See also the list of *important aspects of governance* as outlined by ESPON (European Spatial Planning Observation Network, 2005, p. 73), which are proposed as a basis for approaches to measure differences in the capacity of governance. They comprise the areas of existing institutional settings including government structures (e.g. satisfaction with actual government, number of public employees, and openness in terms of cross border activities); economic governance (e.g. network activities expressed by the number of regional cluster, e-government, and regulatory burdens); civil society (e.g. participation, trust, and information & communication patterns, and ‘attachment to region’ as an indicator of decentralisation); and space (e.g. ‘flow’ characterising relations and exchange between different regions, interdisciplinarity and multi-level composition of actors involved in governance processes. Furthermore, also consult the ‘Explorative Innovation Scoreboard’ of the EXIS report (Arundel & Hollanders, 2005), which features data for the governance dimension. Moreover, confer Hoppe’s (2000, pp. 232-233) reference criteria for the detection of system immanent strength and weaknesses of implementation procedures of information and support structures.

innovation and the importance of the institutional superstructure, proximity between actors and their relational capital.<sup>4</sup>

The transformation to a wider and systemic view of innovation that has taken place is also reflected in the changes made to the definition and typology of innovation proposed by the OECD in its ‘Oslo Manual’ as well in the revision of the innovation indicators within ‘European Innovation Scoreboard’ (EIS) published by the European Commission. In contrast to the previous version of the Oslo Manual, the third edition (Organisation for Economic Co-operation and Development & Eurostat, 2005, §146 on p. 46), for instance, explicitly includes organisational innovation and marketing<sup>5</sup> and the fifth edition of the EIS for 2005 (European Commission, 2005f, pp. 6-8) also correspondingly introduced two indicators such as registered Community trademarks and designs granted for the EU by the Office for Harmonisation in the Internal Market (OHIM) as a first proxy of these two new dimensions.

It is believed that innovation is nurtured in functioning innovation systems. The *regional innovation systems* concept represents in this respect an advanced form of a ‘regional *learning system*’, as Cooke & Morgan (1998, p. 71) imply, and it is defined here ‘in terms of a

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<sup>4</sup> In this respect, the Oslo’s Manual own discussion of innovation theory and the presentation of its conceptual understanding of the structure and character of the innovation process (Organisation for Economic Co-operation and Development & Eurostat, 2005, §74-97 on pp. 28-34) is useful as it provides a quick glance at currently as important perceived topics and issues concerning innovation and its key characteristics. Furthermore, it particularly illustrates the changes to and the evolution of the understanding of innovation, when juxtaposed with the earlier editions of the manual (e.g. Organisation for Economic Co-operation and Development & Eurostat, 1997).

<sup>5</sup> While the OECD’s earlier definition used in the second edition of the Oslo Manual (Organisation for Economic Co-operation and Development & Eurostat, 1997, §130 on p. 31 and cf. also Figure 3 on p. 36) was mainly based upon technological product<sup>5</sup> and process (TPP) innovation that ‘comprise implemented technologically new products and processes and significant technological improvements in products and processes’, the third edition (2005, §146 on p. 46) defines *innovation* as ‘the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.’ The earlier and narrow 1997 definition explicitly only comprised new or improved purely organisational innovation ‘if there is a significant measurable change in output’ (ibidem 1997, §156-157 on pp. 36-37).

collective order based on microconstitutional regulation conditioned by trust, reliability exchange and cooperative interaction' (Cooke, 1998, pp. 24-25; Cooke, Gomez Uranga, & Etxebarria, 1997, p. 490). Importantly, this comprises 'the full panoply of innovation organizations set in an institutional milieu where systemic linkage and interactive communication among the innovation actors is normal' (Cooke & Morgan, 1998, p. 71). The array of organizations corresponds to economic, institutional, technological and social sub-systems, 'which interact continuously with each other and operate as a system' (Cooke, 1997, p. 362).

The definition of the governance dimension applied here follows Le Galès & Voelzkow (2001, pp. 5-6), who refer to *governance* as 'the entirety of institutions which co-ordinate or regulate action or transaction among (economic) subjects within an (economic) system (Hollingsworth & Boyer, 1997b; Hollingsworth, Schmitter, & Streeck, 1994; Streeck & Schmitter, 1985)'. Correspondingly, the governance infrastructure does not just comprise the regional tier (and other multiple levels) of government that influence regional innovation policy and activities, but the wider organisational framework and environment of business associations and networks, business support organisations and services, university-industry technology transfer agencies, and so on. Moreover, innovation policy is also defined here in a wider sense, which not just comprises actual initiatives and programmes, but the structures and relationships between actors in the governance system too (cf. European Spatial Planning Observation Network, 2005, pp. 72-73).

The advocated cluster policy as part of building an innovaton system 'refers to a wider set of specific government policy interventions aiming at strengthening existing clusters or

facilitating the emergence of new ones' that 'may take different forms and follow different objectives, such as industrial and SME policy or research and innovation policy' (European Commission, 2008a, p. 73).

### *Research objectives and questions*

Consequently, this thesis aims to ascertain whether the regional innovation system model takes enough account of the specialities and peculiarities of the complexity of regional governance and economic policy-making in practice. Thereby, this analysis reviews the key characteristics and features of regional innovation systems - that are detailed for instance, by contemporary theoretical conceptions by scholars such as Braczyk, Cooke, & Heidenreich (1998a) - and scrutinizes the extent to which they describe what is found in practice. By doing so, it is intended to contribute to the process of comprehending what the governance dynamics of regional innovation systems entail and, especially, how they function and how they can be made to work.

Correspondingly, the overall objective of this thesis is to investigate the dynamics and conditions that effect the functioning of the relationships between and perceptions of actors within the governance infrastructure of a regional innovation system. In order to shed some light on the nature of these dynamics, its causes and their effects, this thesis more precisely *aims*:

- to review the key features of the concept of regional innovation systems and to contribute to the understanding what they are and, more importantly how and why they work;
- to identify and compare potential significant differences in terms of structures and dynamics within the governance of a regional innovation system and its sub-systems;
- to explore and ascertain the reasons for any such differences; and subsequently
- to identify enablers and obstacles to structural and institutional change as well as to the overall governance of regional innovation systems and its sub-systems; and eventually
- to contribute to the development of the regional innovation systems conceptualisation;
- to draw theoretical and practical implications that contribute to a better understanding, conceptualisation and practice of systemic innovation policy-making; and thereby
- to bridge any apparent gap between theory and practice.

Accordingly, the research objectives outlined above can be split into the following specific *research questions*, which this thesis tries to answer:

- How and why do regional innovation systems work or not work in practice, in particular with regards to the functioning of the governance infrastructure?
- What are the similarities and differences of the dynamics and structures within the governance of a regional innovation system and its sub-systems in terms of strategic policy measures, organisational set-up, relationships, processes, perceptions and sources of ideas?



- What are the enablers and obstacles for successful innovation policy, governance coherence and cooperation in order to make regional innovation systems work?
- Can a systemic-ness of governance structures be generally found in practice and why?
- Does innovation policy as such exist and is there a gap between the conceptualisations of innovation policy in theory (by academics) and practice (by policy-makers and practitioners)?

By aiming to provide policy-makers with a vision of how they could or should overcome obstacles and implement facilitating processes and structures within a regional innovation system, this thesis hopes, thereby, not to be of mere interest to academics but to practitioners in the wider innovation policy sphere.

### *Research approach and design*

This thesis adopts a qualitative research approach in order gain an insight and understanding of the underlying reasons behind the complex dynamics, perceptions and relationships between actors, which a quantitative approach would have found difficult to grasp.<sup>6</sup> Following the aim of scrutinizing regional and in particular sub-regional dynamics of regional innovation systems, and to limitations in scope, this thesis comprises an investigation of the working of the governance dimension in one (albeit a very large) German region, that is the Federal State of North Rhine-Westphalia. The research design is composed of four in-depth qualitative case studies all within the same - at least supposedly functionally homogenous -

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<sup>6</sup> If an assessment of governance conditions would have been the primary goal, then the quantitative measurement of certain indicators related to important aspects of governance could have been considered at a larger scale. Still, measuring governance remains an empirical challenge. Yet, the ESPON programme (European Spatial Planning Observation Network, 2005, p. 73) has recently presented some initial proposition on how to measure important aspects of governance.

regional setting, namely the city-regions of Aachen, Dortmund, Duisburg and Düsseldorf. While the fieldwork centres upon these sub-regional case studies, their regional level as well as other dimensions of governance are also considered.

North Rhine-Westphalia was chosen as a research setting for the case studies because it was reported to have followed a (sub-) regionalised policy approach (e.g. see Grabher, 1993a, p. 272; Heinze & Voelzkow, 1997) and because it has a long history in attempting to execute structural and institutional change as a former heavily industrialised region. Thereby, this thesis is different from other case studies in that it investigates a region still struggling with industrial change and not one that is currently highlighted as a model region in terms of economic performance.

The research comprises an extended literature review and detailed desk-study of secondary literature as well as a total of 50 semi-structured interviews with 47 policy-makers, practitioners, and academics. The timeframe of the research focuses upon the period between February 2001 and January 2003. It also considers some recent developments since the fieldwork was undertaken.

### **Overview of chapters**

*Chapter 2* provides a general theoretical background in understanding how economies work and what the major determinants are to national and regional economic development and growth. It introduces different schools of thoughts on economic development in explanation of economic differences in terms of productivity and competitiveness. This chapter explains

the important role that innovation plays for economic development and gives an insight into the innovation process.

*Chapter 3* presents a spatial perspective to both policy-making and economic development. Starting with a conceptualisation of what a region constitutes, this chapter draws attention to the recent trends towards regionalisation and regionalism. In the first part, this chapter reports on the rise of devolved regional governance and regional government as well as the consequent regionalisation of policies and institutions. It presents the main rationales behind these trends and argues that the region, indeed, appears to be *the* appropriate governance level to drive innovation policy. The second part of the chapter elaborates on the rediscovery of the regional economy under the so-called ‘New Economic Geography’.

Next, *Chapter 4* presents some of the contemporary conceptualisation of so-called ‘territorial innovation models’ (Moulaert & Sekia, 2003), which aim to explain the spatial concentration of economic activity. These models such as new industrial spaces, industrial districts, innovative milieux, clusters, and innovation systems are briefly juxtaposed and placed in the context of, what is labelled here, the ‘Economic Geography Triangle’ (of industrial organization, social institutional environment, and innovation). The organization of the discussions in this chapter follows this triangle. Building upon the discussions of the previous chapter on industrial organization, this chapter then focuses upon elaborating the evolutionary and institutional turns in economics. The evolutionary view is also put into a spatial context discussing the relevance of proximity in the globalised knowledge-based economy. Furthermore, this chapter elucidates the recent rise of the increasing importance attached to

the role of the socio-institutional environment, which marked an ‘institutional turn’ in economics (Amin, 1999, p. 368; Blyth, 2002, p. 18; Raco, 1999).

This institutional perspective is next linked to innovation in *Chapter 5*, which discussion centres on the main conceptual model of this thesis, regional innovation systems. The chapter starts by outlining some of the common characteristics of the systems of innovation approach are outlined, before its different strands are discussed in more detail. First, the national innovation systems strand is very briefly introduced. Then, the regional innovation systems strand is decoded into its three subtle propositions (on region, innovation, and system). Finally, its conceptualisation is compared to that of the cluster concept, which is perceived here as being embraced by it. This chapter further addresses some of the criticism that has been addressed at clusters, e.g. the concept’s fuzziness. To contribute to a clearer understanding of what clusters constitute, this thesis presents common characteristics that have been outlined and provides a useful overview of typologies of clusters that can be found in the literature.

This detailed conceptual discourse precedes the presentation of suggested policy interventions that were derived from these theoretical contributions. Thus, *Chapter 6* compiles proposed innovation policy measures associated with new institutionalism and the regional innovation systems concept. In order to build successful innovation systems, it is argued that innovation policies need to facilitate cluster development in a holistic manner and to construct institutional thickness. This chapter starts by considering the rationales behind policy interventions and discussing the role of government. In the following, the chapter elaborates the proposed symbiotic measures of cluster and institutionalist policy. A specific emphasis in

this respect is placed upon the nature of the policy decision-making process, Finally, this chapter identifies some potential practical policy flaws that policy ought to consider prior to implementation.

The methodological approach of the thesis is discussed in *Chapter 7*. It discusses the methods employed in analysing the working of the governance dimension of innovation systems in more detail. The chapter first starts with introducing the thesis's general epistemological perspective, which follows reflexive, social constructivist approaches, as opposed to rationalist and positivistic explanative frameworks, in that it views reality as being socially constructed by the various actors and the researcher itself (cf. Meyers, 2004a, pp. 463-464). Secondly, the chapter presents the chosen methodological approach applied in testing the hypothesis. This includes an explanation why an empirical-analytical social network analysis and a case-study approach were chosen. It further presents the methodological research steps. Thirdly, the chapter discusses the advantages and disadvantages of different research methods and justifies why a qualitative research approach was employed. Fourthly, it presents the analytical framework and specifies in more detail the methods of gathering information. This involves the presentation of a set of identified success factors of systemic-ness for the working of an innovation system as well as for the effectiveness of policy-making (i.e. governance) of innovation systems. Finally, the chapter explains the reasons behind the case-study design and why the sample city-regions were selected as well.

In *Chapter 8*, the results of the fieldwork are presented. First, an introduction is given to the national and the regional settings. Hence, some common characteristics of the German national innovation system and the regional *Land* level of North Rhine-Westphalia are

presented. Latter comprises an outline of the contextual and historical settings within the Federal State of North Rhine-Westphalia, which includes an overview of past and current policies and organisation for the support of innovation. This identifies a shift from bottom-up inclusive regional structural policy to a top-down process of competitive bidding labelled here as ‘localised regional cluster policy approach’. Then, the particular findings at the sub-regional level are reported. This includes a description of innovation policies and local initiatives, organisational governance structures, relationship between and perceptions of policy-makers and practitioners, and a categorization of the institutional interactions and systemic-ness within the four case-studies of the city-regions of Aachen, Dortmund, Duisburg and Düsseldorf.

Then, *Chapter 9* compares the results of a cross-case analysis comparing the findings of Chapter 8 in order to answer the research questions raised. The comparative analysis highlights the differences in innovation policies and institutional dynamics found in the fieldwork at multiple levels of governance and between different governance structures at the sub-regional level. Consequently, this chapter identifies the obstacles and enablers to the systemic-ness of governance and policy development. Correspondingly, this chapter proposes some potential practical implications and options for policy development and -making to enhance its coherence and cooperative reach. This concerns in particular the lessons learned with regards to the overall organisational set-up and the nature of policy- and decision-making processes. Subsequently, necessary changes to contemporary theoretical conceptualisations and practical approaches of regional innovation policy, strategies and governance are discussed and suggested.

Conclusions are drawn in the last *Chapter 10*, which provides a summary of the key findings of the thesis and its contribution to academic thinking and policy thinking. It demonstrates how the objective of the research was reached and how the research questions have been addressed. It indicates the originality and importance of the research as well as some of its limitations. The chapter concludes by raising some new questions that have evolved from the research findings and, therefore, proposes some issues and scope for future research to be undertaken.

## **CHAPTER 2**

### **A GENERAL BACKGROUND**

#### **REGIONAL ECONOMIC DEVELOPMENT AND INNOVATION**

A profound understanding of economic growth and its underlying determinants is necessary if the aim is to investigate policies towards regional economic development. Therefore, this thesis begins by sketching out the main determinants of economic growth and development as well as point to recent trends and drivers and subsequent changes in the views about the most determining factors of economic growth. This makes it necessary to address wide-spread issues such as regional competitiveness, regional economic development, innovation promotion and to summarise how these issues are linked to each other and why they are important for employment and the prosperity of a region.

The purpose of this chapter is to briefly outline past and current academic thinking on how national and regional economies work. This involves introducing the various schools of thought concerned with economic development and growth as such, and policy-making in particular. Different theories of economic development and growth are introduced to provide a background to regional economic development.

First, some general comments are made about the economy and economic growth in particular and their underlying determinants identified. Then, recent trends and paradigm changes in theoretical conceptualisations are presented. Next, the special role of innovation as one of the factors that determine growth, as well as the prominence given to the regional level are



discussed, followed by an analysis of the role of institutions and systemic structures of economies.

### **The quest for a successful economy**

Economic growth and development represents one of the central questions of economics. In order to find new or refined answers to the question of economic development and growth, academics have not only drawn from and built upon existing knowledge in obvious fields such as macroeconomics and business studies but also brought in patterns of thinking and understanding from associated disciplines such as Geography, History, Political Sciences, Social Science, Biology, and Psychology. Scholars of diverse backgrounds and disciplines have all provided explanations of how our economy works and why differences exist in economic prosperity between countries and regions.<sup>7</sup> The disciplinary boundaries for example between economics, geographical and political sciences have merged and been blurred in the quest for successful regional development and policy.

### **Different theories for explaining regional productivity differences**

The various theories have differing assumptions and stress different individual factors in explaining economic growth. While neoclassical (equilibrium) theory (Solow, 1956, 1957; Swan, 1956) emphasise the supply side<sup>8</sup>, post-Keynesian<sup>9</sup> as well as economic base theory<sup>10</sup>

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<sup>7</sup> Closely linked to question of why differences exist, is the question whether these differences will widen, sustain or narrow. Opinions on this matter differ greatly and the corresponding discussion is known as the convergence-divergence debate (e.g. see H.W. Armstrong, 1998; H. W. Armstrong & Vickerman, 1995; Barro & Sala-i-Martin, 1991, 1992; Button & Pentecost, 1999; P. Cheshire & Carbonaro, 1997; European Commission, 2004h; Gardiner, Martin, & Tyler, 2004; Labour Asociados, 2003; Reiner Martin, 1999).

<sup>8</sup> This goes back to Adam Smith's *classical* understanding, which derived from his observation of pin manufacturing, which ascertains that the 'Wealth of Nations' (first published in 1776) is dependent upon an efficient use of production factors that is foremost achieved by the benefits of a division of labour and subsequent specialisation.

<sup>9</sup> The *postKeynesian growth theory* emphasises demand and views investment as the decisive determinant of economic growth. It points out that additional investment causes an income (multiplier) effect, a capacity

emphasize demand as the main determinant of productivity differences. More lately, the new growth theory and innovation theories highlight the creation of technological progress as a key factor to growth (Grossman & Helpman, 1991; Romer, 1986, 1990) and emphasise human capital, knowledge and learning by doing in this respect (Arrow, 1962a; Lucas, 1988; Stokey, 1988; Young, 1991).

### *New Economic Geography*

Building upon some of the findings of the new growth theory, more recent approaches of explaining regional productivity differences have stressed the importance of spatial concentration of economic activities for economic growth. By emphasising economic agglomeration, these concepts reintroduced the variable ‘space’ into the analysis of the economy, which had been eliminated before by the classical school (cf. Krugman, 1991, p. 8; Schätzl, 2001, p. 17). As these concepts merge to some extent the disciplines of economics with geography, they are grouped under the label of the so-called ‘new economic geography’.<sup>11</sup>

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increasing effect and creates incentives for complementary investments along the value chain by forward and backward linkage effects, final demand linkage effects as well as technological and fiscal complementary effects. PostKeynesian Scholars (or neoKeynesian as they are also called) who have build upon the aggregate economics that originated from Keynes’ book *The general Theory of Employment, Interest and Money* (1936) include, for instance, Evsey D. Domar, Roy F. Harrod, Albert O. Hirschman and M. H. Watkins (cf. Schätzl, 2001, pp. 143-146 who summarises their contributions).

<sup>10</sup> The *economic base theory* - sometimes also referred to as ‘export base theory’ - stresses the importance of exports, which basically represents external demand (Fritsch, 1991; Geck & Petry, 1981; Krietemeyer, 1983; Richmann, 1979).

<sup>11</sup> This study takes a wide view of which concepts fall under the grouping of the new economic geography. Here, it is understood as to comprise dynamic-cyclical approaches which focus on interregional movements of economic activity as well as the more recent dynamic evolutionary approaches of economic geography that concentrate on intraregional economic development. Thereby, this study follows Schätzl’s (2001, p. 202) grouping instead of Martin’s (1999, pp. 66, 68 and 79) and Amin’s (1999, pp. 368-369) more narrow view that only comprises the more formal (mathematical) models of equilibrium location theory and regional or local economic agglomeration or the new growth theory, while the more soft ‘eclectic and empirically-orientated concepts’ that ‘emphasise the political, economic institutional and social bases of regional development and

These contributions mainly emanate from the thought that proximity matters – more lately also with particular regards to innovation (Boschma, 2005a, 2005b; Capello & Faggian, 2005; Kirat & Lung, 1999; Morgan, 2001a; Oerlemans & Meuus, 2005; Torre & Rallet, 2005; Turok, 2004). They assume in contrast to the neoclassical perspective that here is not an equal and unimpeded geographical diffusion of innovation (Gardiner et al., 2004, p. 1049) but instead a concentration of economic activity in general and of innovation in particular. Consequently, similar to the new growth theory, the new economic geography models allow for interregional differences, while the neoclassical theory did not, as discussed above. However, this strand of theory does not consent to the assumption of natural free factor mobility with balancing, converging effect (e.g. by flows of knowledge workers) but instead conceptualises ‘centripetal forces’ (Krugman, 1991, p. 37; 1998; cf. Turok, 2004, p. 1076) that lead to the agglomeration or clustering of economic activity – as already identified long ago by Alfred Marshall’s (1898) classical analysis of industry localization. As a result, the new economic geography rather postulate the evolution of ‘core-periphery’ equilibrium pattern of productivity (Davis & Weinstein, 2001; cf. Gardiner et al., 2004, p. 1050) or ‘center-periphery pattern’ with persistent interregional differences (Krugman, 1991, pp. 15-17 and 26). While traditionally these differences were predominantly viewed in international and interregional comparisons (e.g. factor endowment), evolutionary approaches have more recently focussed on intraregional economic development.

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industrial agglomeration’ are not labelled as ‘new economic geography’ but contrasted as ‘economic geography proper’.

*Table 1 Three theoretical perspectives on regional productivity growth*

Theory	Explanation of regional productivity differences	Predicted evolution of regional productivity differences <sup>12</sup>
Neoclassical Growth Theory	Due to different factor endowments, especially differences in capital/labour ratios and technology	Regional convergence (catch up) in productivity based on the assumption of constant returns to scale; diminishing returns to factors of production; free factor mobility and geographical diffusion of technology. <sup>13</sup>
New Growth Theory (NGT)/ Endogenous Growth Theory <sup>14</sup>	Due to differences in the capital/labour ratios, knowledge base and the proportion of the workforce in knowledge-producing industries <sup>15</sup> , which leads to localized knowledge/ technology spillovers	No long-term convergence. Convergence, persistence or divergence (widening) of productivity gaps depending upon changes in the degree of geographical diffusion of technology and knowledge, and flows of knowledge workers
‘New Economic Geography’ models	Due to spatial agglomeration / specialization / clustering (localisation and urbanisation advantages), as sources of positive externalities and increasing returns (labour, knowledge spillovers, specialist suppliers etc.)	‘Core-periphery’ equilibria and persistent regional differences in productivity as a result of increasing spatial concentration and specialization of economic activity and labour migration

Source: Altered and shortened version of Table 1 by Gardiner, Martin, & Tyler (2004, p. 1049).<sup>16</sup>

<sup>12</sup> For a discussion of the empirical literature concerning the evolution of regional productivity differences literature consult the contributions to the convergence divergence debate (e.g. see H.W. Armstrong, 1998; H. W. Armstrong & Vickerman, 1995; Barro & Sala-i-Martin, 1991, 1992; Button & Pentecost, 1999; P. Cheshire & Carbonaro, 1997; European Commission, 2004h; Gardiner et al., 2004; Labour Asociados, 2003; Reiner Martin, 1999).

<sup>13</sup> The overall growth rate of an economy is entirely determined by the exogenous given growth rate of technology.

<sup>14</sup> The New Growth Theory – which is sometimes also labelled as Endogenous Growth Theory because of its ‘endogenous explanation’ of technological progress – should not be confused with Theories of Endogenous Development, which stress the activation of intraregional potential as key to the economic development. Contributions to theories of endogenous development (cf. chapter 2.3.4 in Schätzl, 2001, pp. 155-158) often call for a bottom-up approach to policy-making in order to overcome existing bottlenecks and to further specialise existing comparative strengths within a region.

<sup>15</sup> Thereby stressing one particular aspect of factor endowment, namely human and knowledge resources.

<sup>16</sup> For further characteristics of the New Growth Theory and New Economic Geography with regards to spatial concentration of economic activity, see also Sternberg (2001, Tab. 1 on p. 161) based upon Lagendijk (1997b, first version, p. 22).

In the following, the increasing recognition of innovation is explained in more detail, while this thesis returns later on to this strand and discusses some of the key concepts of new economic geography in the context of the resurgence of the role of the region.

### **On the importance of innovation**

Traditionally, innovation was long regarded in economic theory solely as an isolated technological invention created through research that is exogenously given. Nowadays, however - following evolutionary research on innovation and knowledge and according to the so-called new growth theories, innovation has regained <sup>17</sup> a prime place within the last decade in explaining the success and failure of regional and national economies within economic development theory.

It is necessary to start by pointing out some rather obvious but fundamental reasons of *why innovation is important*: For businesses, improving their innovation performance means maintaining or gaining competitive advantage and enabling future growth (cf. Organisation for Economic Co-operation and Development & Eurostat, 2005, p. 35). A common message from innovation studies ([European Commission], 2002, p. 2) is that ‘in an increasingly global, increasingly knowledge-based economy, innovation assumes greater importance than ever before.’<sup>18</sup> Innovation and entrepreneurial activities enable businesses to improve productivity and to meet fast-changing market needs and increasing consumer awareness and bargaining power, which are results of the progressing realization of an information (and knowledge-based) society. Consequently, innovation is not only a prerequisite but also an

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<sup>17</sup> Referring here to early works of scholars such as Schumpeter’s 1934 study on *The Theory of Economic Development*.

<sup>18</sup> This point represents one of five key messages from the 2002 status report ([European Commission], 2002, pp. 2-3), which summarised the latest results that emerged from 20 ‘innovation policy studies’ edited up to 2002 by the Commission’s Directorate-General for Enterprise.

imperative of staying ahead in the increasing global competition of the ‘knowledge-based economy’.<sup>19</sup>

For regions or nations, it just means exactly the same. Innovation is just as much key to competitiveness and hence economic prosperity for the spatial areas of businesses. Innovation within a business may enable the wider regional business base to benefit from positive externalities and can provide chances for the region to defend or to develop a sectoral or niche competence, which may shape and form part of the region’s ‘diamond system’ of determinants of its competitive advantage. Indeed, reaching or sustaining the innovation-driven stage for a national or regional economy is the most sufficient means of securing future economic growth – especially for already advanced economies, which cannot compete on labour costs but on productivity and by innovative products. Hence, innovation should not be seen as an end in itself but the most effective means of defending one’s competitiveness.

### ***The emerging innovation paradigm and why its importance has now been recognised***

For understanding the importance of innovation and its implications for businesses and their territorial systems, which emanates from it, one should not only look at current trends and academic thinking on how the economy works, but also at those of the past. Among the array of papers on paradigm changes<sup>20</sup>, Capello’s (1996) extended review essay based upon Conti, Malecki & Oinas (1995), for example, elaborates upon three distinct economic paradigms of industrial organization, which by no means are exhaustive but, nevertheless, highlight the

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<sup>19</sup> The OECD’s third edition of the Oslo Manual (Organisation for Economic Co-operation and Development & Eurostat, 2005, §71 on p. 28) defines *the knowledge-based economy* as ‘an expression coined to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors.’

<sup>20</sup> Cooke and Morgan (1993, p. 562) define a paradigm as ‘a hegemonic set of principles, methods of understanding, and practices which provide a coherent and useful way of engaging with the world’. Dosi (1988, p. 224) distinguished paradigm from changes or trends by seeing it as being “patterns” ‘for solutions of selected techno-economic problems based on highly selected principles derived from the natural sciences’.

most prominent changes in understanding corporate strategy and regional development in the second half of the last century: the *large firm paradigm* characterised by economies of scales as a result of automated mass production ('Fordism') and division of labour ('Taylorism') , the *industrial district paradigm* with a shift to a 'flexible regime of accumulation' (Albrechts & Swyngedouw, 1989) with a cluster of specialised small firms realising economies of scope, and the network paradigm (Cooke & Morgan, 1993) highlighting the need for cooperation, networking and co-competencing between businesses in order to use economies of association (i.e. network externalities) and to take account of the transition from an industrial to a complex knowledge-based society and economy (cf. European Commission, 2002d, pp. 8-9 and 22-23; Schätzl, 2001, pp. 224-225) .<sup>21</sup>

Indeed, businesses need to become efficient 'learning organisations' (cf. M. Armstrong, 1996, p. 521) in order to fully exploit their quality potential and to satisfy and adapt quickly to fast changing customer demands (Missethon, 1993, p. 10) through continuous improvement. Hence, networking becomes a competitive strategy, in particular for smaller firms (Cooke, 1997, pp. 359-360), with a focus on learning and information exchange. This form of collaboration offers an opportunity – sometimes in a rather unspecified way – for small and medium-sized enterprises (SMEs) to share and access tangible resources as well as intangible knowledge resources, which they would have not been able to create or to obtain themselves due to their limited resources. Besides this association, Michael Enright (1995), a colleague of Michael Porter, notes in this respect though to the need for an optimal mix of collaboration

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<sup>21</sup> In his paper on innovative networks and regional development, Sternberg (1999, p. 85) also builds upon Capello's presentation of paradigms and provides a German translation in slight alteration of Capello's valuable table 1 (1996, p. 487) characterizing the three paradigms.

and competition in order for a given (regional) industry cluster to be most effective (cf. Cooke, 1997, p. 360; Cooke, 1998, p. 5).<sup>22</sup>

More importantly, with their network paradigm, Cooke & Morgan (1993, p. 554) draw attention already to what they call ‘the *microregulatory* networks of institutions which give spatial definition to interfirm networking’ by discussing the cases of the successful networked regional economies of Baden-Württemberg and the ‘intelligent region’ (cf. Cooke & Morgan, 1991) of Emilia-Romagna and as well as to the two aspirational cases of the Basque Country and Wales. In their conclusion, Cooke and Morgan (1993, p. 562) summarise the key (success) features of networking. At corporate level they name ‘interdivisional integration, total quality, delaying, user involvement, market response, alliances, and collaborative subcontracting’, while at spatial level they highlight ‘a thick layering of public and private industrial support institutions, high-grade labour-market intelligence and associated vocational training, rapid diffusion of technology transfer, a high degree of interfirm networking and, above all, receptive firms well-disposed towards innovation.’<sup>23</sup>

In order to promote the process of innovation in a region, an environment has to be created in which innovation activities are enhanced and ideas, new technologies and best practice can be disseminated. While the focus in this respect was previously on the accumulation of human

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<sup>22</sup> However, this is not an easily comprehensible argument since collaboration and competition traditionally represent a paradoxical combination. Nevertheless, on the one hand, effective industry clusters need competition, as it forces businesses to constantly upgrade and innovate their products and services and thus does not allow inertia to set in due to a false feeling of security. On the other hand, collaboration in some activities can provide external economies of scale, e.g. by sharing the same laboratory or using increased bargaining power in joint bulk purchasing (Cooke, 1997, p. 360).

<sup>23</sup> Hence, the network paradigm is to be seen as a kind of prelude and in line with their later proposed ‘associational economy’ (Cooke & Morgan, 1998) and the ‘regional innovation systems’ model (H.-J. Braczyk, P. N. Cooke, & M. Heidenreich, 1998b), which will be addressed and introduced later.



capital through education and learning, nowadays it is more on creativity (Merschmann, 2005), which to foster becomes part of a successful businesses' innovation management.

However, this is a difficult task, which faces inherent organisational obstacles, as every new idea is a disruptive factor to the existing order of things. Indeed, innovations are incremental, piecemeal improvements, they represent cumulative and localized change, or in other words, they are mutations in routines (Boschma, 2004, p. 1003).<sup>24</sup> Therefore, the key to success is 'developing and sharing an innovation culture' as the Green Paper on Innovation (European Commission, 1995, p. 1) points out.<sup>25</sup> This concerns the individual business as much as the wider innovation system. In this respect, the importance of relational capital (Capello, 2002; Capello & Faggian, 2005, p. 79) has been stressed for collective learning and regional organisation of economic restructuring.<sup>26</sup>

### ***The link between innovation and economic growth***

The link between innovation and economic growth has long been investigated, both theoretically and empirically. Undoubtedly, there is a clear general consensus that innovation drives productivity and in logical consequence economic development. As an example, the UK government (Department of Trade and Industry, 2003a, pp. iv and 8) has recognised innovation as 'the most important influences on productivity growth alongside changes in

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<sup>24</sup> Similar to parents, who try to oppose children's ideas and creativity if it changes the normal way to do things, businesses' dynamics often also suppress creativity. For this reason, Panse calls for less strategic communication and more emotional discussions, linked to the notion of children's leadership (Schamari, 2005).

<sup>25</sup> The European Commission's (1995, p. 1) Green Paper (discussion paper) on Innovation states in this respect the following: 'According to the dictionary, the opposite of innovation is "archaism and routine". That is why innovation comes up against so many obstacles and encounters such fierce resistance. It is also why developing and sharing an innovation culture is becoming a decisive challenge for European societies.'

<sup>26</sup> According to Capello & Faggian (2005, p. 79), *relational capital* is formed by public and private partnerships as well as explicit and implicit cooperation among actors within the relational space at local level.

skills and capital intensity’, and uses it as one of five drivers of productivity for their framework analysis of how to increase productivity.

Even though it may be hard to establish a clear direct link between innovation and GDP at the national level for instance (European Commission, 2005f, p. 22) – because ‘some forms of innovation may also only be partially captured in the EIS’ (European Innovation Scoreboard) and because ‘innovation is only one factor among other structural ones’ such as employment, education, skills and lifelong learning, regulation, taxation, and macroeconomic variables such as inflation, exchange rates etc., to name a few<sup>27</sup> – all in all, there is ample and sufficient empirical evidence in the literature (further cf. also Mairesse & Mohnen, 1995) to suggest a strong link between innovation performance - whether measured in R&D expenditure or patents - and productivity, which again is seen as key to economic growth<sup>28</sup>

*Focus on weaknesses of an innovation system may be more effective*

An interesting result from the 2005 European Innovation Scoreboard (EIS) published by the European Commission (2005f, pp. 6, 15 and 29-30) stems from the attempt of testing whether innovative capabilities are more likely to spill over from areas of strength to areas of

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<sup>27</sup> Other important issues in this respect are government deficits, inward investment and the role of multi-national companies (MNCs), the impact of EU enlargement and further consolidation of the Single Market as well as ‘the cost of non-Euro zone’. Latter is coined here as an allusion to the pre 1992 discussion of ‘The cost of non-Europe’ by the Cecchini report published by the European Commission (Commission of the European Communities, 1988), which exaggerately demonstrated possible economies of scale within a Single Market (cf. also Cecchini, 1988). Here, this phrase means the potential opportunity costs for the development of regions in countries having opted out or yet declined the participating in the Euro zone, namely the UK, Denmark and Sweden.

<sup>28</sup> This link between innovation performance and economic development serves as a policy rationale for supporting innovation by addressing obstacles and market failures that prevents innovation (cf. European Commission, 2005f, p. 21).

weakness, or whether it is more likely that weak area act as a ‘blockage’, thus preventing progress.

The correlation of the variance for seven composite indicators – the five dimension from the EIS plus data for innovation demand and governance from the EXIS report (Arundel & Hollanders, 2005)<sup>29</sup> - against the Summary Innovation Index (SII) for 21 countries shows (European Commission, 2005f, p. 30) that there is a statistically significant negative relationship, with innovation performance (SII) declining with the amount of variance in the seven sub-indices ( $R^2 = 0.84$ ,  $p < 0.001$ ). These results provide initial evidence for the assumption that an even performance on the various dimensions of innovation fosters the overall innovation performance.<sup>30</sup> In other words, ‘countries which show a below average performance on one of these dimensions as compared to the country’s overall performance [such as Germany, Denmark and the UK (ibid., p. 15)], might be in danger of hampered future innovative performance’ (ibid., p. 6). These results crucially imply that ‘policy would be more effective in improving overall innovation performance by concentrating on improving areas of weakness than on making further improvements to areas of strength’ as the EIS report points out (ibid., p. 30).

However, this point needs to be clarified here, as there is the risk of misinterpreting the implications to a general oversimplified policy message. While, on the basis of these EIS results, one has to agree that policy-makers should focus on the weak ‘dimension(s)’ of the innovation system, the results do however not imply the transfer of the same message to the

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<sup>29</sup> The EXIS report features an ‘Exploratory Innovation Scoreboard’ that complements the European Innovation Scoreboard (EIS). It is available online at [http://www.trendchart.org/scoreboards/scoreboard2004/scoreboard\\_papers.cfm](http://www.trendchart.org/scoreboards/scoreboard2004/scoreboard_papers.cfm)

<sup>30</sup> Please note that the variance is calculated after standardization to remove the performance effect (cf. European Commission, 2005f, pp. 6 and 29).

sectoral level. Hence, any interpretation of these results in the sense that policy-makers should focus on weak 'sectors' is vividly rejected. Addressing weak 'dimension' such as skills shortages is on the other hand advocated.

This standpoint is, however, in stark contrast to Nelson & Winter's (1977, p. 36) view, who argue that that the most important innovation policy issues concern making currently lagging sectors more progressive. Instead, here rather the opposite is advocated: to focus on the weak 'systemic' dimensions *and* on strong performing sectors that have the potential to 'innovate at the leading edge' (cf. von Hippel, 1988, p. 9) and stand the test of international benchmarking and reach world-class status, and as a result can form the core of a so-called future cluster

The reason for this argument is that these efforts could change competition conditions (from a focus of price competition to innovation) for these sectors and act as a spark for others (by spill-over effects). Whether in less-favoured regions (LFR) or in an already well-performing region, the key of policy has to be to enhance the framework conditions for businesses to reach excellence, while avoiding a more direct subsidizing of either declining or growing sectors.<sup>31</sup>

Yet, these objectives may not be to the liking of policy-makers and politicians alike. While, practitioners might favour not having to train and bet on a lame horse, so to speak, and relish potential credit for a success story, policy-makers and in particular politicians may disfavour such policy. In simplified and exaggerated generalisation, politicians often want to be seen as

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<sup>31</sup> While there is no argument for providing financial assistance for those latter growing sectors (apart from ensuring access to growth finance), subsidies to declining sectors are likely to fritter away and may - instead of spurring an innovation culture - create a subsidy culture, which expects continuous support of otherwise non-competitive industries.

the heroic, omnipotent saver who steps in at the last minute helping the poor, weak and needed, instead of being accused of giving money to the rich. In contrast, practitioners instead are perceived here as wanting to be seen as the maker, organiser, mover & shaker, string-puller and so on.

### ***From innovation to the link between Entrepreneurship and Economic Growth***

Innovativeness can further provide the necessary impetus for as well as be itself nourished from entrepreneurship within a given region. To illustrate this, one can first refer to the so-called *spin-out* or *spin-off* companies, which are defined as ‘a new company established to commercialise the knowledge and skills of a university, non-university research institute or corporate research team’ (Elle et al., 1997, p. 77; and cf. European Commission, 2002e, p. 23) Thus, entrepreneurship can be viewed in these cases as a kind of output of innovation activities too.

Secondly, in generalisation, new start-ups are often vibrant enterprises that are creative and therefore provide a source for innovations. According to the Austrian economist Joseph Alois Schumpeter (1883-1940), economic growth is based upon innovative activity that derives from entrepreneurs, who take risks and introduce new technologies and thereby stimulate economic activity. He famously labelled this conducive replacing of old technologies as a process of ‘creative destruction’ (Schumpeter, 1976b).<sup>32</sup> This idea of technological and business cycles was later further developed by Technology and Innovation Research (or so-called innovation theories) and Evolutionary Economics (cf. Cantner, 1995, pp.27-28).

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<sup>32</sup> Schumpeter’s elaboration of ‘The Process of Creative Destruction’ features in his book ‘Capitalism, Socialism and Democracy’ (1976a) that was first published in the USA in 1942. It can also be found in the excellent reader (reference collection) by Edquist & McKelvey (2000b, pp. 75-80).

Similar to innovation, entrepreneurship is also linked to economic growth. Yet, in addition, with reference to the literature review by Audretsch (2003), the Entrepreneurship Green Paper (European Commission, 2003f, p. 6) highlights that entrepreneurship not only contributes to economic growth but to job creation too (something with which innovation is not always directly attributed). Another empirical study to be considered here is the 2000 Global Entrepreneurship Monitor (GEM) report, which outlines the extent to which the level of entrepreneurship activity (Total Entrepreneurial Activity Rate) influences the growth rate of an economy and prosperity of a country given as the Gross Domestic Product (GDP) growth rate for 1999-2000 in constant prices (see Table 4.4 in Sternberg, Otten, & Tamásy, 2000, p. 17).<sup>33</sup> The research shows a positive relationship between entrepreneurship activity and economic growth with a correlation coefficient of 0.69 that is statistically highly significant.<sup>34</sup>

Above's reference to Coriat & Dosi's (1998b, p. 107) notion of 'virtuous circle' and 'vicious circle' concerning innovation can equally be applied to entrepreneurship. In this respect, one can flag out the typology of four regional growth regimes (see Table 2 below) provided by Audretsch & Fritsch (2002, p. 119).<sup>35</sup> According to their characterisation, high entrepreneurial activity turns a regions rather in an 'entrepreneurial growth regime' instead of a 'routinized growth regime' (i.e. Grabher's (1993b) mentioning of the 'locked-in' Rhine-Ruhr area); or makes a region a 'revolving door regime' (with a high degree of simultaneous entry and exit of businesses) instead of a 'downsizing regime' (for which the perhaps more fitting label of an

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<sup>33</sup> The data for GDP and Total Entrepreneurial Activity Rate were based on the GEM citizen surveys in the summer of 2000 as well as on the IWF World Economic Outlook Database of April 2000.

<sup>34</sup> The difference in the level of start-up activities explains around half of the goodness of fit ( $R^2=0.48$ ) of economic growth.

<sup>35</sup> Within the theory of growth regimes, the concept of the technological regime was extended 'from the unit of observation of the industry to a geographical unit of observation' as Audretsch & Fritsch (2002, p. 119) state themselves.. Therefore, this represents similarities with the extension of the product life cycle theory (from a microeconomic viewpoint) and of the theory of long waves or Kondratieff-cycles (from a macroeconomic viewpoint) to the geographical unit of observation (e.g. cf. the discussion of dynamic-cyclical approaches in Schätzl, 2001, pp. 209-221).

‘exit or closed door regime’ is suggested here). Hence, for less favoured regions, entrepreneurship can be a question of a revolving or a closed door.

*Table 2 Audretsch & Fritsch's typology of regional growth regimes*

<b>Type of regional growth regime</b>	<b>Enterprise structure</b>	<b>Entrepreneurial activity</b>	<b>Growth rate (relative), or <i>Employment</i></b>
Entrepreneurial regime	Turbulent	High	High
Routinized regime	Large, incumbent enterprises in stable industries	Low	High
Revolving door regime	Non-innovative industries	High	<i>Low</i>
Downsizing regime	Large, incumbent enterprises in declining industries	Low	Low

Source: Own creation based upon an article by Audretsch & Fritsch (2002, in particular pp. 115-116)

On the basis of their empirical evidence showing that eight out of the 13 regions identified as revolving door regimes of the 1980s (out of a total of 74 West German regions investigated) became entrepreneurial growth regimes in the 1990, Audretsch & Fritsch (2002, p. 119) rightly point to the likely positive long run effects of a high level of start-up activity. They in fact conclude that small firms and new firm start-ups ‘are the seeds of future growth’ (ibidem, p. 122) and accordingly ‘that regional policy should focus in promoting new firm start-ups’ (ibidem, p. 121).<sup>36</sup>

However, the otherwise neat article is unfortunately absent of a note of caution with respect to a policy focus on start-ups within revolving door regime regions. At least in the short run, there is an obvious danger for policy support to start-ups falling flat (cf. van Stel & Storey,

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<sup>36</sup> The European Commission (2001a) report on ‘Creating an entrepreneurial Europe’, for instance, outlines the EU measures of the Third Multiannual Programme to assist SMEs (1997-2000) regarding its objectives of ‘improving the framework conditions for SMEs’ and providing ‘support for businesses through various programmes and financial instruments to support SMEs’. The Third Multiannual Programme for SMEs has been succeeded by the Multiannual Programme for Enterprise and Entrepreneurship (2001-2005).

2002, p. 29), and thus wasting scarce financial resources, if they result in mainly funding the non-innovative entries established out of unemployment that have elsewhere been defined as ‘spin-in’ (Elle et al., 1997, p. 77) or ‘necessity entrepreneurship’ (Sternberg, 2002)<sup>37</sup>. As Audretsch & Fritsch (2002, p. 116) point out themselves, these types of start-ups are likely not to have a significant technological advantage and to produce for the regional market only, which only ‘crowd out local competition instead of creating additional employment in the region’.

Indeed, Armington & Acs (2002, p. 43) find little support for a positive impact of unemployment on new firm formation rates. Instead, in their analysis of data on firm birth for 384 US labour market areas in six industry sectors between 1991-1996 - from the new Longitudinal Establishment and Enterprise Microdata (LEEM) data base constructed by the Bureau of the Census -, Armington & Acs (2002, p. 43) conclude that variations in new firm start-ups are ‘substantially explained by regional differences in industrial density, population growth and income growth’, suggesting that market-size or agglomeration effects may be less important than other kinds of external economies. They also find ‘significant evidence on the importance of human capital on new firm formation rates’, thus rather emphasizing localized knowledge spillovers than economies of scales.

However, Sternberg (2002, p. 30) points out that despite recent papers reporting positive relationship between the level of entrepreneurial activity and subsequent employment growth in West German regions (Audretsch & Fritsch, 2002) and, similarly, in British regions (van

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<sup>37</sup> Please note the notion of ‘necessity entrepreneurship’ was made by Professor Rolf Sternberg during his presentation at the Regional Studies Annual Conference on 21.11.2002 entitled ‘Entrepreneurial Climate, Economic Performance and New Firm Policy in German Regions’ and while it features in the draft full paper, it does not appear within the conference proceedings of his paper (Sternberg, 2002) published by the Regional Studies Association (Hardy, Larsen, & House, 2002).



Stel & Storey, 2002), there are nevertheless controversial empirical results regarding the impact of start-ups on regional development, exemplary referring to the discussion by Verheul et al. (2002).<sup>38</sup>

In this respect, David Storey also questions the marginal effectiveness of ‘further’ start-up initiatives when start-up rates are already at high levels, as such in the UK and Germany (which are even higher than in the US.<sup>39</sup> He also points out that according to recent research (Carree, van Stel, Thurik, & Wennekers, 2002) the correlation between GDP figures in 23 OECD countries and the level of start-ups remains only modestly positive correlated (in particular if you would exclude Luxembourg and Ireland), with Japan for example having one of the lowest start-up rates while actually having a similar GDP growth in that time period as the UK.

In addition, Storey points out further difficulties of start-up policy initiatives, such as the necessity of clear objectives, a long-term approach and a focus on ‘special groups’ as well as the difficulties of identifying good practice for this sort of policy. This is also supported by Feldman, Francis, & Bercovitz (2005, pp. 138-139) who claim that government policy focused on the creation and replication of entrepreneurial clusters are bound to fail. Hence, for Storey, support for established SMEs should not be neglected.<sup>40</sup>

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<sup>38</sup> Confer also van Stel & Storey (2002, pp. 4-5), who also refer upon some empirical studies that have adopted different approaches and yielded different results concerning the relationship between ‘entrepreneurship’ and ‘economic success’.

<sup>39</sup> The author is grateful to Professor David Storey of Warwick Business School who raised this issue during his presentation entitled “Why more firms?” at a conference entitled “Cluster Policies and Local Enterprise: Benefits to You”, held on November 28<sup>th</sup> 2002 by the Mercia Institute of Enterprises as part of the EnterpriseFest 2002 at the European Research Institute at the University of Birmingham.

<sup>40</sup> Presentation given by David Storey of Warwick Business School entitled “Why more firms?” at a conference entitled “Cluster Policies and Local Enterprise: Benefits to You”, held on November 28<sup>th</sup> 2002 by the Mercia Institute of Enterprises as part of the EnterpriseFest 2002 at the European Research Institute at the University of Birmingham.

Overall, this thesis takes the view that innovation and entrepreneurship are to some extent interlinked and that entrepreneurship is also a positive contributor to economic growth. Policies for the support of entrepreneurship, however, have to take the regional idiosyncrasies carefully into account.

### **The innovation process**

The innovation process was long analysed as a *black box* (Rosenberg, 1982) i.e. ‘a system containing unknown components and processes’ (Kline & Rosenberg, 1986, pp. 278-279).<sup>41</sup> The *linear model* of innovation (cf. Kline & Rosenberg, 1986, pp.285-288; Klotz, 2003, p. 23; Schätzl, 2001, pp. 115-116) that emerged after World War II viewed innovation as continuously running process subdivided into the following rough, chronological phases, which together represent the sequence of the innovation process: research, invention, innovation, and diffusion (latter comprising imitation and adaptation).<sup>42</sup> By this view, the individual phases became much more transparent and the technological innovation process as a whole lost its character of a ‘*black box*’, as Pfirrmann (1991, p. 64) puts it.

By the 1980s, the stringent linear model was advanced by Kline & Rosenberg’s (1986, pp. 289-294) *chain-linked model*, which made the relationship between the different phases more interdependent by including feed-back loops and links through accumulated knowledge and research. This paradigm - present up to the 1990s - was more a ‘holistic’ view of innovation and featured already a reference to the ‘systems nature’ of research (ibidem, p. 292).

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<sup>41</sup> The article by Kline & Rosenberg provides actually a neat overview on innovation, of which a copy can also be found in the reader (reference collection) compiled by Edquist & McKelvey (2000b).

<sup>42</sup> Most frequently, one finds the differentiation of three phases for the linear model: invention, innovation, and diffusion, though Kline & Rosenberg (1986, p. 286) render this conventional model - which was the paradigm since World War II up to the 1980s - as a succession of research, development, production, and marketing.

The chain-linked model was superseded by the integrated and enlarged *systemic approach* of innovation, which recognizes the complex nature of innovation. It is now widely accepted that ‘innovation is systemic rather than linear’ ([European Commission], 2002, p. 3). ‘Systemic’ means that the innovation process is nowadays seen to be inter-disciplinary and multidimensional, e.g. in terms of competences, people, finances, and time. Thus, to grasp the innovation process, one looks not just at the individual entrepreneur or business but at the entire ‘system of innovation’, which may, for example, involve knowledge transfer and include businesses’ external linkages to other economic actors such as universities and so on.

The complexity and uncertainty of innovation activities favours a joint collaborative approach of formal organisation towards innovation that bundles different competences in research or innovation teams or networks instead of efforts by individual innovators (cf. Dosi, 1988, p. 223). Broadly following DeBresson & Amesse’s discussion (1991, pp. 367-368), there are the following three rationales for such cooperation:

Firstly, innovation activities often require considerable financial investment over a longer period of time, while facing ‘strong technical and market uncertainties’ (DeBresson & Amesse, 1991, p. 367) and volatility.<sup>43</sup> This is because innovation is ‘inherently stochastic’ and encompasses ‘considerable institutional complexity and variety’, as Nelson & Winter (1977, p. 115) highlight. Networking thus enables businesses to pool their resources and to share risks and costs.

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<sup>43</sup> The Collins Dictionary of Economics (cf. ‘innovation’ entry in Pass et al., 1993, p. 261) names photocopying as an example of an innovation that has been a lengthy and expensive process. In this case, it took Xerox 10 years further development to launch a first commercial product following their invention of the photocopying process in 1948.

Arguably more important, though, is the second rationale, which concerns the complexity or ‘systems dimension’ of the involved cutting edge technologies, processes or concepts – which requires diverse and multiple sets of complementary competences and skills from different disciplines.<sup>44</sup> A collaborative approach such as networking means the bundling of competencies – which is of particular relevance for SMEs that sometimes may not have a critical mass of their own to carry out innovation activities.

As a third sources and causes for networking, DeBresson & Amesse (1991, p. 368) identify the economic incentive of likely ‘super-additive gains’ from the new collaboration of actors. They labelled these joint innovative profits from this positive-sum game as the quasi rents of ‘inter-preneurship’.

A prerequisite for reaping the benefits is, however, the effective and efficient functioning of such networks. A status report of results from innovation studies ([European Commission], 2002, p. 3) points out in this respect that well functioning innovation systems ‘may have technical components but, above all, are networks of individuals.’

Accordingly, the systemic approach must take account of interactions and dynamics of interpersonal relations – including the possibility of opportunistic behaviour – as well as the relevance of the institutional framework conditions.

In this respect, Capello & Faggian (2005, pp. 79 and 85), for example, have pointed out that cultural as well as social proximity as the basis of relational capital matters in promoting

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<sup>44</sup> One may only think only of the example of the automotive industry, where mechanics meet electronics, electrics etc.

innovation. They demonstrated that relational capital (measured via collective learning channels) affects the innovation activity of firms positively. Consequently, the proximity of actors is regarded as favouring networking and thus the innovation process, due to the peculiarity of learning, knowledge transfer and knowledge spillovers.<sup>45</sup>

As part of his contribution to the national systems of innovation approach, Johnson (1992, p. 33) provides a good overview of the relations between learning, knowledge and innovation (see Figure 1 below). It builds upon the earlier understanding of different types of learning (cf. Cooke, 1998, pp. 12-15; Koschatzky, 1999, pp. 737-738; Malecki, 1997, p. 59) that comprises the stages of learning-by-doing (Arrow, 1962a), learning-by-using (Rosenberg, 1982), and learning-by-interaction (Lundvall, 1988); for latter of which Johnson presents the forms of producing, searching, and exploring.<sup>46</sup>

Johnson's figure below disregards feedback loops and interdependencies only for the reason of simplification (1992, p. 33). It still clearly shows that innovation is an endogenous process and it also makes the case for continuous re-learning (or 'remembering-by-doing') in order to prevent the stock of tacit knowledge from deteriorating due to forgetting.<sup>47</sup> More importantly for the systems of innovation' approach, Johnson illustration also stresses that these complex relations are all shaped by institutional factors.

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<sup>45</sup> This point also represents one of five key messages from the 2002 status report ([European Commission], 2002, pp. 2-3), which summarised the latest results that emerged from 20 'innovation policy studies' edited up to 2002 by the Commission's Directorate-General for Enterprise.

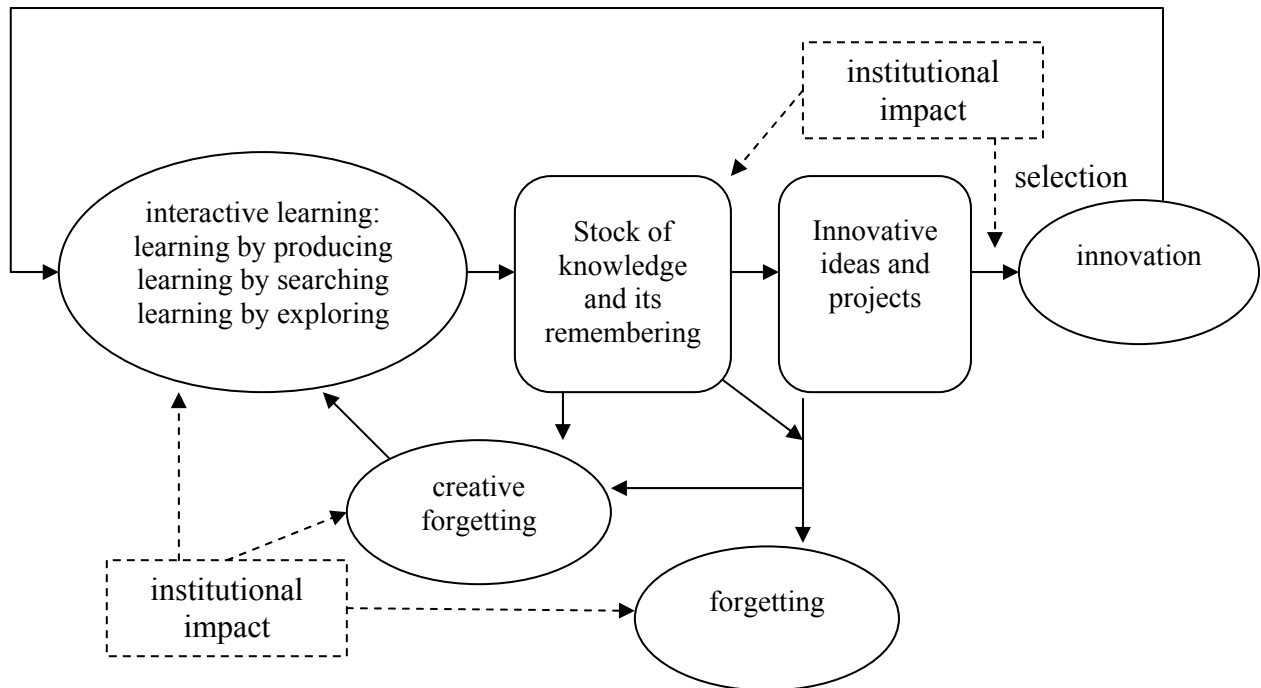
<sup>46</sup> In her brief explanation of the 'learning organisation', Bund (1998, p. 41) differentiates between individual and organisational learning processes, where latter is characterised by *single-loop-learning* (that changes behavioural patterns), *double-loop-learning* (which also changes thinking patterns and values), and *deutero-learning* (that improves learning capabilities, that is learning how to learn). Of relevance here is that the double-loop-learning requires the capability of creative organisational forgetting from members of an organisation in order for the organisation to remain flexible and adaptable. In addition, more types of technological learning are listed, for example, by Malecki (1997, Table 2.3 on p. 59).

<sup>47</sup> Knowledge is generally classified (cf. Warrian & Mulhern, 2005, p. 163) into codified (i.e. know-why, know-what) and tacit knowledge (i.e. know-how, know-who).

As a consequence, the advanced form of learning-by-interaction (and cooperative networking) can evolve to a superior reflexive stage close to Stiglitz' (1987) notion of learning-by-learning (cf. Cooke, 1998, p. 13). If this is the case, the learning process is then embedded in a systemic integration approach in which the partnership model can be described as 'associative' (Coleman, 1997; Cooke & Morgan, 1998; Hirst, 1994) towards enhancing the commercial community, and where institutional monitoring has become part of the system (Cooke, 1998, p. 13). Accordingly, such economic systems have been labelled as 'learning economies' and learning regions' (e.g. Florida, 1995; Gertler, Wolfe, & Garkut, 2000; Hassink, 2001; Hudson, 1999).

The FP5 funded CRITICAL project (Charles, 2007) defines a *learning city or region* as one 'that creates and supports institutions and social structures that invest in cooperation and learning between and within organisations, and has learning at all levels, the individual, the network of organisations and the societal level' (The CRITICAL team, 2007, p. 10). They further specify that it is thus 'a place encouraging civil society to participate in learning, defining the strategy of *how* learning is provided' (ibid., p. 11). This may involve so-called *communities of practice* which is defined by Wenger and Snyder (2000, p. 139) as 'groups of people informally bound together by shared expertise and passion' with the primary output being knowledge.

Figure 1 The relations between learning, growth of knowledge and innovation



Source: Johnson (1992, p. 33)

This thesis investigates in particular the role of institutional actors as influencing factors to economic change. This focus is to be seen in this respect on changing perceptions, which may entails efforts towards a new vision, the realisation of lock-in, an analysis of the status quo and shortcomings, external independent advice, and a consensus on the way forward between the main actors within the economic system.

‘Innovation is considered as an interactive, cumulative, and path-dependent process, unfolding along technological trajectories (Arthur, 1994; Dosi, Freeman, Nelson, Silverberg, & Soete, 1988)’, thus also being a ‘historic and geographical process having a structure both in time and space (see also Capello, 1999)’ – as Tödtling (1999, p. 693) summarises (similarly to Morgan, 2001a, p. 6).

The thesis turns to consideration of the rationale for the growing focus on the region.

## CHAPTER 3

### THE RESURGENCE OF REGIONS

Linked to the emergence of innovation at the forefront of academic research and policy focus for regional economic development is the increasing importance that is given to the concept of the region. This chapter looks at regionalisation and regional governance. It argues that the region is *the* location to drive innovation as innovation is viewed here as being ‘geographically localised’. Therefore, it elaborates the rationales behind the ‘resurgence’ of the region including those that led to a ‘geographical turn’ in Economics.

#### **The concepts of region, regionalisation and regionalism**

The term *region* is ambiguous as it is used for supranational, national and subnational territorial areas alike, even though it is probably mostly used for supralocal geographical areas that are bigger than urban areas (Schätzl, 2001, p. 99) and less than the state in which it exists (Cooke, 1997, p. 354).<sup>48</sup> The ambiguity is illustrated by Blotevogel (2000, p. 496) description, who sees the region as a ‘multi-dimensional semantic field’ with ‘fuzzy edges’ and ‘multi-dimensional meaning’ (cf. Herrschel & Newman, 2002, p. 13). Its definition very much depends upon the problem one encounters (Jovanovic, 1997, p. 292) and hence there is ‘no general understanding of how to define a region (Harvie, 1994)’ as Cooke & Memedovic (2003, p. 3) write (and cf. Lovering, 1999, p. 383). A region is basically an geographical area that in terms of at least one specific feature (i.e. geographical, functional, social or cultural reasons) is considered as a unit (Collins, 1994, p. 1305). Accordingly, delimitations of regions

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<sup>48</sup> The different size of nations and regions add to the ambiguity of the concept of a region. For example, a German federal State such as North Rhine-Westphalia is regarded – here and elsewhere – as a region, even though in terms of population and economic output it is equal to countries such like Australia and the Netherlands.



often differ depending on which is highlighted: the homogeneity, e.g. in terms of per-capita income (cf. Jovanovic, 1997, p. 292); the functional relationships and thus intraregional interdependencies (A. J. Scott & Storper, 2003, p. 580); or the political and administrative planning unit of regions (cf. Schätzl, 2001, p. 99).<sup>49</sup> Martin (1999, pp. 77-78) has criticised the lack of consideration of ‘how “regional” and “local” economies can be meaningful conceptualised, and how such conceptions can be translated into empirical terms’. He condemns the ‘cavalier’ treatment of space and place by adding that ‘[i]nstead, there is an ontological slippage between regions as abstract points and spaces [in the mathematical models], on the one hand, and the uncritical use of whatever administrative units happen to be convenient for illustrative and empirical purposes on the other.’

Accordingly, the term region has different interpretations and its conceptualisation also found different applications, for example, with the two derived terms of regionalisation and regionalism (cf. Barter, 2000, paragraphs d. and 2.7 on pp. 5 and 14; Collins, 1994, p. 1305; Cooke, 1997, p. 354), which are briefly introduced here.<sup>50</sup> *Regionalisation* describes the top-down process of creating regions and regional governance, which can either take place in

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<sup>49</sup> Scott & Storper (2003, p. 580) define the term region as ‘any area of subnational extent that is functionally organized around some internal central pole’. Furthermore, regions can also be differentiated in terms of their institutional environments in the framework of evolutionary economics, as Boschma (2004, p. 1005) indicates with his definition of the ‘region (at whatever spatial level) as a meaningful and relevant entity that affects the behaviour and performance of local organizations’. Cooke (1998, p. 15) also states that ‘[c]onceptually, regions are often defined in terms of shared normative interests (cultural areas), economic specificity (mono-industrial economies) and administrative homogeneity (governance areas). To these may be added such criteria as non-specific size, except that of being subcentral in relation to its host state; identifiable homogeneity in terms of criteria such as geography, political allegiance and cultural or industrial mix; ability to be distinguished from other areas in terms of these criteria; and possession of some combination of internal cohesion characteristics.’ In his introduction of the concept of regional innovation systems, Cooke (1998, p. 16 ) actually defines ‘regions in terms of a system of collective order’ similar to A.J. Scott’s (1998a) discussion, and ‘as subcentral administratively and cohesive culturally, and in terms of political economy’ (ibid., p. 24 ).

<sup>50</sup> Please note though that the meaning of these terms here need to be distinguished from the terminology used in other disciplines. With regards to international relations, for example, *regionalisation* refers to the concentration of international transactions between national entities in terms of trade, migration, communication and so on, while *regionalism* defines the institutional amalgamation of states to supranational entities for a particular or more fields of policy, mainly trade (Hummel & Menzel, 2004, pp. 422-423). Accordingly, the term *regionalism* is also defined as ‘preferential trade agreement among a subset of nations’ (Bhagwati, 1993, p. 22) and thus contrasts the terms of nationalism (or re-nationalisation) and globalism (globalisation).

form of a devolution of political power and administrative responsibility to self-governing autonomous regional states ('political regionalisation') or - tentatively weaker - 'only' as a functional decentralisation with a re-allocation of administrative resources to regional bodies, which fulfil a co-ordinating or administrative role ('regional decentralisation').<sup>51</sup>

Regionalisation and regional governments vary greatly internationally and range between the two extreme forms of '*unitary states* (with, at most, central administrative functions undertaken at the regional level), to '*federal states*, where regions have budgetary and legislative powers and directly elected parliaments' (Barter, 2000, paragraph 2.7 on p. 14, emphasis added, and cf. Table 1 and 2 on pp. 33 and 35). Cooke (1997, pp. 354-355) describes regions in general as *weak* when they either operate 'in a *laissez faire* or nightwatchman state' such as contemporary USA, or in a unitary '*dirigiste* state like contemporary France or England', while he views regions or regional governments as *stronger* which operate in states 'where centralized sovereignty and hierarchy are low'. Latter includes the contemporary German *Länder* that are characterised as heterogeneous, competitive and pluralistic, as well as homogeneous regions that are characterised as associational and well networked, such as Catalonia in Spain.<sup>52</sup> However, there can also still

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<sup>51</sup> Barter (2000, paragraph 2.7 on p. 14) reiterates the broad dichotomy between 'regional decentralisation' and 'political regionalisation' referring to the Council of Europe (1998). Cooke (1997, p. 354) defines *regionalization* as 'the delimitation of a supralocal territory by a superordinate political body'. This process can either take place in form of 'devolving functions down or transferring responsibilities upwards' (cf. Barter, 2000, paragraphs 3.8-3.10 on pp. 22-23 and 6.8 on p. 36). In other words, this means that some administrative responsibilities or powers are either taken away from the supraordinate (e.g. national) level or from the local level (cf. Morgan, 2002, pp. 805-807). Keating (1998, p. 2) instead labels the political and administrative decentralization by the state as 'top-down regionalism', as opposed to the bottom-up regionalism, which stems from pressures from below.

<sup>52</sup> In this respect, Cooke provides (1997, pp. 355-356) the Four Motors Regions of Lombardy, Rhône-Alpes, Baden-Württemberg, and Catalonia as regional examples (in this respective order). Cooke's four-fold typology of conceptualisations of regions (1997, see Figure 1 on p. 355) is somewhat similar to the typology of forms of regional government presented by Barter (2000, see Table 1 on p. 33 and Table 2 on p. 35), who distinguishes between federal states with wide-ranging powers; regionalised states with advanced powers (political regionalisation); devolving unitary states with limited powers (regional decentralisation); and finally classic unitary states with no powers (latter meaning 'regionalising without creating a regional level').

exist important intrastate differences between regional governments (cf. Keating, 1998, p. 8). While, for example among the German *Länder*, Baden-Württemberg is seen to be more centralist, North Rhine-Westphalia is reported to regard regional policy more a sub-Land matter (Sturm, 1997).

Correspondingly, *regionalism* describes the rather bottom-up advocacy, ideology or political call or for such a process of creating regions and regional autonomy. The term does therefore refer here also to ‘regional patriotism’ (Collins, 1994, p. 1305) and separatist endeavours at the sub-national level, such as in the Basque country, Catalonia, Corsica, Scotland, Lombardy, Quebec and so on (Hummel & Menzel, 2004, pp. 422-423).

### ***Distinguishing regional governance from government***

In this context, a distinction has also to be made between government and governance, used here mostly for the regional level. In contrast to the traditional notion of formal institutions of government, *governance* is understood here as a wider concept, which comprises the government sphere - of control, exercising political authority, or the action governing, political rule and administration (cf. Collins, 1994, p. 669) - but also goes beyond it by including the wider collective actions within flexible, self-regulating networks of actors from public-private partnerships, associations and so on (cf. Barter, 2000, paragraph 2.4 on p. 13; Herrschel & Newman, 2002, pp. 12-13; Keating, 1998, p. 3). According to Le Galès & Voelzkow (2001, pp. 5-6), “[g]overnance” refers to the entirety of institutions which co-ordinate or regulate action or transaction among (economic) subjects within an (economic)

system (Hollingsworth & Boyer, 1997b; Hollingsworth et al., 1994; Streeck & Schmitter, 1985)'.<sup>53</sup>

### **The rise of regional governance**

Overall, international evidence shows that there has been both 'a rise of regional governance' and an 'emergence of regional government' (Barter, 2000, paragraphs 2.4 on p. 13, 6.8-6.9 on p. 36 and cf. 1.3 on p. 11). Arguably, one of the most prominent examples is the UK with the devolution of political powers (political regionalisation) in Scotland and Wales and administrative regional decentralisation in England with the incremental creation of Government Offices (GOs), Regional Development Agencies (RDAs) and Regional Assemblies.

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<sup>53</sup> There are, however, several distinct definitions of the concept of governance in the various fields of social science. Rhodes (1996, p. 652) has, for example, identified six different meanings: 'the minimal State, corporate governance, new public management, good governance, social-cybernetic systems and self-organised networks'. In comparison, for instance, [*European*] "Governance" means rules, processes and behaviour that affect the way in which powers are exercised at European level, particularly as regards openness, participation, accountability, effectiveness and coherence' - according to the European Commission's (2001b, p. 8) White Paper on European Governance. Even though that these *principles of good governance* are outlined with particular regards to *European* Governance, it was actually stressed that they 'apply to all levels of government - global, European, national, regional and local' (European Commission, 2001b, p.10). These five principles are further linked to the three *fundamental principles of the European Union*, namely the principles of conferral, subsidiarity and proportionality, which ought to be considered before launching any European initiatives (European Commission, 2001b, pp. 10-11). See also the European Commission's website on 'Governance' in this respect at [http://europa.eu.int/comm/governance/index\\_en.htm](http://europa.eu.int/comm/governance/index_en.htm)

These three fundamental principles are enshrined in Article 5 of the Treaty establishing the European Community. The Treaty states that from conception to implementation of policies, the European Union 'shall act within the limits of the competences [or powers] conferred upon it by the Member States' (*principle of conferral*) as well as that the appropriate level at which action is taken (from EU to local) and the appropriate instruments in proportion to the objectives must be selected. To elaborate on the latter two, this means that the European Union shall act 'only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States' but can rather 'by reason of the scale or effects of the proposed action, be better achieved' at union level (*principle of subsidiarity*, see also footnote 56). Further, it means that the content and form of Union action 'shall not exceed what is necessary to achieve the objectives of the Treaty' (*principle of proportionality*).

### ***The rationale behind the rise of regionalisation***

There are a number of reasons given in the literature for the resurgence of the region and the call for regional government. Supporters of the thesis of the re-scaling of the nation-state such as Marks (e.g. Marks, Hooghe, & Blank, 1996) and Hooghe (1995) postulated the emergence of a system of multi-level governance (MLG) with overlapping spheres of political control at the various spatial levels (local, regional, national, supranational) in the wake of progressing globalisation and European integration, which provided sub-national authorities with a new set of opportunities (cf. Giordano & Roller, 2003, pp. 912-914).<sup>54</sup> While Giordano & Roller (2003, p. 913) identify these ‘windows of opportunities’ (cf. also A. J. Scott, 1998b, p. 392) within the economic, institutional and political spheres, Barter’s review (2000, section f on p. 6 and paragraphs 2.11-2.35 on pp. 15-20), for example, rather identifies four underlying key arguments (together with counter-arguments) for developing a regional tier of government: democratic arguments, economic imperative arguments, European imperative arguments, and technocratic (functional) arguments.<sup>55</sup> These arguments partly cut across the different spheres and are briefly covered below - starting with the democratic or political rationales behind regionalisation.

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<sup>54</sup> Rodriguez-Pose (2001, p. 27) describes the greater complexity of multiple governance levels strikingly as a Russian Doll. He subtly states the following: ‘Different territorial levels of economic and institutional governance are like a Russian *matriushka*, with local levels of governance embedded in regional, and these, in turn, in national and supranational levels. All are interdependent and interrelated.’

<sup>55</sup> The author wants to recommend the well-balanced preliminary literature review on the potential form, and remit, of ‘Regional Government in England’ compiled by Wendy Russell Barter from the Local & Regional Government Research Unit at the Department of the Environment, Transport, and the Regions (DETR) as a useful starting point for further study into this debate. The review (Barter, 2000) was published by the DETR in 2000 and is available online directly at <http://www.local.detr.gov.uk/research/data/review.pdf> via <http://www.local.detr.gov.uk/research/research.htm> or <http://www.local.detr.gov.uk/research/regngovn.htm> .

### *The democratic or political arguments for regionalisation*

First of all, regional differences in identity, tradition, and needs and subsequent regionalism are the obvious arguments for creating a regional forum of expression and democratic reflection below the national level (cf. Barter, 2000, paragraphs 2.14 and 2.18 on pp. 15-16). However, the drive for regionalisation does not nor has to only come from regionalism. Indeed, sometimes regions or regional governments are even created without consideration of the *demos*, or the existence of a coherent regional identity (cf. Barter, 2000, paragraph 4.3 on p. 28). Artificially created regions such as the German *Land* of North Rhine-Westphalia have shown that, despite the lack of a pre-existing regional identity, they can maintain a coherent modern political identity. Hence, a regional identity is not necessarily a pre-requisite to regionalisation (ibid., paragraph p. on p. 8).

Still, among the most common arguments put forward for political regionalisation (and consequent devolution of administrative responsibility) are that regional governments are more likely and suited to deliver better *governance*, especially in terms of more ‘accountability, democracy and greater efficiency’ (cf. Barter, 2000, paragraphs 2.15 on p. 16; Straw, 1995). Jones (1988, p. 5), however, sees regional government as having the potential to weaken the role of municipalities and therefore it does not represent ‘genuine decentralisation’ but rather centralism in disguise (cf. also Barter, 2000, paragraph 2.17 on p. 16; Morgan, 2002, p. 805).

### *The European-led push for regionalisation*

Linked to the democratic arguments in favour of devolving decision-making to the regional level is the so-called ‘European imperative’ (Barter, 2000, paragraphs f on p. 6 and 2.30-2.32 on pp. 19-20). At supranational level of policy-making and implementation within the EU, regional governance is to be seen as a requirement under the principle of subsidiarity<sup>56</sup>, while regional governments appear to be the favoured interaction partner of the European institutions in an envisaged rhetoric of a ‘federated “Europe of the Regions”’ (Amin, 1993, p. 278).<sup>57</sup> This European-led push for regionalisation concerns most notably the access and control of regionally-steered programming, implementation and administering of the EU Structural Funds’ regional assistance - in particular of its European Regional Development Fund (ERDF).<sup>58</sup>

However, the impact of regional influencing of EU decision-making remains marginal (cf. also Barter, 2000, paragraph 2.31 on p. 19), or limited at best, since the national level retains its dominance. With respect to international relations in general, and the contested sphere of implementing EU regional policy in particular - especially within the UK - Bache (1999, pp. 28-29) describes the role of central governments as that of an ‘extended gatekeeper’, thus

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<sup>56</sup> The *principle of subsidiarity* (see also footnote 53) stands for the principle of devolving decisions to the lowest appropriate level. The principle has its origins in the social doctrine of the Roman Catholic Church, according to which all social bodies exist for the sake of the individual so that what individuals are able to do, society should not take over, and what small societies can do, larger societies should not take over (Collins, 1994, p. 1538). Within the EU, this principle is enshrined in Article 5 of the Treaty establishing the European Community, which will become Article I-11 of the European Constitution, if entered into force (see the current and proposed legal texts, which are available at <http://www.eur-lex.europa.eu/en/treaties/index.htm>).

<sup>57</sup> Besides defining the term *Europe of the regions* as ‘to encourage regional independence’ and referring to regionalisation, Amin (1993, p. 279) also provides the alternative interpretations of ‘encouraging regional cultural diversity’ and ‘eliminating regional economic disparities’. In his paper, Amin (1993, p. 293) actually concludes that the ‘Brussels vision of a return to regional economies will remain an illusion’.

<sup>58</sup> Bache (1999, p. 35) points out that the ‘creation of regional partnerships for the administering of the Structural Funds in 1998 was an attempt by the European Commission’ – even though rather unsuccessfully as he argues with regards to the UK – ‘to empower subnational actors at the expense of national government domination over the implementation process’.

taking an intergovernmentalist position. As a result, he opposes Gary Marks' (e.g. Marks et al., 1996, p. 342) pluralist concept of 'multi-level governance' by instead suggesting rather the mere presence of 'multi-level *participation*'.<sup>59</sup>

### *The drive for better governance*

The European-led drive to regionalisation does not only stem from the argument for more democratic governance but also from the 'separate demand for more effective governance' - which it is 'all too often confused with' (Morgan, 2002, p. 804). At the core of this demand lies the understanding that the intermediate tier of regional government, or otherwise strengthened regional governance structures, 'will empower regions to pursue their own development goals' (Amin, 1993, p. 279) and the belief that this is the best option in terms of efficiency and effectiveness. This view prevails even though the consequent interregional competition may come with some potentially counter-productive effect with regards to regional inequality as already 'winning' regions are likely to be better prepared and endowed for the competition (cf. Barter, 2000, paragraphs 2.27-2.28 on pp. 18-19).<sup>60</sup>

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<sup>59</sup> Even though the nation state may yet remain dominant (at supranational level) and the proclaimed 'death of the nation state' by functionalists (cf. Meyers, 2004b, p. 508) be exacerbated, the argument that some of the classical national state functions have become eroded and the traditional concepts of state and nation have begun to change and fade can hardly be disputed (cf. Marks et al., 1996, p. 371). This is the result of ever closer and complex international relations and consequently overlapping network of international and transnational organisations (e.g. with the accelerated process towards European Integration). Among others, Charles, Perry, & Benneworth (1996, p. 5) have recognised, for example, the shift towards multi-scalar science policy in the UK context. They rightly point out that science policy is no longer solely a matter of national policy but of regional and supra-national (e.g. EU) policy too.

<sup>60</sup> Not only may the different regional endowments and readiness for global competition become more transparent but also the apparent overall *aim conflict* at superior levels between the diverging objectives of balancing disparities (and helping less favoured regions catching up) on one side, and supporting advancing growth centres (which are in global excellence competition with the USA and Japan for example) on the other.



On the other hand, the local level is also seen as not being suitable to drive economic development. Instead, the regional level is advocated in performing the ‘brokerage role’ (cf. Barter, 2000, paragraphs f on p. 6 and 2.29 on p. 19). Supposedly, larger-scale regional authorities are functionally better endowed with the necessary competencies (than local authorities) to deal with the complex cross-cutting issues of strategic functions that, for example, are linked to economic development. Parr (2005, p. 556) also declares that the city too ‘is becoming something of an outmoded entity’, which ‘is emerging as an inappropriate unit, both for analysis and for local administration/government, in as much as it no longer adequately reflects the underlying structure of economic and social organization’.<sup>61</sup> The traditional economic rationale for considering the city (or urban agglomeration) as a key locus (e.g. for its localization advantages as elaborated in the next section) is hence apparently becoming insufficient.

In theory, this should facilitate the capacity and flexibility to adjust to economic and social changes and to create decentralised innovative capacity (cf. Barter, 2000, paragraph 2.24 on p. 18; Morgan, 2002, p. 801). In line with the innovation systems theory which is discussed later (from p. 82 onwards), Barter (2000, paragraph 2.24 on p. 18) point out that ‘[e]mpirical evidence suggests that institutional capacity – the extent and form of regional organisations – plays an important role within the economic development trajectory of regions.’

However, it is important to stress that regional governance structures are one important influencing factor, but it is far from being a sufficient one (cf. Barter, 2000, paragraph 2.26 on

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<sup>61</sup> Parr (2005, p. 556) elaborates this point with reference to Senior (1966) by stating that the city ‘boundary, even if generously drawn, has lost much of its former significance, particularly with respect to the functioning of the housing market and the labour market, as well as the spatial structure of private and public service provision’.

p. 18; Morgan, 2002, pp. 801-804). For once, other regions may attempt to imitate successful structures, but foremost, at the end of the day, it is businesses that create economic development not policy, which can only support it.

### *Governance versus government*

Finally, while the above stated arguments provide for a clear rationale for regionalisation, the case for regional government as opposed to regional governance remains at least contested. Here, the view is nevertheless taken that there is a value-added by the creation or existence of an intermediate level of regional government, despite the doubts raised by Jones (1988). Some benefits could stem, for example, from the added accountability and from the at least potential disadvantages of *governance*, which according to Keating (1998, p. 8) ‘represents a poorly structured space in which those interests with a minimal of organizational capacity have a huge advantage over other social interests, with no organizational capacity at all (cf. Stone, 1989).’

However, this thesis argues that the key to strategic planning and business superstructure being efficient, effective and innovative, rests not solely with government, but in contrary is mostly distinguished by the dynamics within the wider institutional framework of governance, both at regional and local level. The extent and peculiarities of the institutional diversity and interactions and its effects form the core of later discussions below.

### ***New Regionalism and the regionalisation of policies and institutions***

The rise of regionalisation is very much linked to the resurgence of interest in conceptualising economic development at the regional level. Both can actually be seen as mutually reinforcing parallel trends. One provides the incentive or argument for the other, and they both should be viewed in each other's context.

While the arguments presented in the previous section may serve as practical political justifications for demanding or initiating a process towards regional governance (including economic development policy), the following section instead provides arguments in favour of (re-)considering the region as the key locus for analysing economic development – mainly stemming from the concepts of the New Economic Geography. If one agrees with such an argumentation of a hierarchy of regional economies, or in other words believes that understanding how the economy works is best conceptualised at the regional level, then this *can* serve too as an argument for regional governance and as regarding the region as a level of economic policy-making (Storper, 1995, p. 192). To explain this 'new regionalism' (Lovering, 1999), if most of the determining factors for economic growth are seen to be at regional level, then it *can* consequently also be argued that economic development policies – if advocated - should intervene and be governed at the same level.<sup>62</sup> Yet, the emphasis is placed upon 'can argue' as this proposed implication contains some complacency of a 'normative bias' (cf. Keating, 1998, pp. 3-4; Lovering, 1999, p. 380) which forms part of the critique brought forward against 'new regionalism'.

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<sup>62</sup> In contrast, Lovering instead argues the other way, that theory was misled by policy

For instance, Lovering (1999) has provided - what can only be called - a *ferocious attack* on 'new regionalism' and some its advocates.<sup>63</sup> He regards (ibid., p. 390) the growth of New Regionalism in large parts as a response to the rise of a 'new regional service class' and 'symbolic analysis' of issues in particular regions (e.g. Wales), hence suggesting that theory was [mis]led by policy (cf. also Lagendijk, 2001, pp. 151-155) – as his article's title hints.<sup>64</sup> He illustrates this with a vivid though singular account of the impact that the 'catchy tunes' of a Cardiff Conference (subsidized by the marketing endeavours of economic development organizations and policy-makers to talk up their region) had on the empirical error of subsequent reporting of an allegedly successful Welsh 'economic transformation'.

The subsequent reaction or response on the policy side to the conceptualisations of regional economic development can be regarded as the third 'regional shift' besides the political (governance) shift and the conceptual shift to be covered in the following section. This third shift in practical policy endeavours towards the regional level is a reflection of both the awareness of the relevance of regional dynamics in industrial organization as well as of the importance of regional governance structures. Recent policy trends include the *regionalisation of economic and innovation strategies and policies*, i.e. initiatives, projects, and programmes that are specific to, subsumed and geared towards the regional level (see Dohse, 2001; Hassink, 1992, pp. 153 and 158; Heinze & Voelzkow, 1997; Klee & Kirchmann, 1998; Koschatzky, 2000, 2003; Lompe, Blöcker, Lux, & Syring, 1996; Raines,

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<sup>63</sup> Confer also Lagendijk's (1997b; 2001) somewhat similar stance on this.

<sup>64</sup> Lovering (1999, p. 392) appears to see the construction of new regional structures under the New Regionalism only as a 'guise' for top-down policies of the competitiveness agenda 'to dismantle national redistributive structures and hollow out the democratic content of economic governance', which are to be replaced by inter regional competition. If he would not have not added 'unwittingly', one *could* have got the impression that he talks about a conspiracy.

2002a, p. 33; Raines, 2002b, p. 159; Sturm, 1997; Waniek, 1993, p. 469)<sup>65</sup>, and the support of the creation of further regional institutional structures in the area of economic development (e.g. set-up of regional development agencies or boards to drive economic and innovation strategies) – often with supranational support from the EU.<sup>66</sup> Regarding the latter aspect of *institutional regionalisation*, Lovering (1999, p. 390) provides some interesting crude statistics on the proliferation of organizations of regional economic governance:

In Britain, for example, there were barely a dozen agencies formally charged with local economic development in the early 1980s. Now [in 1999] there are several hundred, including over 400 local authorities, 80 training and enterprise councils, numerous enterprise agencies, innovation support units, technology-transfer bodies and so on. World-wide there were perhaps four hundred regional development agencies in the mid-1980s; now there are at least ten times as many. (Lovering, 1999, p. 390)

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<sup>65</sup> Lompe, Blöcker, Lux, & Syring (1996) conclude in their case study, for example, that the regionalisation of economic development and structural policies provided the basis for the innovation strategy of the Lower Saxony region in Germany being modelled as a transport competency region in the 1990s. They also placed special attention upon the regional development agency ‘reson’ within their analysis of the region, in which the automotive manufacturer Volkswagen (VW) is a dominant factor of the economic production regime. In addition, Klee & Kirchmann (1998) also report that the process of a regionalisation of structural policies constituted a paradigm change in regional policies. Furthermore, Raines (2002b, p. 159) reports of cases of cluster development, namely in Limburg, País Vasco, Scotland and Styria, that ‘could be said to be part of a regionalised industrial policy’, while making out ‘a clear trend towards the decentralisation of regional development-policy-making’ (Raines, 2002a, p. 33). Koschatzky (2003) also identifies a ‘regionalisation of innovation policy’. Finally, Waniek (1993, p. 469 in particular) further describes developments towards a ‘decentralization of economic development policies’ in North Rhine-Westphalia, while Hassink (1992, pp. 153 and 158) speaks about ‘regionalisation of innovation policies’ within this German State that has had a ‘positive impact’.

<sup>66</sup> The EU, for example, has supported the forming of ‘Regional Technology Plans’ (RTPs), ‘Regional Innovation Strategies’ (RIS), and ‘Regional Technology Transfer Strategies and Infrastructures’ (RITTS) including regional institution-building since 1994 as well as more recently encouraged regional knowledge transfer among local innovation stakeholders via the PAXIS programme under FP6 since 1999, and regional knowledge development models towards ‘regions of knowledge’ (Know-REF) since 2004 in order to promote *regional* economic development.

However, building up regional governance capacity does not just rely on creating institutional structures such as civic assemblies, integrated regional offices, regional development agencies and so on, but also very much relies on the way how these institutions are built. Amin & Thrift (1995, p. 56) stress in this respect that an ‘open, inclusive way’ is ‘more important [...] than the actual institutions themselves’. The underlying dynamics of this process is elaborated in more detail later on when the institutionalist perspective is presented.

### **The rediscovery of the regional economy**

The interest in regional governance accompanies the growth in conceptualising economic development at the regional level and is an undeniable essential contributor to the ‘regional salience’ (cf. Lagendijk, 2001, p. 139); although critical explanatory ‘stories’ have been put forward (Lagendijk, 1997b, 2001; Lovering, 1999). Indeed, the editors of *Regional Studies* state in their special issue ‘Rethinking the Regions’ (Vol. 37, Issue 6&7) that it might be argued that we have entered ‘the new age of regions’ and that ‘it seems that regions have re-emerged as key arenas of socio-economic life’ - ‘as the industrial economy has rapidly given way to the rise of a “knowledge-driven”, service-orientated, information- or post-industrial globalized economy’ (The Editors [of *Regional Studies*], 2003, p. 545).

### ***The geographical turn by the concepts of the New Economic Geography***

The rationale behind this ‘hierarchy of regions’, for example, (Hassink, 1992, p. 11) has its roots in the striking empirical feature that not only regional economic development in general is uneven, but also that the economic activity of many specialized industries is geographically concentrated (or clustered) in particular locations.<sup>67</sup>

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<sup>67</sup> For instance, Knox & Agnew (1998) provide a comprehensive historical overview of the rise of core economies in part 2 (chapters 4-7) of their book on the *Geography of the World Economy*.

However, it was in particular the empirical rediscovery in the 1980s – e.g. by Piore & Sabel (1984) and others (see J. M. Simmie, 2001, p. 23) - of ‘new industrial spaces’ (Benko & Dunford, 1991; A. J. Scott, 1988) and successful *neo-Marshallian industrial districts* (cf. Harrison, 1992; Landabaso, 1996, p. 5; Le Galès & Voelzkow, 2001, p. 10; Ron Martin, 1999, p. 71; Park, 1995; Storper, 1995, p. 193) in the ‘most civic regions’ (Putnam, 1993, p. 97)<sup>68</sup> of the so-called ‘Third Italy’ (notably Tuscany and Emilia-Romagna), and in southern Germany (with Bavaria and Baden-Württemberg), that contributed to the revival of interest in the traditional conceptual models of industrial agglomeration and theories of business location concerning the organizational dynamics of firms in space (industrial organization). These ‘dense vertically disintegrated districts [...] were said to be manifestations of a resurgence of the region as the centre of “post Fordist”, “flexible”, “learning-based”, production systems’ as Storper (1995, pp. 191-192) reports.<sup>69</sup>

The rise in conceptualising economic development at the regional level emanates from a ‘geographical turn’ in economics (Ron Martin, 1999, p. 67) that is foremost associated with the ‘new economic geography’ and its rediscovery of increasing returns and spatial agglomeration.

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<sup>68</sup> Putnam (1993, p. 97) describes Italy’s ‘most civic regions’ such as Emilia-Romagna and Tuscany – in contrast to ‘hierarchical patron-client networks’ - as strong *civic communities* in which ‘citizens are actively involved in all sorts of local associations – literary guilds, local bands, hunting clubs, cooperatives and so on.

<sup>69</sup> Webb & Collis (2000, pp. 857-858) comment in this respect more critically - on what Lovering (1999, p. 380) calls ‘the historico-empirical claim that “the region” is becoming the “crucible” of economic development’ - by stating the following: ‘This [‘supposed transition from Fordism to post-Fordism’ with the ‘prolonged accumulation crisis of the 1970s’] signalled the re-emergence of “the region” as, conceptually, the system of flexible specialization encouraged spatial clustering and integration at the regional level whilst, empirically, the most dynamic post-Fordist economies just so happened to be those regions or “new industrial spaces” (A. J. Scott, 1988) which had successfully responded to the crisis of Fordism by adopting the system of flexible specialization (Sabel, 1994).’

*Traditional location and agglomeration theory towards the industrial organisation of the Marshallian industrial districts*

According to Alfred Weber's (1909; 1929) traditional *Theory of the Location of Industries* (cf. also Grichting, 1976, p. 44; Kappler & Rehkugler, 1991, pp. 220 following; Schätzl, 2001, pp. 37-48; Wienert, 1998, p. 39), there are three main factors that influence production costs and hence a firm's constituent decision where to (optimally) locate: above all transportation costs (see also Isard, 1956, 1960), but also labour costs, and agglomeration advantages and disadvantages.<sup>70</sup>

It should be noted, however, that localized industries also give rise to some agglomeration disadvantages (negative externalities) with 'centrifugal force' (Fujita & Krugman, 2004, p. 156) that can negate the above-listed advantages of agglomeration. Marshall pointed already (1947, pp. 272-273) to increasing factor prices (i.e. wages and office spaces) and housing prices (for workers) as examples, but they also comprise pollution, traffic congestion and so on.<sup>71</sup>

Turok (2004, p. 1075) describes these *agglomeration economies* as the classical concept that 'emphasizes the "positive externalities", or external economies of scale, scope and complexity, that follow from co-location of many businesses'. Here, businesses gain

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<sup>70</sup> A wider selection of location factors that feature in the literature would include issues concerning land, property and buildings; raw materials, operating resources and manufacturing supplies; finance, taxation and subsidies; and regulations. One should not forget in this respect that the choice of location for firms is a complex problem since it is a *constituent decision*, which is difficult to revise and which has far- and long-reaching consequences (Kappler & Rehkugler, 1991, p. 217).

<sup>71</sup> From the subjective viewpoint of an individual business, one could superficially or wrongly add the factor 'increasing competition' to this list. However, in the long run, increasing competition is not only conducive to the aggregated economy from an Schumpeterian perspective but most likely also to the individual business – as it may spur it on to innovate and prevent it from becoming complacent.



advantages from *localization and urbanization economies* that are external to the individual firm. Regarding the first, advantages stem from a ‘specialized’ infrastructure, services and skills concerning specific sectors, while latter economies derive from ‘generalized’ urban assets such as the all-important classical motorway access<sup>72</sup>, airports (of particular relevance to MNCs), educational institutions such as universities (as the new ‘must have’ for regions (Charles, Perry, & Benneworth, 2004; Kanter, 1995) in attracting inward investment) and so on, that serve all industries (Turok, 2004, p. 1076).<sup>73</sup> More lately, universities and public and private research institutions have gained in importance as determining factors of localization and regional economic development not only because they are a potential source of knowledge spillovers but also because, as educational institutions, they create the absorptive capacity within firms (cf. Schätzl, 2001, p. 228).

#### *Krugman’s New Economic Geography*

According to Krugman (1991, pp. 8-9), ‘space matters’ and therefore, there is a need ‘to bring geography back into economic analysis’. The most significant argument for the (re)discovery of regional economies in the recent body of literature is that ‘[r]egional comparisons offer a huge, almost untapped source of evidence about how our economy really

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<sup>72</sup> In deed, access to the transport network represents one of *the* infrastructure factors (cf. Schierenbeck, 1999, pp. 43-44), which affects competition and thus attractiveness of a location for investment. It is not only one of the most important components for transportation costs and delivery times (‘just-in-time’) in terms of distribution location, but it also affects the location’s potential supply of human resources in terms of catchment population (cf. Schierenbeck, 1999, pp. 19-32). Therefore, it is not surprising that ‘highway accessibility’ was most frequently identified to be an ‘important’ site selection factor according to the 1998 US Corporate Opinion Survey with 288 respondents by the *Area Development Magazine*, December 1998, pp. 40-82, as quoted in KPMG’s (1999, p. 57) report *The Competitive Alternatives – A comparison of business costs in North America, Europe and Japan*. In total, 91.5% of respondents considered the factor ‘highway access’ to be either ‘very important’ or ‘important’.

<sup>73</sup> See Porter’s distinction between ‘generalized’ and ‘advanced’ factors.

works' (1991, p. 99), hence providing an 'intellectual and empirical laboratory' (ibid. 1991, pp. 8-9) - as Krugman writes in his Lecture Series on *Geography and Trade*.

Besides the externalities and increasing returns from the inherent advantages of specialization (comparative advantage in inter-industry trade), Krugman (1991, p. 11) also makes out transportation costs and market demand as driving forces for the 'cumulative process of regional divergence'.<sup>74</sup> He (1991, p. 26) also states in this respect that '[t]he circular relationship in which the location of demand determines the location of production, and vice versa, can be a deeply conservative force, tending to lock into place any established center-periphery pattern.'

Similarly, Porter (1998b, pp. 73 and 124-125) also believes that 'chance events' play an important role in the emergence of successful industries and in shifting competitive advantage within industries.<sup>75</sup> In this respect, Krugman (1991, p. 64), for example, emphasises non-high-technology factors (research park, venture capital) in the agglomerative process of high-technology clusters. This view that allows for considerable uncertainty and suboptimal patterns (cf. Ron Martin, 1999, p. 70) with multiple equilibriums.

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<sup>74</sup> Fujita & Krugman (2004, p. 156) also present a list of forces affecting geographical concentration (centripetal forces) and dispersion (centrifugal forces). These forces go back to Nobel Prize Laureate Gunnar Myrdal's (1957) notion of 'backwash effects' and 'spread effects', respectively (cf. Schätzl, 2001, p. 163). Swedish Gunnar Myrdal and Austria-born UK citizen Friedrich August von Hayek jointly received the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel in 1974 "for their pioneering work in the theory of money and economic fluctuations and for their penetrating analysis of the interdependence of economic, social and institutional phenomena". See <http://nobelprize.org/economics/laureates/1974/index.html>

<sup>75</sup> Accordingly, 'chance' represents one of two additional variables that influence Porter's interactive 'diamond' system of national advantage Porter (1998b, p. 124) lists the following important examples of 'chance events' that can influence competitive advantage: acts of pure innovation, major technological discontinuities (for example, biotechnology, microelectronics), discontinuities in input costs such as the oil shocks, significant shifts in world financial markets or exchange rates, surges of world or regional demand, political decisions by foreign governments, and wars. Regarding latter, the Greek philosopher Heraklit of Ephesus, for example, expressed his understanding of changeability with the phrase 'war is the father of all things' (Microsoft Corporation & Bibliographisches Institut & F.A. Brockhaus AG, 1995).

However, as Martin (1999, p. 76) criticizes, ‘the treatment of history in the new economic geography is more metaphorical than real’. It inadequately theorises (cf. also Amin, 1999, p. 368) the degree and pattern of ‘path dependence’ as a kind of sequence of parameter outcomes, thereby neglecting the - what Krugman calls - ‘messy’ factors that influence agglomeration advantages and spatial economic development, namely the ‘real, complex, locally-embedded and emergent socio-historical process of technological, institutional and social evolution’ (Ron Martin, 1999, pp. 75-76).<sup>76</sup>

### *Porter’s regional shift*

Besides Krugman (1991, p. 99), Porter (1994, p. 38; 1998a, pp. 228-230; 1998b, p. 158; 2003, p. 550) has also stressed specifically the enhanced economic importance of the regional level in order to understand how and, in particular, why industries move to and succeed in particular places.

While acknowledging the importance of geographic concentration, Porter himself raises the question whether the nation is the relevant unit of analysis already in his earlier work (1990; 2nd ed. in 1998b) – to which it is referred here as ‘Porter I’ . Indeed, he states that ‘[t]he conditions that underline competitive advantages are indeed often localized *within* a nation’ and that his diamond model ‘can be readily extended to explain why some cities or regions are more successful than others’ (Porter, 1998b, pp. 157-158 and cf. pp. xxiv-xxv).

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<sup>76</sup> With regards to technological evolution, one should make a reference here to the earlier discussion of characteristics of technological knowledge and innovation. The there- mentioned ‘technological trajectories’ (Dosi, 1988, p. 225; Nelson & Winter, 1977, pp. 56-60) may represent also to some extent bottlenecks (or opportunities) for a narrowly (locked-in) specialized industrial district.

Accordingly, he agrees that the concept *can* be downsized as he introduces the notion of ‘the competitive advantage of cities and regions’.<sup>77</sup>

Indeed, Porter gives the regional meso level a much more prominent role in his later work (Porter, 2003; Porter & Ketels, 2003, p. 27; Porter, Monitor Group, ontheFRONTIER, & Council of Competitiveness, 2001), which is labelled here as ‘Porter II’. Following his analysis of US regional economic performance between 1990 and 2000, he acknowledges the substantial differences of regions within virtually every nation and the ‘striking importance of regional economies to the overall performance of nations’ (Porter, 2003, pp. 550 and 571). This shift also led Porter (2003, p. 571) to call for ‘much of economic policy to be decentralised to the regional level’ adding that policy should ‘be attuned to traded clusters’, ‘focus on upgrading the productivity of all clusters’ of meaningful position instead of migrating to ‘desirable’ ones, and finally to foster ‘building innovative capacity’.

This chapter has demonstrated that there has been a ‘resurgence’ of regional governance and a ‘resurgence’ of regional economies, which serves to answer the question: Why regions? The discussions in the following chapters present some of the underlying conceptualisations that form the basis of the understanding that economic activity is geographically concentrated and specialized as well as how they evolve.

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<sup>77</sup> Porter (1998b, footnote 26 on pp. 158 and 791) refers in this respect to the work of Jacobs (1984), which highlights the role of cities in economic development.

## CHAPTER 4

### EVOLUTIONARY AND INSTITUTIONAL CONCEPTUALISATIONS OF TERRITORIAL INNOVATION MODELS

Lagendijk (1997b, p. 2) writes that '[s]ince more than a decade, economic geography has been dominated by a new orthodoxy built around an emphasis on the region, networking and resource-orientation, labelled by some as "New Regionalism".' At its core, he (1997b, p. 3) sees the concepts of industrial districts, innovative milieu, regional innovation systems and clusters (Table 3 on page 68), which with common 'cross-referencing' share 'an interest in the role of innovation and economic success ("competitiveness") at the level of the particular regions [...], by a discursive style of argumentation and by an emphasis on the institutional, cognitive and cultural dimensions of regional development.' Jones (2005, p. 186) also directly connects the emergence Lovering's (1999) notion of the 'new regionalism' with 'growing overlap between studies of economic geography and innovation'.

Storper (1995, p. 199) ascertained that agglomerations 'constituted industrial communities where endogenous dynamics of knowledge and technology development [or 'technological innovation turns'] occurred', and for which not just market co-ordination and localization but also 'appropriate communication rules' are important. Hence, he succinctly argues circulatory (ibid., pp., p. 199) 'that the "institutional arrangements" of agglomerations (Cooke & Morgan, 1990; A. J. Scott & Storper, 1991; Storper & Scott, 1989) - that is the nexus of transactions and their economic performance - were themselves outcomes of broader institutional environments, and themselves generators of future choices for pathways of development.'

### ***Three lines of analysis in the resurgence of regional economies***

In an article, Michael Storper (1995, p. 192) identifies three main schools in the debate on *the resurgence of regional economies*, namely institutions; industrial organization and transactions; and technological change and learning, while he himself argues for a more convincing explanation that understands the ‘region as a nexus of untraded interdependencies’ (Storper, 1995, p. 191).<sup>78</sup> This grouping of the main schools is broadly adopted here as a guiding structure of analysis, with the various ‘territorial innovation models’ (TIM) and explanatory concepts (cf. Legendijk, 2003, Fig. 1 on p. 722; Moulaert & Sekia, 2003, Fig. 1 on p. 295) being discussed in - what is called here – the *Economic Geography Triangle* of industrial organization, innovation, and social-institutional environment.<sup>79</sup> (see Figure 2 on page 65 below).

The thesis turns first to look at industrial organization as the founding corner of this Economic Geography Triangle.

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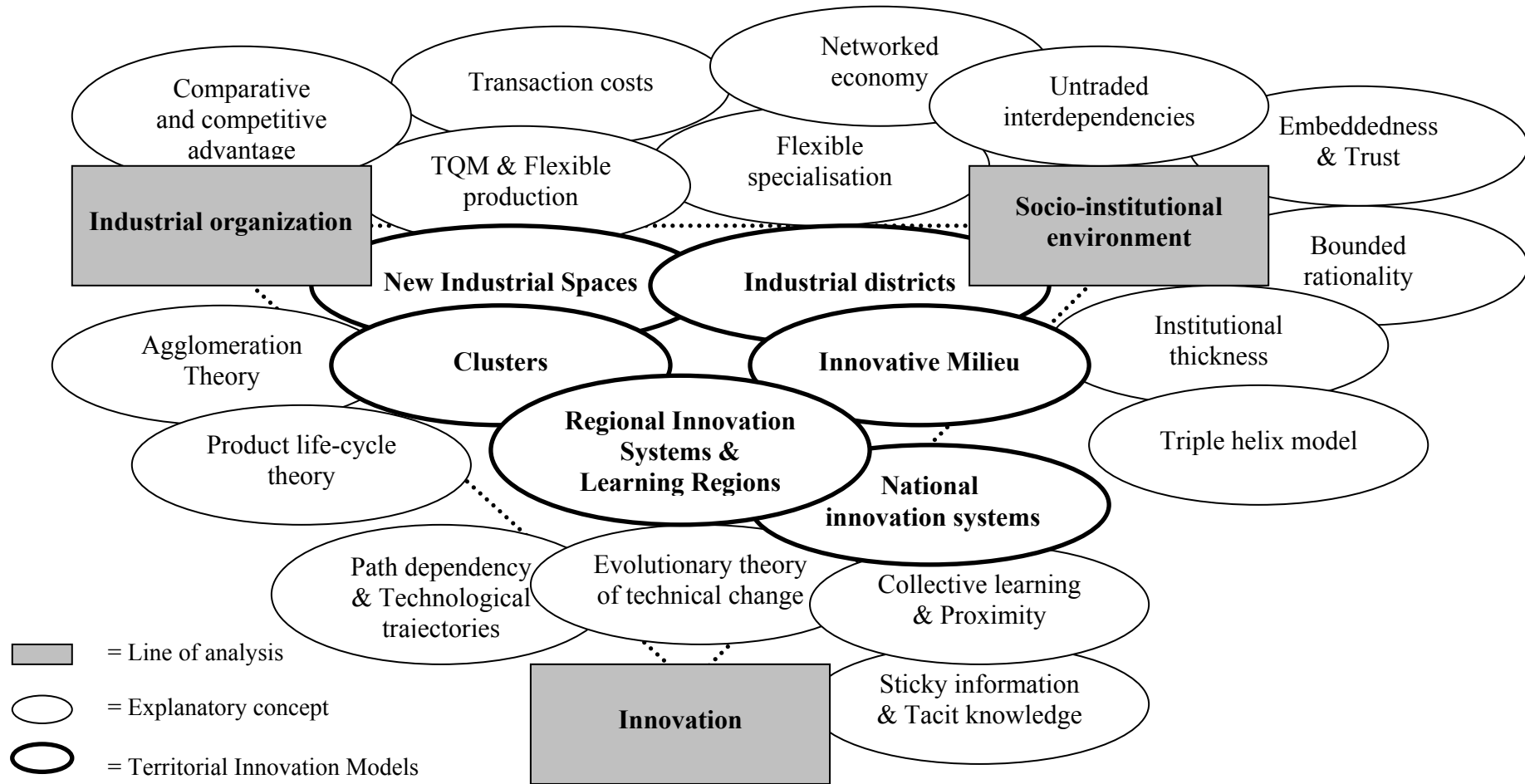
<sup>78</sup> Storper himself (1995, p. 192 and footnote 1 on p. 214) credits Dosi and Lundvall with the coining of the term ‘untraded interdependencies’ though he points out that the idea goes back to the earlier writings of Perroux and Scitovsky. Indeed, Dosi (1988, p. 226) provides a neat elaboration of the term in his discussion on the nature of the innovation process and the ‘public’ characteristic of technology, which he ‘relates to the *untraded interdependencies* between sectors, technologies and firms and takes the form of technological complementarities, “synergies”, and flow of stimuli and constraints’. Dosi adds that ‘[a]ll of them represent a structured set of technological externalities which can be a collective asset of groups of firms/industries within countries/ regions (see, for example, Lundvall, 1984, and Chapter 17 of this book) and/or tend to be internalised within individual companies (see, for example, Teece, 1982, and Chapter 12 of this book; Pavitt, 1984c).’

Dosi (1988, p. 226) further stresses that ‘[t]hese untraded interdependencies and context conditions are, to different degrees, the unintentional outcome of decentralised (but irreversible) processes of environmental organisation (one obvious example is “Silicon Valley”) and/or the result of explicit strategies of public and private institutions.’

<sup>79</sup> A good summary of the different school of thoughts can also be found in the discourses by Storper (1995), Simmie (2001), Schätzl (2001), Sternberg (1999), Legendijk (1997b), and regarding an overview of strategy and competition literature see, for example, Budd & Hirmis(2004).

Please note that, even though this study adopts Storper’s grouping of main schools, a different order of presentation was chosen.

Figure 2 A Selection of territorial innovation models and explanatory concepts in the economic geography triangle



Source: Own creation inspired by Moulaert & Sekia's (2003, Fig. 1 on p. 295) and Lagendijk's (2003, Fig. 1 on p. 722) conceptual genealogy of 'territorial innovation models (TIM)'; crudely arranged along the three main schools (or lines of analysis) in the resurgence of regional economies as identified by Storper (1995, pp. 191-192). Further influenced by the discourses of Simmie (2001), Schätzl (2001), Lagendijk (1997b); Sternberg's (1999, Tab. 2 on p. 87) overview of concepts of regional economic concentration based upon Lagendijk (1996, p. 19); and the overview of strategy and competition literature by Pettigrew & Whipp's (1993), Budd & Hirmis (2004, Fig. 1 on p. 1018).

### ***Industrial organization***

Theories and conceptualisations of industrial organization comprise foremost the above introduced traditional neoclassical-orientated location and agglomeration theory (Marshall, 1898; Weber, 1909, 1929) with the Marshallian ‘industrial districts’, and modern agglomeration theory with the ‘flexible specialization’ school (Piore & Sabel, 1984), ‘new industrial spaces’ (A. J. Scott, 1988), and Porter’s ‘clusters’ of competitive industries (Porter, 1998b, p. 73 and cf. p. 149).

The initially mainly mathematical formulised models of industrial organization and the modern eclectic non-formalised agglomeration models were complemented by empirically-orientated approaches to economic geography that were informed by sociology, institutional economics, cognitive science, and other theories (cf. Ron Martin, 1999, p. 66). These influences marked an ‘institutional turn’ (Amin, 1999, p. 368) and an ‘evolutionary turn’ in economics, in so far as more account was taken of the role of the socio-institutional framework in regional economic development as well as it involved the incorporation of an evolutionary understanding of technical change and innovation.<sup>80</sup>

This led to more contemporary ‘territorial innovation models’ (Moulaert & Sekia, 2003) based upon a ‘network approach’ (Butzin, 2000a, 2000b) such as ‘innovative milieux’ by *GREMI*<sup>81</sup> (Aydalot & Keeble, 1988; Camagni, 1988; Crevoisier, 2001; Kamann, 1997;

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<sup>80</sup> A good source of literature in this respect are two special issues of the journal *Zeitschrift für Wirtschaftsgeographie*. One is Volume 44 (2000); Issue 3/4 guest-edited by Bernhard Butzin, which focuses on network approaches in regional development (*Netzwerkansätze in der Regionalentwicklung*), the other being Volume 45 (2001); Issue 3/4 edited by Rolf Sternberg and Walter Thomi, which is dedicated to contemporary approaches on knowledge and innovation as possible new paradigms of regional development (*Wissen und Innovationen als neue Paradigmen der Regionalentwicklung?*).

<sup>81</sup> GREMI is an abbreviation for *Groupe de Recherche Européen sur les Milieux Innovateurs*, which translates as Group of European Research on Innovative Milieux/Environments. According to Storper (1995, p. 203), ‘the



Maillat & Vasserot, 1988; Ratti, Bramanti, & Gordon, 1997), ‘intelligent regions’ (Cooke & Morgan, 1991; Landabaso, 1996)<sup>82</sup> or ‘learning regions’ (Amin, 1999, pp. 369-370; Florida, 1995; Gertler et al., 2000; Hassink, 2001; Hudson, 1999; Morgan, 1995; Pommeranz, 2000) and the ‘regional innovation systems’ strands (Braczyk et al., 1998b; Cooke et al., 1997; Cooke & Memedovic, 2003; Cooke & Morgan, 1994b; 1998, pp. 70-72; Morgan & Nauwelaers, 1999b; Santos, 2000).

All in all, the territorial innovation models highlighted above in Figure 2 are also the key concepts in explaining the spatial concentration of economic activity, namely New Industrial Spaces, Industrial Districts, Innovative Milieux, Clusters, and regional and national innovation systems. The key characteristics and differences between these concepts are summarised and highlighted below in Table 3.

As most of these conceptualisations of industrial organizations have already briefly been covered in previous sections, the attention of the discussion swiftly turns to the other ‘triangle’ pillars of innovation and the social-institutional environment in the following sections.

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milieu is something like a territorial version of [...] the “embeddedness” of social and economic processes (M. Granovetter, 1985)’.

<sup>82</sup> Cooke & Morgan (1991, pp. 41-43) conclude in their research on industrial and institutional innovation within the Italian region of Emilia-Romagna that the ‘intelligent’ characteristics in the policy sphere include networking, informational competence, decentralised delivery, and social innovation.

Table 3 Theoretical concepts in explanation of spatial concentration of economic activity (a selection)

<b>Characteristics</b>	<b>New Industrial Spaces</b>	<b>Industrial Districts</b>	<b>Innovative Milieux</b>	<b>Clusters</b>	<b>Innovations systems (national, regional)</b>
Core argument and hypothesis; main actors	vertical disintegration causes spatial concentration of production	local actors embedded in socio-cultural milieu	a milieu as organisation of networked actors	business strategies in dependency upon the 'diamond'	system of institutional ties
Spatial reference	full spectrum from centre to periphery	mainly successful regions	mainly successful high-tech regions	particularly competitive countries / regions	broad spectrum of regions with innovation potential
Processes of change over time due to ...	'windows of opportunity', lock-in effects, path dependency	small enterprises embedded in a socio-cultural environment	entrepreneurship	comparative advantage, interaction between 'diamond' elements	long waves leading to path-dependency
Causes of spatial concentration	agglomeration effects, 'untraded interdependencies'	embeddedness and increasing flexibility causing strengthening of locational ties	location-specific learning processes	intraregional interaction of competitors, producers, consumers and so on	space as a container, spatial proximity facilitates interaction of producers and consumers
Role of networks	neglectable	Central	central, especially intraregional	important	important
Decisive actor	rather large enterprises	small enterprises	local entrepreneurs, politicians	rather large enterprises	institutions and their systems, entrepreneurs
Advocates	Scott, Storper, Walker [from the so-called 'Californian School']	Sabel, Granovetter, Marshall, Brusco, Becattini	Camagni, Aydalot, Maillat	Porter	Nelson, Lundvall, Freeman; Cooke, Morgan

Source: Own translation of Sternberg's (1999, Tab. 2 on p. 87) adaptation and supplementation (translated into German) based upon Lagendijk (1996, p. 19), altered here only slightly by some additions under 'advocates'. Please note that a similar table can also be found in Sternberg (2001, Tab. 1 on p. 161) based upon Lagendijk (1997b, first version, p. 22), which listing is added by the concepts of the New Economic Geography and the New Growth Theory.

### *Innovation and proximity: the Evolutionary economics perspective*

While the characteristics of innovation have also already been discussed above, the focus is placed here on the relation between innovation on the one hand and spatial as well as later institutional proximity, on the other.

To make the case for the relation between innovation and spatial proximity, one should refer to two differing approaches (cf. Schätzl, 2001, p. 202): the dynamic-cyclical approaches and to the dynamic-evolutionary approaches.<sup>83</sup> While the latter focus on the factors conducive to innovation and technological change (e.g. learning, knowledge transfer, knowledge resources), the former looks rather at how industries evolve and how their development is bounded to geographical areas and includes the prominent product life-cycle concept.

### *Product life-cycle and Kondratieff cycle*

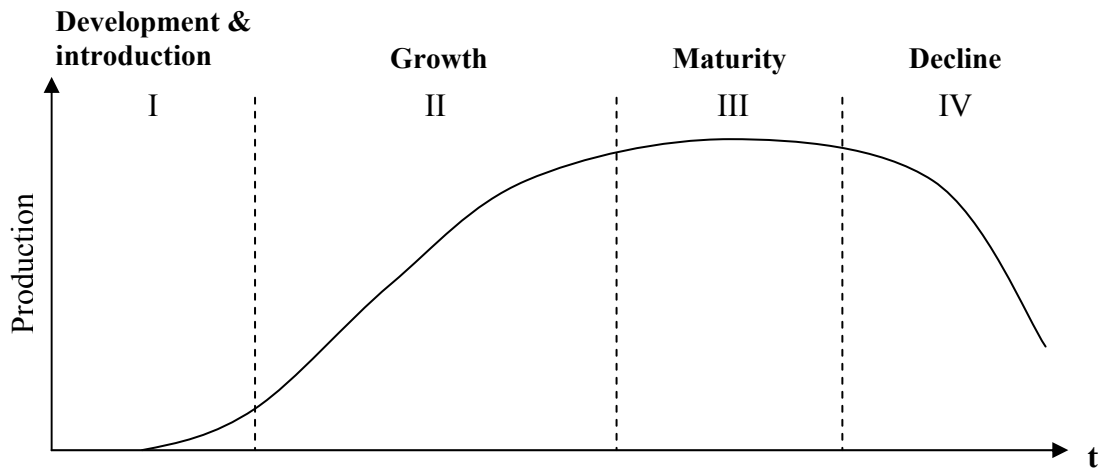
The dynamic-cyclical approaches derive from the assumption that there is constant structural economic change, which is based either upon a microeconomic view of the product life-cycle theory, or upon a macroeconomic view of the ‘theory of long waves’ of so-called ‘Kondratieff cycles’, or indeed both (cf. Schätzl, 2001, p. 209).<sup>84</sup>

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<sup>83</sup> The dynamic view in these approaches basically looks at the processes and development over time and, therefore, contrast earlier static models that focus merely on factor endowment.

<sup>84</sup> For an overview of the dynamic-cyclical approaches, namely the product life cycle theory and the theory of long waves, with regards to spatial development, see e.g. Schätzl (2001, pp. 209-221).

Figure 3 Phases of the product cycle



Changes:

PRODUCTION	human capital intensive	→	real capital or labour intensive
INNOVATION	product innovation	→	process innovation
INVESTMENT	R&D investments	→	rationalization/efficiency investments
PRODUCTION VOLUME	small batch production	→	mass production
MARKET DOMINANCE	seller market	→	buyer market
PROFITS	Losses,	increasing profits,	decreasing profits, losses
OPTIMAL PRODUCTION LOCATION	Agglomeration	Surrounding area of agglomeration	Peripheral regions low-wage countries

—————→  
 Intraregional, interregional and international  
 Decentralisation

Source: Schätzl (2001, Abb. 2.38 on p. 211), own translation. Confer also Grant (1998, see Figure 10.1 on p. 243 and Table 10.2 on p. 247)

The concept of the product life-cycle goes long back to Kuznets (1930) and Burns (1934) - as Tichy (2001, p. 182) writes – as well as to Schumpeter’s (1939) analysis of business cycles, while Grant (1998, footnote 1 on pp. 262-263) mainly associates it in terms of corporate strategy with the later works of Rogers (1962) and Levitt (1965). It is based on the hypothesis that products have a limited life span, which can be grouped into the following four broad phases of development & introduction, growth, maturity, and decline (see Figure 3 above on page 70). Crucially, the model is thought not only to apply to the evolution of individual products but in generalisation equally to the evolution of their industries and – in longer waves – to economies too.

However, the key sources of competitive advantages for most products are seen to change with increasing product and industry maturity, for example, from a human capital intensive R&D investments, via quality focus, to more low-cost production. In consequence, the optimal production location shifts from high-income central agglomerations with specialized skills towards the lower-wage periphery. Accordingly, as Schätzl (2001, p. 213) points out, this embraces a ‘tendency to intraregional, interregional, and international decentralisation of production’, or in other words incorporates an understanding that industries move locations.

These spatial shifts of industrial activity can be regarded as a driving force for general economic fluctuations of the particular regions and countries, where innovation is not just timely but also spatially concentrated.

### *Evolutionary theory of technological change and innovation*

In contrast to the dynamic-cyclical approaches, which analyse the life span of products and industries, modern dynamic-evolutionary approaches rather focus on the initial development phase. There is now an abundance of work on evolutionary economics (Boschma, 2004; Camagni, 2001; Coriat & Dosi, 1998b; Dosi, 1991, 2000; Dosi et al., 1988; Hodgson, 2002; McKelvey, 1997; Metcalfe, 1995; Nelson & Winter, 1982), which goes back to Nelson & Winter's (1982) book presenting *An Evolutionary Theory of Economic Change*, and it builds upon the Darwinistic biology tradition of stressing the role of diversity in 'natural selection' (cf. Nelson & Winter, 1982, p. 9; Porter, 1998b, p. 174)<sup>85</sup>, Schumpeter's (1976b) notion of the 'process of creative destruction' and Kondratieff's (1926) long-term economic cycles caused by the bunching of significant innovations.

At the centre of investigation of evolutionary economics are the conducive factors in the creation of innovation and technological change. Following the insights from new growth theory and cognitive sciences, they are not just regarded as an exogenously given impetus (e.g. knowledge resources), but instead viewed more as an endogenous outcome of knowledge transfer and learning processes – as depicted by Johnson (1992, p. 33). In accumulation, they thereby may initiate the emergence of new industries and/or regional structural change and economic growth. Storper (1995, p. 207) phrased this more eloquently as follows:

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<sup>85</sup> When discussing their 'triple helix' model, Etzkowitz & Leydesdorff (2000, p. 112) point, however, in this respect to an important difference between cultural and biological evolutions. They state the following: 'Biological evolution theory assumes variation as a driver and selection to be naturally given. Cultural evolution, however, is driven by individuals and groups who make conscious decisions as well as the appearance of unintended consequences.'

The evolutionary school of technological change opened up the question of economic development as one of learning, or *becoming*, and of untraded interdependencies as a major feature of this process.

Furthermore, the evolutionary school also comprises that ‘tacit capabilities are localised and embedded in individuals and organisational routines’, that ‘organisations display an awesome range of capabilities’ and ‘behavioural patterns’, and finally ‘that knowledge is spatially “sticky” and that tacit knowledge (...) is not easily communicated other than through personal interaction in a context of shared experiences (Nelson & Winter, 1982; Dosi et al, 1988; Dosi & Marengo, 1993; Lundvall, 1992; Storper, 1997)’.

While the former propositions show the linkages to institutional economics (which is covered in the next section), the latter in particular highlights the importance of the role of geographical proximity for innovation. Studies have shown in this regard that business R&D tends to cluster in specific areas in order to exploit knowledge spillovers, and that geographical proximity favours both knowledge transfer and research collaboration (Department of Trade and Industry, 2003a, p. 71). Gertler et al. (2000) also suggest that local context still exerts a significant influence on the nature and extent of innovative activities in the knowledge-based economy. Boschma’s insightful table - which is reproduced below (Table 4) - presents his five forms of proximity and also crucially provides possible solutions to the relevant problem of too little or too much proximity.

*Table 4 Five Forms of proximity: some features*

	Key dimension	Too little proximity	Too much proximity	Possible solutions <sup>86</sup>
1. Cognitive	Knowledge gap	Misunderstanding	Lack of sources of novelty	Common knowledge base with divers but complementary capabilities
2. Organizational	Control	Opportunism	Bureaucracy	Loosely coupled system
3. Social	Trust (based on social relations)	Opportunism	No economic rationale	Mixture of embedded and market relations
4. Institutional	Trust (based on common institutions)	Opportunism	Lock-in and inertia	Institutional checks and balances
5. Geographical	Distance	No spatial externalities	Lack of geographical openness	Mix of local 'buzz' and extra-local linkages

Source: Boschma (2005b, p. 71)

It is clear that the region is *the* location to drive innovation as innovation is viewed here as being 'geographically localised'. The thesis now turns to look at the remaining cornerstone of the 'Economic Geography Triangle', which is the socio-institutional environment.

### ***The Socio-institutional Environment***

The complementary of the relationship between geographical proximity and social and institutional proximity and its importance for the creation of knowledge and innovation has been stressed above. The close affinity between the two schools is summarised by Morgan's (2001a, p. 18) following comment:

<sup>86</sup> Boschma (cf. also 2005a, p. 43) suggests mechanisms that offer simultaneous solutions to the problems of too little proximity (by enhancing effective coordination and control) and too much proximity (by preventing actors becoming locked-in through ensuring openness and flexibility).



Evolutionary political economy rightly allots an important role to the institutions which shape, and which are in turn shaped by, these deep developmental processes. Like all structures, these institutions are both the medium for, and the result of social action: in other words they enable and constrain what firms and other agents wish to accomplish.

To distinguish broadly between the main emphases of these affiliated schools of thought, it can be said in simplification that the evolutionary strand focuses on knowledge, learning and innovation processes as drivers of economic development, while the institutional perspective is rather occupied with the ‘collective or social foundations of economic behaviour’ (Amin, 1999, p. 366), hence concentrating its attention on inter-personal and inter-institutional relationships, behaviour and dynamics. The latter focus is not an entirely new one, more a rediscovery, but the contemporary works of the ‘new institutionalism’ (cf. Raco, 1999, p. 952) provide more of an explanation of the underlying causes for these dynamics.<sup>87</sup>

While the previous section has rendered the propositions of the evolutionary strand, this section now looks at the main propositions of the institutionalist school. It argues that regions has to be also viewed as a ‘relational space’ (Morgan, 2001a, p. 25) not just as a geographical space and that in this respect ‘institutions matter’.

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<sup>87</sup> See also Blyth (2002, pp. 18-27) for his discussion of the different schools of institutionalism, namely Historical Institutionalism and Rationalist Institutionalism. For instance, Blyth (2002, p. 19) elucidates that ‘[f]or historical institutionalists, institutions “structure” individuals’ preferences, whereas for rationalists, the preferences of individuals “structure” institutions.’

### *Institutionalist economics*

The '*institutional turn*' (Amin, 1999, p. 368; Blyth, 2002, p. 18; Raco, 1999) in economics is based on a number of propositions from different strands such as sociology and anthropology, organizational theory (e.g. see Schwartzman, 1993) and so on. Accordingly, an *institutionalist perspective* is in effect a socioeconomic perspective (Grabher, 1993b) that comprises the following three main sets of ideas identified by Amin (1999, pp. 366-367):<sup>88</sup> the recognition that the behaviour and decision-making of economic actors is that of 'boundedly rational' agents and *not* of perfectly rational 'economic man'; Granovetter's (1985, p. 506) description of economic behaviour being 'embedded in networks of interpersonal relations'; and Karl Polanyi's (1944) view of economic life as an 'instituted process' shaped by enduring collective forces (cf. Amin, 1999, pp. 366-367; Amin & Thrift, 1995, p. 50; Blyth, 2002, pp. 3-11). These three sets of ideas are briefly explained in the following.

Firstly, the rejection of the idea of 'economic man' or 'homo oeconomicus'<sup>89</sup> means that the behaviour and decision-making of economic actors is instead regarded as one that is '*boundedly rational*' and influenced by habits and routines of individuals, groups and institutions (Amin & Thrift, 1995, p. 51; Boschma, 2004, p. 1007) and by 'perceptions of self

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<sup>88</sup> In an earlier paper, Amin & Thrift (1995, pp. 50-53) outline five main strands of work that contributed to 'socioeconomics' (Grabher, 1993b) and rise of the 'third way' of associationism.

<sup>89</sup> The concept of the 'economic man' or *homo oeconomicus* (cf. Bundeszentrale für politische Bildung, 2002, p. 15) embodies the idea or image of the human role within classical and neoclassical economic theory, that is of a rational thinking individual who will always act rationally in specifying his aims and then take optimal decisions which are consistent with the set objectives. This entails the presumption that the decision-maker is always aware of all alternatives, which, in other words, is the assumption of the transparency of markets by perfect information. As a logical consequence of the negation of the assumption of rational behaving actors, behavioural theory instead postulates that markets are not efficient.

interest' (Boschma, 2004, pp. 99-100), i.e. beliefs and attitudes (Blyth, 2002, preface on p. ix).<sup>90</sup>

This leads to a social constructivist view - meaning that markets are seen as being as socially constructed – which comprises, secondly, the idea of *embeddedness* (M. Granovetter, 1985).<sup>91</sup> It subsequently regards economic outcomes to be interactively 'influenced by network properties such as mutuality, trust and cooperation or their opposite (Dore, 1983; Granovetter, 1985; Grabher, 1993; Fukuyama, 1995; Mizralski, 1996)' as Amin (1999, pp. 366-367) states.

This also links to the third idea of economic life as an 'instituted process' (cf. Amin, 1999, pp. 366-367; Amin & Thrift, 1995, p. 50), which basically refers to the view that the multiplicity of institutions (of which agents are part) shape the collective outcomes of an economic system (Coriat & Dosi, 2002, p. 99). According to Coriat & Dosi (2002, p. 98), the broad meaning of the term *institution* includes 'formal organizations (ranging from firms to technical societies, trade unions, universities, all the way to state agencies); patterns of behaviour that are collectively shared (from routines to social conventions to ethical codes); and negative norms and constraints (from moral prescriptions to formal laws)'.<sup>92</sup> These formal and informal

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<sup>90</sup> The assumption of the rational decision-making human is contested by institutional economics (Budd & Hirmis, 2004, p. 1017) and behavioural theory with the contrasting concept that M. E. Eliot Hurst labelled as 'noneconomic man' (cf. Schätzl, 2001, p. 96). Behavioural theory instead argues that goals are imperfectly rationalized and rather the result of an interactive bargaining process between individuals and sub-groups (e.g. of managers in a firm). The inherent conflict between the various individual goals within complex organizations (e.g. in firms between the traditional profit-maximizing goal, production goals, sales goals and so on) is assumed to result in the overall goals being compromises (in the form of aspiration-level or satisfactory targets) rather than maximizing goals (cf. Pass et al., 1993, pp. 38-39 and 320). Behavioural theory thereby represents an alternative to the traditional, profit-maximizing 'theory of the firm'. In this respect, organizational theorists also point out that this 'satisficing' behaviour (Pass et al., 1993, p. 484) is more likely to be the norm in larger, hierarchical organizations, while less likely to occur in small enterprises, where perhaps an individual entrepreneur is setting the objectives.

<sup>91</sup> See in this respect also Hay's (2002, p. 206) discussion of different positions of constructivism ('thick' and 'thin') and on the structure-agency debate (ibid., p. 54).

<sup>92</sup> Amin (1999, p. 367) only distinguishes between formal and informal or tacit institutions, thereby subsuming Coriat & Dosi's (1999, p. 98) 'negative norms and constraints' under either of the two. Amin's description of

institutions are itself seen ‘to be socially constructed and subject to slow evolutionary change’ (Amin, 1999, p. 368) as they are also regarded as ‘carriers of history’ (David, 1994) - thus coming round a full circle.<sup>93</sup>

### *Gradations of institutionalism*

Coriat & Dosi (1995, pp. 98-101)<sup>94</sup> discuss the dichotomies between an institutionalist view and the standard ‘neoclassical’ paradigm in which institutions are largely absent from the conceptualisations and actors are rather perceived as perfectly rational. They illustrate this dichotomy in a table (ibid., Table 6.1 on p. 100) reproduced below (see Table 5), which also provide a useful overview in this respect of the ‘different *gradations* of institutionalism’, ranging from weak to strong.

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formal institutions include ‘rules, laws and organizations’, while he names ‘individual habits, group routines and social norms and values’ as examples for informal or tacit institutions.

For reason of clarity, this thesis here prefers to make a distinction between institutions and organizations. The term *institutions* is used here mostly to depict informal or tacit institutions ‘that pattern behaviour’, while an effort is made to use the term *organizations* when concrete, formal institutions such as firms and so are meant (cf. Cooke & Morgan, 1998, pp. 71-72). Cooke & Morgan (1998, pp. 71-72) also add that ‘[o]rganizations can be conceived as embedded in institutions in a process view of socio-economic change’. See also Edquist & Johnson’s (1997) useful chapter in this respect on ‘Institutions and Organizations in Systems of Innovation’.

<sup>93</sup> The various views on how human (agents) are interrelated with system structures also feature in the so-called *agency-structure debate*. In contrast to behavioural theories, theories of functionalism, structuralism and system theory all emphasise structural dynamics and decision-making, which is not sufficiently explained just by people and their actions (cf. Schmidt, 2002, p. 203). See also Samuels (1995) for a discussion of institutional economics.

<sup>94</sup> Coriat & Dosi’s (2002) updated version of an earlier paper published in French in 1995 (cf. asterix note in Coriat & Dosi, 2002, p. 117) is also republished (Coriat & Dosi, 2000) in Dosi’s (2000) compilation of selected essays.

*Table 5 Weak and strong varieties of institutionalism*

	‘Weak’ Institutionalism	‘Strong’ Institutionalism
1. Role of institutions	Parameterize system variables; contain menu of strategies	Also ‘embed’ cognitive and behavioural patterns; shape identities of actors
2. ‘Primitives’ of the theory	(Perfectly or boundedly) rational self-seeking agents; institutions as derived entities	Institutions as ‘primitives’; forms of ‘rationality’ and perceptions of self-interest as derived entities
3. Mechanisms of institution-formulation	Mainly intentional, ‘constitutional’, processes	Mainly unintentional self-organization processes
4. Efficiency properties	Institutions perform useful coordinating and governance functions; may be considered equilibria in some selection space	Institutions as ‘carriers of history’; reproduce path-dependently, often irrespectively of this functional efficiency

Source: Coriat & Dosi (2000, Table 6.1 on p. 100) reproduced in (1998a, p. 8; 2000, p. 352, both as Table 1.1)

In summary, these ideas form the basis of a new understanding that recognises that the ‘dense social networks’ (cf. Boschma, 2004, p. 1006) or ‘institutional thickness’ (Amin, 1999, p. 368; Amin & Thrift, 1995, p. 53) have an ‘institutional impact’ (B. Johnson, 1992, p. 33) upon the embedded, collective and geographically localized learning processes (cf. Baptista, 2000, pp. 530-531; Boschma, 2004, p. 1006; Cooke & Morgan, 1998, p. 6; Maskell & Malmberg, 1999a, p. 9; J. M. Simmie, 2001, p. 24). Inasmuch, the region is seen not just as a territorial space but as a relational and institutional space too (cf. Morgan, 2001a, p. 26), as a ‘nexus of untraded interdependencies’ (Storper, 1995, pp. 191 and 192 ) and ‘learning processes’ (Cooke & Morgan, 1998, p. 60). In consequence, ‘institutions count’ (Cooke & Morgan, 1998, p. 98) as ‘assets’ to local and regional competitiveness (Amin, 1999, p. 368;

Tödting, 1999, p. 694).<sup>95</sup> Institutions matter insofar as they influence relational or social capital (Cooke & Morgan, 1998, p. 7; Edquist, 1997, pp. 24-26; Iyer, Kitson, & Toh, 2005, pp. 1016-1017; Putnam, 1993, pp. 86-91)<sup>96</sup>, and have the potential to reduce opportunistic behaviour and negative effects of too much proximity (lock-in and inertia).

The thesis has looked at how economies work, at the role of innovation in economic development, and at the rationale for focussing on regions and regional economic development, in which innovation plays a role. It has established that institutions and thus governance of the process of innovation constitutes part of the conceptual framework in understanding the process of regional economic development. The next chapter now turns its attention to innovation systems, which in conjunction with the cluster model serve here as the main conceptual models to look at economic governance. They bring together the themes discussed so far in the thesis.

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<sup>95</sup> Maskell and Malmberg (1999b, p. 9) similarly stress that ‘localized learning’ for innovation is ‘strongly influenced by the specific localized capabilities such as resources, institutions, social and cultural structures’.

<sup>96</sup> In the *Regional Studies*’ special issue (Vol. 39; Number 8; November 2005) on ‘social capital’, Iyer, Kitson & Toh (2005, pp. 1016-1017) provide a definition of *social capital* that ‘includes shared values and rules for social conduct including trust and civic responsibility’, hence mirroring the above-mentioned informal institutions. In the same special issue Beugelsdijk & van Schaik (2005, p. 1061 and cf. p. 1053) analyse the differences in social capital and come to the preliminary results ‘that there is a positive and significant relationship between social capital and economic performance in a sample of 54 Western European regions’, while Cooke, Clifton, & Oleaga’s (2005, p. 1065) research on 12 UK regions more cautiously concludes that although the ‘conscious use by firms of “relational embeddedness” in markets’ is an important indicator of SME performance, this cannot be conclusively measured to be an important indicator of regional economic performance. Furthermore, Beugelsdijk & van Schaik (2005, p. 1062) interestingly state that ‘despite the extensive literature on social capital, no clear policy implications have yet emerged’. Yet, Tura & Harmaakorpi’s (2005, p. 1121) suggest “network-facilitating innovation policy” as a policy implication to promote creative social capital’ as an element in enhancing regional innovative capability. However, they also point to some problematic issues in the bidirectional relationship between innovative capability and social capital.

## CHAPTER 5

### LINKING INSTITUTIONS AND INNOVATION: THE CLUSTER AND INNOVATION SYSTEMS MODELS

The above discussion of the institutionalist perspective has illustrated that the socio-institutional environment in which firms are embedded has an effect upon their innovative performance. Similarly, the earlier discussion of patterns of innovation creation has shown that innovation and technical change is not be understood simply as a result of a linear process but instead the outcome of an interactive, cumulative process within a system of complex elements (cf. Edquist, 1997, p. 13). Both influences make up the systemic nature of the so-called *systems of innovation* approach, the subject of this chapter. The analysis begins to explore the *hypothesis* of the thesis that current conceptualisations of regional innovation systems do not adequately capture the regional and in particular sub-regional governance dynamics, and thus are of little operational guidance to innovation policy-making. This thesis is tested empirically in following chapters in looking at the pattern of economic governance in the case-study regions.

#### ***Innovation systems: linking institutions and innovation***

According to Lundvall (1992a, p. 2 ), ‘a system of innovation is constituted by elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge’. Furthermore, Edquist & Johnson (1997, p. 42) state that ‘[s]ystems of innovation are normally defined in institutional terms’, for which Nelson & Rosenberg’s definition (1993, p. 4) is representative. In the introductory chapter of Nelson’s (1993) influential book on ‘National Innovation Systems’, they (Nelson & Rosenberg, 1993, p. 4)

define the term *system* in a way that ‘the concept is of a set of institutions whose interactions determine the innovative performance, in the sense above, of national firms’.

The ‘common characteristics of the systems of innovation approaches’ have been outlined by Edquist (1997, pp. 15-29) and comprise the following nine aspects:

1. Placing innovations and learning at the centre of analysis;
2. Being holistic and interdisciplinary in encompassing a wide array of determinants of innovation;
3. Taking an evolutionary perspective by recognising that history matters as innovation processes are often path-dependent;<sup>97</sup>
4. Rejecting the notion of optimality of systems of innovation and thus acknowledging the diversity of different structural set ups;
5. Stressing that innovation is determined not only by the elements of the system, but also by the relations between them (i.e. their interdependence and interaction);
6. Encompassing a wide definition of innovation to include process, product as well as organizational innovation;
7. Emphasising the role of institutions in influencing innovation;
8. Being associated with conceptual pluralism or ambiguity; and
9. Representing a conceptual framework for the analysis of innovation and not a formal theory, despite its roots in various theories of innovation.

In identifying the ideas that form the conceptual core of ‘approaches in the understanding of what constitutes successful regional development and policy’, Tödting (1999, p. 694) also suggests that ‘innovation systems serve as an umbrella to some of these concepts’. According to Tödting (1999, pp. 694-695), these concepts include viewing innovation and learning as an interactive process, which ‘occur in various kinds of networks’ that ‘are formed along

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<sup>97</sup> Confer also the earlier discussion of patterns of innovation above.



industry clusters' (Porter, 1990) and which create 'untraded interdependencies' (Storper, 1995, pp. 191 and 192 ) and 'unique relational assets'.

Despite these common characteristics, the 'systems of innovation' approach can be distinguished into different key strands of thought. Edquist & McKelvey (2000a)<sup>98</sup> differentiate between spatial delimitations – national and regional – and a sectoral perspective, to identify the following *three-part categorization*:<sup>99</sup>

- '**National innovation systems**'<sup>100</sup> (Freeman, 1995; Lundvall, 1988, 1992b; Nelson, 1993; Organisation for Economic Co-operation and Development, 1997a, 1999b, 2002a; Patel & Pavitt, 1994);
- '**Regional innovation systems**' (Braczyk et al., 1998b; Cooke et al., 1997; Cooke & Memedovic, 2003; Cooke & Morgan, 1994b; 1998, pp. 70-72; Malmberg & Maskell, 1997; Morgan & Nauwelaers, 1999b; Santos, 2000; Saxenian, 1996; Storper, 1995); and
- '**Sectoral and technological systems of innovation**'. (Breschi & Malerba, 1997; Carlsson & Stankiewicz, 1991; Dahmén, 1988; Nelson, 1996), which also comprises the prominent 'cluster' concept (Organisation for Economic Co-operation and Development, 1999c, 2001; Porter, 1990, 1998a, 1998b; Porter et al., 2001; Porter & Sölvell, 1998)

These three integrative 'systems of innovation' approaches are yet all based upon common influences (see Edquist & McKelvey, 2000b) from 'institutional theories' (Cooke & Morgan,

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<sup>98</sup> Charles Edquist & Maureen McKelvey's reference collection entitled 'Systems of Innovation: Growth, Competitiveness and Employment' compiles articles and book chapters on national, regional, sectoral and technological systems of innovation as well as relevant case studies in the first volume (2000a), while the second volume (2000b) covers contributions regarding interactive learning and networks of innovation, evolutionary theories of innovation, institutionally theories, innovation and growth, and concerning the dynamics of government policy and firm strategy. The author highly recommends this reader to fellow researcher and students alike as a valuable introduction to the study on innovation systems.

<sup>99</sup> Please note that the references indicated for the three strands of 'systems of innovation' is not identical with the list of papers that appear in Edquist & McKelvey's (2000a) reader. Although akin, the list of references here only comprises a conscious selection of them, which was enlarged by further key sources added by the author.

<sup>100</sup> The term 'national system of innovation' was coined by Lundvall (1992b), for which he names Friedrich List's (e.g. 1885a) concept of 'The National System of Political Economy as his source of idea (cf. Freeman, 1995, p. 5).

1998; Edquist & Johnson, 1997; List, 1885a; Rosenberg, 1960; Zysman, 1994), ‘evolutionary theories of innovation’ (Dosi, 1988; B. Johnson, 1992; McKelvey, 1997; Nelson & Winter, 1977; Schumpeter, 1976b) and those that highlight ‘interactive learning and networks’ (Asheim & Cooke, 1999; DeBresson & Amesse, 1991; Florida, 1995; Hassink, 2001; Henderson, 1998; Kline & Rosenberg, 1986; Lundvall, 1988; Malecki & Oinas, 1999; Malmberg & Maskell, 1999; Tödtling, 1999). The latter includes the notion of ‘innovative networks’ and ‘learning regions’, which are closely linked to the ‘regional innovation systems’ strand.<sup>101</sup>

The last two of the common characteristics concern more the conceptual nature than its contents. In relation to the label ‘conceptual framework’ or approach as applied to systems of innovation, Edquist (1997, p. 28) points to the distinction between “‘hard core’ theories which are proven and not disputed’ and ‘formal models, conceptual frameworks useful for the generation of hypotheses, and empirical generalizations, etc.’”<sup>102</sup> Cooke (1998, pp. 11-12; and very akin Cooke & Memedovic, 2003, p. 6) also differentiates between ‘operational’ and ‘conceptual’ systems. The former ‘refers to a real phenomenon’, while the latter ‘represents a logical abstraction’.

In regard to conceptual pluralism, it suggests that in taking such an approach means that we ‘do not define the limits of the systems in an operational way’ (Edquist, 1997, p. 27). Nelson

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<sup>101</sup> The author wishes to highlight the special issue (Volume 7, Number 6, December 1999) of the *European Planning Studies* on ‘Innovation Networks, Collective Learning, and Industrial Policy in Regions of Europe’ guest-edited by Franz Tödtling, which comprises some valuable paper (e.g. Capello, 1999; Koschatzky, 1999; Legendijk, 1999b; Tödtling, 1999; Tödtling & Kaufmann, 1999) on the topic of ‘innovative networks’.

<sup>102</sup> Edquist (1997, p. 28) also refers in this respect to Nelson & Winter’s (1982) distinction between *appreciative theorizing* that ‘tends to be close to empirical substance and empirical work’, which is interpreted and expressed verbally by abstract reasoning; and *formal theorizing*, which ‘at some intellectual distance from what is known empirically’ proposes instead ‘an abstract structure expressed in highly stylised form’ in order to check logical connections.

& Rosenberg (1993, pp. 4-5) also similarly acknowledge in this respect that ‘it provides no sharp guide to just what should be included in the innovation system, and what can be left out.’ However, Lundvall (1992a, p. 13) argues in favour of a broad definition to ‘be kept open and flexible’ in order to reflect ‘the importance attached to interactive learning as a basis for innovation’. Thereby, it maintains the systemic nature and avoids the alternative definition of the narrow ‘linear model of technical change’ and innovation.

In consequence, the systems concept can rather be defined as an ‘analytical tool’; representing ‘a specific methodological approach’ that is a common analytical framework and hence ‘is not itself a substantive theory’. By using this definition, it is not necessary to have ‘clear-cut boundaries’ but, therefore, it leaves the understanding of a system approach ‘open to flexible interpretation’.

In order to overcome some of this ‘conceptual plurality’ and ambiguity that comes with applying such a broad, generic definition, Edquist (1997, p. 27) suggests that any attempts at specification is to be complemented by trying ‘to identify the core elements in systems of innovation, and focus on the relations between these.’ In this respect, Edquist (1997, p. 20) also highlights that ‘[c]omparisons are crucial for policy purposes; for the identification of problems that should be subject to intervention. Such comparisons between systems must be genuinely empirical and would therefore be similar to what is often called “benchmarking” at the firm level’. This is because it can be argued that there is no such thing as an optimal system (see also N° 4 above), which is partly due to the ‘cooperative, trust-dependent and associational character’ of innovation systems (Cooke et al., 1997, p. 490) that requires to

take account of the individual idiosyncrasies. This would also reflect the apparent difficulty in researching the all-important *systemic* dimension, as reported by Cooke (1998, p. 2).

The next few sections identify some elements of innovation systems. Since the thesis has already discussed the concept of a cluster and thus presented an industry perspective, it refrains from elaborating more on ‘sectoral and technological systems of innovation’ here, and instead focuses in the next few sections on the spatial delimitations, especially upon the regional innovation systems strand. Thus, although the concept is arguably open-ended, there are some distinct models but as the thesis hypothesises these current conceptualisations of regional innovation systems do not adequately capture the regional and in particular sub-regional governance dynamics. This section begins by looking at national innovation systems.

### *National innovation systems*

In line with the explanations given above, Lundvall (1992a, p. 2) defines that ‘a national system encompasses elements and relationships, either located within or rooted inside the borders of a nation state’. It, therefore represent a social and dynamic system, which is determined by the national-cultural and the state-political dimensions, and therefore differs across national economies ‘regarding the structure of the production system and regarding the general institutional set-up’ (Lundvall, 1992a, p. 13).<sup>103</sup> These ‘complex combination of institutions that support learning processes and technological accumulation’ are what determine national systems of innovation (1997, p. 236).

The basic international differences in terms of ‘historical experience, language, and culture’ are viewed by Lundvall (1992a, p. 13) as to reflect the ‘national idiosyncrasies’ in the following *elements* of the national innovation system: ‘internal organisation of firms; interfirm relationships; role of the public sector; institutional set-up of the financial sector; and, finally, R&D intensity and R&D organisation.’<sup>104</sup> In an attempt to measure national innovation systems, Patel & Pavitt (1994, p. 81) provide a narrow, very linear, delimitation that mainly focuses on the key organisations, namely business firms, universities, and educational institutions.

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<sup>103</sup> For a very brief overview on national systems of innovation, see also Malecki (1997, pp. 235-237).

<sup>104</sup> Chris Freeman (1995, p. 7) also indicates that ‘many features of the national systems of innovation which are at the heart of contemporary studies’ were already analysed by Friedrich List’s (1885b) work on the ‘National System of Political Economy’, and that he also stressed already the ‘governmental responsibility for education and training and for developing an infrastructure supporting industrial development’ (Lundvall, 1992a, p. 16).

While Morgan (2001a, p. 19) disapproves the concept's 'silence on sub-national institutions', Cooke & Morgan (1998, p. 27) especially criticize the mainstream literature on national innovation systems for the 'little room' it provides for what they call 'intermediate institutions, be they sectoral organizations (like trade associations) or territorial bodies (like local chambers and regional technology transfer centres).'<sup>105</sup> Hence, they add 'intermediate institutions' to their own, more contemporary and broader defined, list of six key elements for an effective national system of innovation (ibid., pp. 25-27). The five remaining elements are the role of R&D, the ensemble of education and training institutions, the financial system, the network of user-producer relationships, and finally social capital as an intangible asset.

### ***Regional innovation systems: from conceptualisation to construction***

Cooke first coined the term *Regional Innovation Systems* (1992; cf. 1998, p. 2) but the concept became popularised through the influential edited book by Braczyk, Cooke & Heidenreich (1998b). Cooke provides a very useful and detailed summary to their so-named theoretical and empirical construct, which he (1998, p. 2) traces back to the work on national innovation systems, naming the writings in Lundvall (1992b) and Nelson (1993) as key influences. Furthermore, Cooke (1998, p. 2) also acknowledges that it builds upon the various earlier conceptualisations that are linked to what has been referred to elsewhere (Moulaert & Sekia, 2003) as 'territorial innovation models'.

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<sup>105</sup> According to Cooke & Morgan (1998, p. 71), the 'full panoply of innovation organizations' constitutes a (regional) innovation system.

### *Decoding Regional Innovation Systems*

The regional innovation systems (RIS) concept can be decoded and analysed by dividing it into its three separate terminological parts, which serve as key underlying explanatory features. Accordingly, the concept comprises an understanding of the predominance of the ‘regional’ level, the ‘innovation’ focus, and a ‘systemic’ view.<sup>106</sup>

To elaborate, the regional innovation systems approach conceptualises *regions* as ‘types of collective order’ that are ‘sub-central administratively and cohesive culturally’ (Cooke, 1998, pp. 16 and 24). It also embraces an evolutionary and systemic understanding of innovation<sup>107</sup> - very much like that presented earlier in this thesis. In addition, it also makes use of the systemic approach, which sees *innovation* as ‘the result of social interaction between economic actors’ in ‘an open system, which interacts with its environment’ (Cooke & Memedovic, 2003, p. 5). Thereby, it stresses the importance of the institutional environment (as outlined before from an institutionalist perspective) and takes an *associative view*, which sees learning, innovation and change ameliorated by cooperation and relational proximity.

In consequence, Cooke (Cooke, 1998, pp. 24-25; Cooke et al., 1997, p. 490) defines the *regional innovation systems* concept ‘in terms of a collective order based on micro-constitutional regulation conditioned by trust, reliability exchange and cooperative interaction’ (see also Cooke & Morgan, 1998, p. 71). Malecki (1997, p. 262) sees the concept

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<sup>106</sup> Similarly, Nelson & Rosenberg (1993, pp. 4-5) also introduce the concept of national innovation systems by discussing the three terms: national, innovation and system.

<sup>107</sup> Cooke (1998, p. 9) succinctly states the following: ‘If we remember that innovation is defined as the *commercialization* of original knowledge, as distinct from invention, which is the original knowledge itself, then the need for rapid response becomes obvious’.

comprising ‘the local institutions that support learning in firms and workers’, while stressing that ‘many of the greatest challenges’ for the network ‘are people-related’.<sup>108</sup>

It becomes obvious that the concept relies heavily upon the linkages and dynamic relationships between the devolved individual conceptualisations of a region, innovation and of a system. Several questions can be asked concerning these linkages such as whether regional innovation exists or whether it is systemic (cf. Cooke, 1998, p. 3). These questions influenced the analytical framework for the empirical work in this thesis, which is discussed in the chapter on the research methodology.<sup>109</sup> As suggested, the models do not adequately capture the regional and in particular sub-regional governance dynamics.

Cooke et al. (1997, p. 489) point out that systemic innovation ‘implies the loose coupling of subsystems’ – regarding which they ‘have identified finance, learning and productive culture as key subsystems’.<sup>110</sup> However, the focal point of this strand becomes clearer when the

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<sup>108</sup> In the German literature and policy programmes, the regional innovation systems concept is often also presented as a concept of ‘regional competence centres’ (*regionale Kompetenzzentren*) defined as the spatial agglomeration of innovation actors (cf. Boekholt, Clark, Sowden, & Niehoff, 1998; Roland Berger & Partner, Fraunhofer Management GmbH, & Willoughby, 1998, p. 8; Schätzl, 2001, pp. 234-238) with a particular emphasis on innovative businesses and science excellence at universities.

<sup>109</sup> By looking at each combination of the ‘three dimensions to the debate’ (i.e. region-innovation, region – system, and innovation – system) from both angles, this study identifies the following *six particular sets of questions* that can be posed. First, with regards to the ‘region-innovation’ combination, the questions are: Does the *region* has an innovation agenda, and which level of governance is the most active and/or most targeted concerning innovation policy? Where does *innovation* practically happens (e.g. at the regional level)? Secondly, with regards to the ‘region-system’ combination of dimensions, the questions are: Does the *region* aims to provide for a system (policy)? Is the present *system* anchored at the regional level, or does it include important actors or sub-systems at other levels? Finally, with regards to the ‘innovation-system’ combination: Are *innovation* mainly driven by systemic influences? Is the *system* foremost geared towards innovation? Yet, due to the focus of this study on governance, not all of these are raised.

<sup>110</sup> According to Cooke et al. (1997, p. 488), the productive ‘cultural aspects most closely linked to “systemic quality” in an innovation system’ comprise the following list: culture of cooperation; associative culture; learning culture; experience and ability to carry out or incorporate institutional changes; coordination and public / private consensus; productive culture (labour relations, cooperation at work, company commitments to social well being, and productive specialisation); existing interface mechanisms (in the scientific field, in the technological field, in the productive field, and in the financial field; different types of learning capacity; social valorisation of the use of science; university linked to the productive system; non-bureaucratised educational and training system linked to the productive system.



proclaimed ‘key pillars in the “systems house” of regional innovation are investigated (Cooke & Morgan, 1994b; Körfer & Latniak, 1994)’, which according to Cooke (1998, p. 3) are ‘business networking, technology transfer and vocational training’.

Cooke (1998, p. 19 and cf. p. 21) sees in particular ‘the *governance* infrastructure and the *business* superstructure’ as constitutive key dimensions of innovation activity, which to some extent are described as alluding to the key elements of ‘systemness’ and ‘clusteredness’. Cooke (1998, pp. 19-24 ) has presented a classification of different modes of regional innovation systems concerning both dimensions, for which the main characteristics are summarised in tabular form below.

The governance dimension (see Table 8) corresponds to ‘modes of regional technology transfer’ (i.e. the nature of providing a soft infrastructure of enterprise innovation support’), namely: grassroots, network, and dirigiste as proposed by Cooke (1992). The latter business innovation dimension (see Table 7) refers to ‘modes of business interrelationship’ (i.e. the extent to which innovation activities are geographically localized or globalized), for which Cooke & Morgan (1994a) have proposed the localist, interactive, and globalized modalities.

However, it is argued here that such a typology of regional innovation systems does not adequately capture the governance dynamics within regions. First of all, it is believed that in reality regions have far too many particularities as to allow regional governance systems of business and innovation support to be put into a straightjacket of just three idealised modalities. Secondly, as a result of the key argument of this thesis, it is believed that most categorisations of regional innovation systems (such as North Rhine-Westphalia in Figure 4) do not bear close examination due to underlying differing governance dynamics at the sub-regional level.

Table 6 Governance infrastructure - Three modalities of regional technology transfer

Characteristics	Grassroots RIS	Network RIS	Dirigiste RIS
<i>Initiation</i> process of technology transfer	Locally organized	Multi-level	Animated by central government policies
<i>Funding</i>	Diffuse mix of local banking, local government, possibly chamber of commerce capital, grants and loans	Guided by agreement among banks, government agencies and firms	Centrally determined (perhaps at decentralized agency locations)
<i>Research</i> competence	Highly applied or near market	Mixed, with both pure and applied	Basic or fundamental
<i>System coordination</i>	Supra-local	High	Potentially high
<i>Specialization</i>	Low (generic problem-solving)	Flexible	Likely to be high

Source: Own creation solely based upon Cooke (1998, pp. 19-21); modalities of regional innovation systems (RIS) initially proposed by Cooke (1992)

Table 7 Business superstructure - Three modalities of business interrelationship

Characteristics	Localist RIS	Interactive RIS	Globalized RIS
<i>Domination</i>	Large enterprise, either indigenous or inward investment	Balance between large and small firms	Global corporations, often supported by clustered supply chains of dependent SMEs
Research <i>reach</i> of firms	Not very great; local	Varies between widespread access or regional research resources to foreign innovation sourcing as and when required	Largely internal
<i>Public</i> and/or <i>Private</i> research activity	Major public but smaller private R&D resources	Mix of public and private R&D resources	Highly privatistic rather than public
Degree of <i>associationalism</i>	Reasonably high	Higher than average	Heavily influenced by the needs of larger firms

Source: Own creation solely based upon Cooke (1998, pp. 21-24); modalities of regional innovation systems (RIS) initially proposed by Cooke & Morgan (1994a)

The regional innovation systems (RIS) concept hence can be seen as a ‘governance approach’ that can ‘assist in understanding of the differences and similarities in terms of level and degree of institutionalization of the RIS, the extent, by implication, that “systemness” can be said to be present, even (on the basis of case studies) whether “regional innovation” is a meaningful notion in concrete instances’ (Cooke, 1998, p. 19). For this purpose, Cooke combined the classificatory schema of both dimension to propose a typology of regional innovation systems, which then was applied to the empirical case studies that featured in the book (Braczyk et al., 1998b). The result is reproduced in Figure 4 below.

Figure 4 Regional innovation systems: towards a typology

		Grassroots	Network	Dirigiste		
Globalized Interactive Localist	Localist	Tuscany	Tampere Denmark	Tohoku (Japan)	Business Innovation	
	Interactive	Catalonia	Baden-Württemberg	Québec		
	Globalized	Ontario California Brabant	North Rhine- Westphalia	Midi-Pyrénées Singapaore		
Governance of enterprise innovation support						

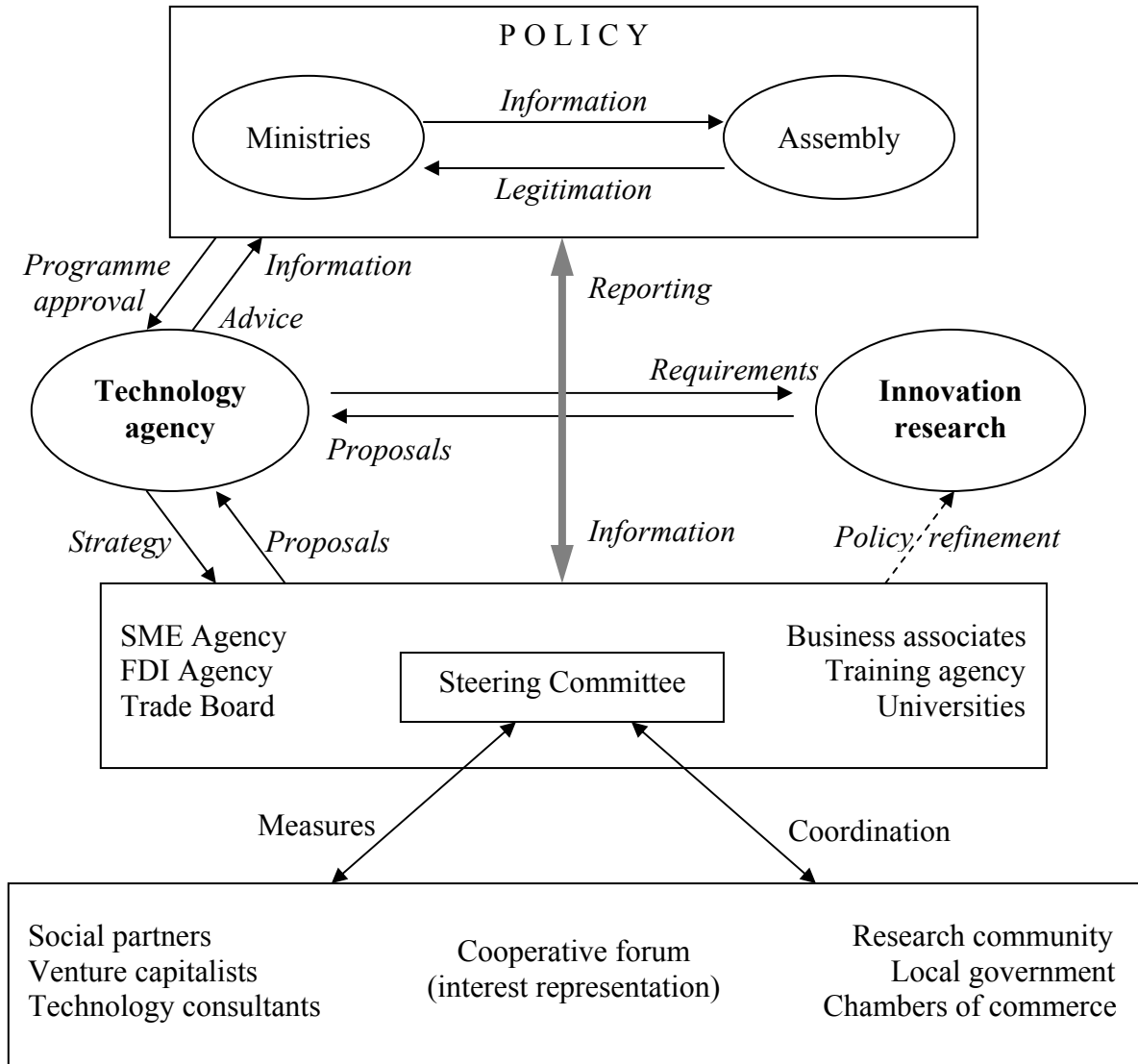
Source: Cooke (1998, Figure 1.2 on p. 22)

By providing a ‘conceptual model of an innovation governance system’(Cooke, 1998, p. 25), the approach certainly overcomes the *national* system of innovation literature ‘silence on sub-national institutions’ (Morgan, 2001a, p. 19). Cooke (1998, p. 17) basically outlines the

essential elements and processes ('key nodes and flows of information, authority, advice and so on') to the 'functioning of an innovation support architecture'.

In contrast to the national innovation system (see Lundvall, 1992a, pp. 12-13), however, the regional conceptualisation is a more 'narrow' orientation, not just spatially, but also as a result of the objective to 'be more operational' (Cooke et al., 1997, p. 489). Nelson & Rosenberg (1993, pp. 4-5), in their understanding of [national] innovation systems, do not presume that the system is 'consciously designed, or even that the set of institutions involved work together smoothly and coherently'. Cooke (1998, pp. 17-18) on the other hand seems to suggest that it is consciously designed and aims to provide an operational guide to the construction and governance of 'regional enterprise innovation support system' by presenting an adaptation of the formal conceptual model after Joanneum Interreg (1995) (see Figure 5 below). The question remains, however what operational guidance it offers. The diagram implies that a cooperative forum and a steering committee are to be established, a technology agency to be created (if not existent already), research to be carried out, and reporting and coordination measures to be introduced, but it does not offer any guidance for how to achieve an inclusive participation of stakeholders or how to overcome vested interests and inter-institutional conflicts that are regarded here as key determinants of regional and subregional governance dynamics.

Figure 5 A regional enterprise support system for innovation



Source: Cooke (1998, Figure 1.1 on p. 18) after Joanneum Interreg (1995)

Cooke & Morgan (1998, p. 71) also regard a regional *innovation* system as an advanced form of a regional *learning* system, in which ‘upstream [or inventive] and downstream or applied research is integrated into regional industry’. The following quote illustrates this view neatly:

Regions which possess the full panoply of innovation organizations set in an institutional milieu where systemic linkage and interactive communication among the innovation actors is normal, approach the designation of regional innovation systems. [...] Moreover, they should demonstrate systemic linkages through concertation programmes, research partnerships, value-adding information flow, and policy action lines from the governance organizations. These are systems that combine learning with upstream and downstream innovation capability and thus warrant the designation *regional innovation systems*. (Cooke & Morgan, 1998, p. 71)<sup>111</sup>

Cooke & Morgan (1998, pp. 72 and 71 respectively) add that '[r]egional innovation systems of the upstream variety will approximate to Porterian (1990) "clusters"' in that interactions are 'close to the point of origination of the invention or idea'. However, a distinction needs to be made between clusters and regional innovation systems. This point is discussed in the next section.

In summary, it can be concluded that the regional innovation systems approach regards regions an economic space (i.e. geography matters in industrial organization), as relational space (i.e. institutions matter), as well as a location to drive innovation (i.e. proximity in a wider sense matters for learning and innovation). However, the question is, the extent to which such a model adequately captures the totality of regional and in particular sub-regional governance dynamics. The thesis turns to look at cluster models.

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<sup>111</sup> The omitted passage lists examples of such innovation organizations. It (Cooke & Morgan, 1998, p. 71) states the following: 'The organizations can be expected to consist of universities, basic research laboratories, applied research laboratories, technology transfer agencies, regional public and private (e.g. trade associations, chamber of commerce) governance organizations, vocational training organizations, banks, venture capitalists, and interacting large and small firms.' Elsewhere, Cooke (1997, p. 362) provides a broad categorization to this long list of organizations by stating that '[a] *regional* innovation system [...] is composed of economic (e.g. firms, private research institutes), institutional (e.g. education institutions, government departments, chambers of commerce), technological (e.g. technology transfer agencies) and social sub-systems, which interact continuously with each other and operate as a system.'

### ***Clusters and Regional innovation systems compared***

The regional innovation system concept can be viewed as emanating from the convergence between the concept of the cluster and the national systems of innovation theory (see Cooke, 1998, p. 24). Indeed, when introducing his concept, Cooke (e.g. 1998, pp. 5 and 10) makes particular reference to Porter's cluster concept. However, he (ibid., p 10) stresses clearly that his interest lies in the 'systemic rather than simply aggregate nature' of the cluster phenomenon. Cooke et al. (1997, p. 476) further distinguish their approach by stating that they rather take a regional instead of a sectoral 'lens through which to observe the ways in which different sectors or even clusters interact with the regional governance and innovation support infrastructures as well as the national and global levels.'<sup>112</sup>

Cooke & Memedovic (2003, p. 21) also state that 'globally competitive regional and local industrial clusters [...] are often telescoped versions of regional and even national innovation systems, especially where science-based, as with biotechnology and ICT' are concerned.<sup>113</sup>

Hence, they see (ibid., p. 2) 'clusters as specific sub-systems operating within regional innovation systems settings'. In this view, as seen before, the cluster represents the business superstructure dimension of the regional innovation system (cf. also Landabaso, 2002, p. 22).

In return, competitive industries tend to cluster in a particular *system* of determinants, which

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<sup>112</sup> Cooke et al. (1997, p. 476) have thus made the important distinction between sectors and clusters, since Chechire & Malecki (2004, p. 259) rightly point out that the cluster concept is [w]idely misapplied in the regional literature as merely the collection of sectors that have traded interactions, indicated by input-output linkages'.

<sup>113</sup> Although akin, both models have to be distinguished clearly, even if one is seen as a sub-system of the other. For clarification, the distinction is put here in different words. On the one side, the cluster model is seen as a particular model of industrial organization theories that describes a potentially favourable situation for firm's growth in a particular spatial setting. Basically, it helps to classify and to explain how a competitive advantage of firms as well as of locations (for firms) arises and thus focuses more on interfirm competition. While, on the other side, an innovation system is seen here more as a classification model and a modular construction system for policy-makers in order to achieve a favourable, associative business environment and superstructure with effective linkages to firms, which may lead eventually to a forming of, or sustaining of, clusters.

for Porter (1998b, pp. 148-149) is the ‘diamond’ competitive model while it is for Cooke the collaborative ‘regional innovation system’. While the cluster concept arguably focuses on interfirm relationships and on competitive factor conditions, the regional innovation systems concept places an emphasis on learning, collaboration and its systemic facilitation or governance of the ‘support system for innovation’ (Cooke & Memedovic, 2003, p. 2).<sup>114</sup> This perspective is also illustrated by Cheshire & Malelecki’s following comment:

[S]maller scale systems [than the national system of innovation (NSI)] are variously called clusters, territorial production complexes, productive systems, territorial systems, milieus, and local systems [but] can nevertheless be seen to belong under the umbrella of regional innovation systems. (P. C. Cheshire & Malecki, 2004, p. 258)

The following section elaborates on the concept of cluster, as the ‘business superstructure’ dimension of regional innovation systems. The next chapter then addresses operational policy aspects.

#### *Porter’s cluster of competitive industries*

Michael Porter’s theory of national competitive advantage ‘constitutes one facet’ of Porter’s systemic ‘diamond’ model of national competitive advantage (Porter & Ketels, 2003, p. 27) that comprises an understanding of industrial organisation characterised by competitive clusters of industries. Porter (1990; 2nd ed. in 1998b, p. 131 and cf. also p. 148) states that ‘competitive industries are not spread evenly through the economy’ but instead ‘are connected

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<sup>114</sup> Cooke & Memedovic (2003, p. 2) also add that ‘[r]eference is made both to the support systems for innovation, from the private actions of the market to the interventions of governments, and to the ways in which well-functioning systems and clusters may have their own formal or informal governance.’



[...] in *clusters* consisting of industries related by links of various kinds'.<sup>115</sup> He defines (1998b, p. xxii of the preface) the concept of *clusters* as 'groups of interconnected firms, suppliers, related industries, and specialized institutions in particular fields that are present in particular locations'.<sup>116</sup>

The geographical proximity of rival firms, customers, suppliers, institutions, and so on, is supposed to spur competition and hence promotes efficiencies and specialization (cf. Porter & Ketels, 2003, p. 27). It enables companies, for example, to gain quickly from external economies of scale by benefiting from the process of innovation and upgrading that occurs in its surrounding environment (Grichting, 1976, pp. 77-79 ; Porter, 1998b, p. 144), which includes universities located nearby that are regarded as sources of new ideas and as providing demand stimuli (Porter, 1998b, pp. 159-160). Therefore, it 'increases the concentration of information', and also 'acts as a strong magnet to attract talented people' (ibid., p. 157).<sup>117</sup>

The cluster concept comprises a clear intra-firm strategic management perspective that views innovation as key to inter-firm competitiveness as well as to some extent recognises the role of the socio-institutional environment as influencing factor condition that goes beyond the pure phenomenon of accumulation of firms in specific locations based upon agglomeration advantages. Clusters further 'improve incentives' and enhance the formation of new

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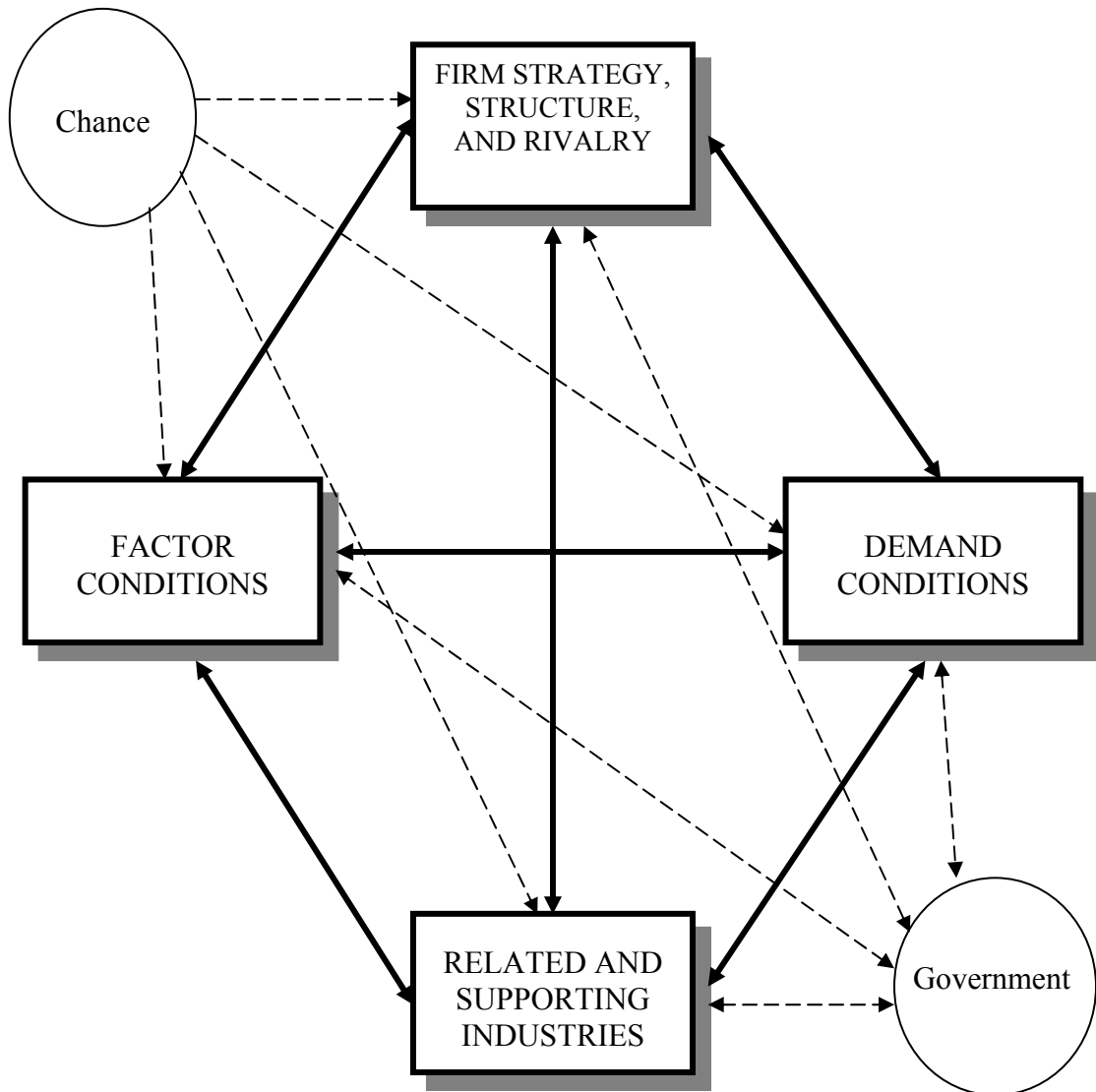
<sup>115</sup> Porter (1998a, see Table 7-1 on p. 262 and pp. 284-287) himself provides a neat extensive bibliography of cluster initiatives, and cluster-based reports and case studies for the years between 1990 and 1997.

<sup>116</sup> Thereby, Porter acknowledges the role of the business support superstructure, even though specialized institutions such as universities are rather regarded - in a static way - as a factor endowment grouped under *knowledge resources* (see Porter, 1998b, p. 75). However, Porter (1998b, p. 134) nevertheless attributes to them being a potential source of dynamic factor creation as a result of industry-research relationships.

<sup>117</sup> Porter's notion of the 'magnet' obviously resembles the 'centripetal force' (Fujita & Krugman, 2004, p. 156; Myrdal, 1957) of Marshall's (1947, p. 271) 'industrial district' of 'groups of skilled workers'.

businesses as well as ‘create collective assets in the form of information, specialised institutions, and reputation, among others’ (Porter, 1998b, pp. xxii-xxiii of Introduction).

Figure 6 Michael Porter's diamond model



Source: Porter (1998b, p. 127)

In this respect, Michael Enright (1998, p. 333), a colleague of Porter at the Harvard Business School, suggests that its not just the increased competition that drives a regional cluster but, equally, the increased cooperation which derives from strategic interdependencies. According

to Enright, it is this, mix, which gives the cluster an advantage over, in contrast to, dispersed industries. Moreover, Rosenfeld (1997, p. 9) stresses that ‘[i]n a cluster the social ecology is as important as the agglomeration economies.’

However, Porter’s cluster concept and other conceptualisations of industrial organization and transactions lack an explanation of the underlying dynamics within socio-institutional framework in regional economic development as well as of how innovation evolves.

*Critical reflections - Deconstructing clusters?* <sup>118</sup>

The notion of clusters was not new neither its conceptualisation. Indeed, it builds very much upon Schumpeter’s ‘swarming’ or clustering of industry (cf. J. M. Simmie, 2001, p. 16) and resembles, to some extent, the earlier ‘growth poles’ (*pôles de croissance*) concept of Perroux (1955), who captured thereby the ‘clustered imbalances (in sectoral and geographical space) that result from the adoption of innovation, as Lasuén (1973, p. 164) points out (cf. also Malecki, 1997, pp. 254-255; Schätzl, 2001, pp. 182-189).<sup>119</sup> Porter’s cluster concept is to be seen as a description of specific industrial grouping, or concentration, with a competitive advantage (which was derived from a firm’s perspective) that is portrayed as the outcome of a particular conducive (‘diamond’) system of determinants (cf. Porter, 1998b, pp. 148-149). While Porter conceptualises this grouping mainly within a national perspective or system,

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<sup>118</sup> The title hints to Martin & Sunley’s paper (2001; 2003) entitled ‘Deconstructing clusters: chaotic concept or policy panacea?’

<sup>119</sup> In a presentation entitled “Clusters: A chaotic concept leading into a spacious policy cul-de-sac?” (at a conference on “Cluster Policies and Local Enterprise: Benefits to You”, held on November 28<sup>th</sup> 2002 by the Mercia Institute of Enterprises as part of the EnterpriseFest 2002 at the European Research Institute at the University of Birmingham), Ray Hudson of Durham University quoted, for example, also a White Paper of Regional Development in the North East (known as The North East Study) from 1963 to point out that the ideas about clusters are not new.

others like Enright (1998, p. 315) or Cooke (1998, pp. 10-11) do so at a regional (subnational) level or within a regional system of determinants fostering competitiveness and innovation.<sup>120</sup>

Porter (1990; 2nd ed. in 1998b, p. xiii in the preface and p. 173) himself acknowledges that his theory of national competitive advantage and his cluster model ‘draws on and spans several fields’ meaning that it is a ‘holistic approach’ (cf. also Porter's late account of historical and intellectual antecedents in 1998a, pp. 206-208). His diamond model hence has been labelled as being rather ‘eclectic’ (Clark, 1999, p. 152), but Rugman & D’Cruz (1993, p. 20), and similarly Raines (2002b, p. 176), for example, see it as a special achievement having brought these different ideas together as holistic determinants of the ‘diamond’ framework (cf. Schierenbeck, 1999, pp. 10-18).

On the other hand, Martin & Sunley’s (2001, p. 11) base their strong criticism and attempt to ‘deconstruct’ the cluster concept exactly on this aspect as they label it as a ‘metaphor’ being ‘deliberately vague and sufficiently indeterminate’ instead of ‘[r]ather being a model or theory to be rigorously *tested and evaluated*’. Martin & Sunley point out that ‘clusters, it seems, have become a world-wide fad, as sort of academic and policy fashion item’ (ibid., p. 4) that ‘have gate-crashed the economic policy arena’ due to its ‘seductive’ nature (p. 5).<sup>121</sup>

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<sup>120</sup> Porter (1998b, pp. 148-149) states that ‘[t]he systemic nature of the “diamond” promotes the *clustering* of a nation’s competitive industries.’ The resulting industrial grouping can take the form of an industrial districts, which Porter (1998a, footnote 5 on p. 269 regarding p. 204) views as ‘a special case of clusters’. This is supported by Enright (1998, p. 315), who accordingly states that ‘[r]egional (subnational) clusters include geographically concentrated industries (including so-called “industrial districts”) and differ from business networks (which involve communication and cooperation among firms that need not to be located in close physical proximity)’.

<sup>121</sup> Raines (2002a, p. 22) also addresses the questions ‘that have been consistently raised about whether the cluster concept has simply “hijacked” economic development policy discourse by re-labelling existing policy approaches with little added value, or “piggy-backed” it by extending the existing policy concepts through the introduction of novel frameworks, targets, instruments and processes of policy intervention.’ In short, it’s the question whether cluster policy exist (‘as an autonomous, distinctive area of public sector endeavour’) as Raines title indicates. In response to this question, Raines (2002a, p. 29 and cf. p. 30) seems to partly prefer the ‘piggy-backed’ label. While obviously agreeing to the ‘considerable debt of current cluster policy to previous policy

They describe the model as a ‘chaotic concept’ (ibid., p. 11) and conclude that its definition ‘seems intentionally opaque and fuzzy’ (p. 13).<sup>122</sup>

In consequence, this ‘fuzziness’ obviously leads to different interpretations of clusters and it has been labelled as an ‘adaptable approach’ with regards to policy-making (Raines, 2002b, p. 176). Despite the criticism it has received on some of its conceptual shortcomings and limits, it can be argued that the cluster concept can be used as an analytical tool.<sup>123</sup> It can be argued that some of the ‘fuzziness’ also derives from this adaptability, meaning that the cluster concept’s interpretation in effect has also evolved by incorporating different new influences. These changes have been adequately outlined by Lagendijk’s (1999a, p. 4) Table as follows:

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traditions’ and its proximate boundaries to other policy portfolios, he notes - with reference to Mariussen (2001) – the cluster concept’s ‘ability to re-combine related but hitherto autonomous policy traditions’. See also the later section on the cluster concept’s policy relevance or contribution.

<sup>122</sup> In a presentation in 2002 (see footnote 119), Ray Hudson also called the cluster concept ‘chaotic’ due to its ‘conceptual fuzziness’. Raines (2002a, p. 22) also reports that ‘[t]he fuzziness of the target of clusters policies is reflected in the portfolio of working definitions used for a “cluster”, ranging from simple commercial networks to traditional sectors to more sophisticated inter-sectoral, business-academic groupings.’

<sup>123</sup> The author of this study wishes to acknowledge here his affinity to the cluster concept. This affinity as well as similarly the earlier refusal to denounce the, though abstract, notion of regional competitiveness (see earlier discussions) may be grounded in the author’s strategic management study background.

Table 8 Six changes in the conceptualisation of 'clusters' identified by Lagendijk

1. Perceiving of clusters as an analytical model, derived from observations of the dynamics of co-located interrelated industries (Porter's Competitive Advantage of Nations).
2. Associating clusters with spatial agglomeration (introducing the concept among geographers).
3. Linking clusters to concepts of innovation (notably to the notion of 'systems of innovation', moving the concept further into the area of policy-making).
4. Building a bridge between clusters and an associative approach to economic development (toning down the 'rivalry' element in the original cluster approach).
5. Gearing cluster approaches towards the development of SMEs (inciting a close marriage with the notion of networking), introducing the concept into the area of business development.
6. Inserting the cluster concept in various concept in various ongoing debates, such as the 'learning economy', 'trades' vs. 'untraded' linkages, the local-global nexus, and issues of regional specialisation; here the difference between clusters as analytical model and policy strategy is increasingly blurred.

Source: Lagendijk (1999a, Table 1 on p. 4)

### Identifying clusters

Nevertheless, it can be argued that there are problems concerning the cluster concept, especially regarding identifying clusters for policy development. However, the key problem issue is not so much the *non*-excluding feature of it in admitting a wide range of specialisations and determinants, as Martin & Sunley try to suggest (2001, p. 11), but instead the *non*-definition of a critical mass, on what a cluster constitutes, which rather represents the other side of the same coin. To be more precise here, it is more the definitional incompleteness of scale not just scope that is often problematic. Yet, on the aspect of scale, Porter (1998b, pp. 739-744) has actual provided a *methodology to identify or measure (national) industrial clusters*, which is predominantly based on comparative export data.<sup>124</sup>

<sup>124</sup> In order to prepare national cluster charts, Porter (1998b, p. 739) proposes to mainly use the *United Nations International Trade Statistical Yearbook* together with national data on FDI and services trade as a basic source.

Based upon Porter's methodology, the European Cluster Observatory provided in June 2007, for the first time, a consistent quantitative cluster mapping analysis of European clusters based on employment data.<sup>125</sup>

It can be argued that Porter's 'cluster chart' methodology identifies a kind of 'minimum efficient scale' for a dynamic 'outward-orientated cluster' (Porter, 1998a, p. 227) in terms of competitive firms.<sup>126</sup> However, this methodology is limited and static in that it only identifies industrial sectors with a comparative performance, while it is not capable to provide clues for future potential nor to outline key ingredients and competencies of a cluster. Rosenfeld (1997, pp. 10-12) ascertains that the key to the synergy and competitiveness of a geographical cluster is not just the 'concentration and critical mass of related firms', i.e. size and capabilities (cf.

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To derive the 'basic raw material', he suggests to identify all three-, four- and five-digit SITC industries 'in which the nation's share of the world market economy exports in the industry equalled or exceeded the nation's average share of world trade in the year (referred to as the nation's cutoff).' In simple words, it's the identification of all those national industries that exhibit an above-average national export performance. From this 'raw material' list of industries, Porter (1998b, pp. 740-741) proposes then to eliminate those industries, which display a negative trade balance - that is where the industry's imports are higher than the exports - (unless they have a high world export share); which are dominated by foreign companies as part of their global manufacturing strategy; and those for which their trade was mainly with neighbouring nations. To arrive at the final cluster chart, he also suggests supplementing the list by those industries, which undertook substantial FDI, and by service industries. Porter (1998b, p. 741), however, points out that in particular the statistical 'data on foreign investment and services trade are highly incomplete' and hence preparing a cluster chart may need a researcher's 'judgment' (e.g. based on field interviews). Furthermore, there are, of course, also some statistical limitations in using such an approach. The industrial classification of the statistical data (SITC, SIC) may, for example, not capture accurately cluster activities that span across different sectoral classifications. A European Commission publication (2005e) compiled by the Enterprise and Industry DG entitled 'EU sectoral competitiveness indicators' also provides a good source of statistical data on the competitive performance of EU industry (i.e. competitiveness), sector by sector, going back as far as 1979. The report is available at [http://europa.eu.int/comm/enterprise/enterprise\\_policy/competitiveness/doc/eu\\_sectoral\\_competitiveness\\_indicators.pdf](http://europa.eu.int/comm/enterprise/enterprise_policy/competitiveness/doc/eu_sectoral_competitiveness_indicators.pdf)

<sup>125</sup> The results are available at <http://www.clusterobservatory.eu>

<sup>126</sup> Porter (1998a, p. 227, emphasis added) distinguishes between '*outward-orientated clusters*' (which can be regional clusters) that 'account for a major share of the economy within a geographic area as well as an overwhelming share of the outward-oriented activity (for example, exports to other locations and investments in other locations by locally based firms' and two other types of local clusters, namely '*localized industries and clusters* that do not compete with other locations (for example, restaurants, entertainment, logistical services, real estate, and construction); and *local subsidiaries of competitive firms based elsewhere* that primarily serve the local market (for example, sales of offices, customer support centers, branch offices, and assembly plants)'. Please also note that normally, the term *minimum efficient scale* (MES) is used - in a different context - for the scale of the individual enterprise 'at which unit costs cease to fall' (Pratten, 1988, p. 18).

Porter, 1998a, pp. 198 and 240), but equally the presence of ‘active channels for business transactions dialogue, and communications’, which determine the ‘dynamics of a clusters’. Hence, it can be argued that Porter does not take sufficient account of the way how clusters evolve and decline – even though he outlines the different cluster stages of development and conducive factors (1998a, pp. 204 and 237-245; 1998b, pp. 159-173 and 545-546).<sup>127</sup>

Instead, the regional innovation systems concept can be considered as model which focuses more on these aspects and, therefore, places more of an operational emphasis on how clusters evolve and how they, perhaps, can be created and supported by the governance of enterprise innovation support. Nevertheless, it is not the intention here to imply that the cluster concept has not of any value in developing a suitable policy. Far from that, this thesis argues that the cluster concept should certainly remain part of this process. It is seen here as being particular useful in order to improve the understanding of the individual characteristics and dynamics of the business superstructure, which represents one dimension of the regional innovation systems. Insofar, it presumes that dynamic clusters shape the overall functioning of their regional innovation systems and that, vice versa, effective regional innovation systems shape the composition of their dynamic clusters of industries, i.e. give rise to new clusters and sustain and/or alter existing ones.

Indeed, there is a clear consensus in the literature that there is no ‘one-size-fits-all’ best-practice policy model or ‘blueprint’ to economic development policy in general, and to promote innovation, clusters, and innovation systems in particular (e.g. Burroni & Trigilia, 2001, p. 78; Cooke & Morgan, 1998, p. 25; den Hertog, Bergman, & Charles, 2001a, pp. 413-

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<sup>127</sup> Indeed, Feldman, Francis, & Bercovitz (2005, p. 130) criticize in general the current literature for their ‘limited understanding of how clusters emerge, take hold and transform regional economies’.



414; Martin & Sunley, 2001, p. 42; Nauwelaers & Morgan, 1999, p. 236; Piore & Sabel, 1984, p. 15; Raines, 2002b, p. 166). Instead, regional policies, for example, ought to be geared towards the idiosyncrasies of the individual region, taking into account the composition, structure and strength of the production system; its main drivers; the political, social and cultural peculiarities; the nature of research activities, cooperation and competences; and so on (see, for example, the characteristics outlined in Table 8 and Table 9) in order to become a more effective. An in-depth understanding of the particular production system or cluster is therefore pivotal to the success of policies. Hence, the next section elaborates on the different views on clusters.

### *Cluster characteristics*

The above-mentioned notion of a ‘critical mass’ is often made in discourses on clusters (e.g. Ache, 2002, p. 27; Advani, 1997; Boekholt et al., 1998, p. 3; Porter, 1998a, pp. 198 and 240; Schätzl, 2001, pp. 234-235 and 239; Temple, 1998, pp. 266-268; van den Berg, Braun, & van Winden, 1999, p. 15).<sup>128</sup> Proposing to define a critical mass of a cluster, to some extent, subliminally assumes that clusters are all alike and one particular phenomenon. However, the literature seems to be in accord with the view that this is not the case. This study refrains here from providing a litany of the different definitions brought forward of what a cluster constitutes (cf. instead the examples drawn by De Propis, 2005, p. 198; Martin & Sunley, 2001, Table 1 on p. 15) and, hence, contents itself with Porter’s definition stated above.<sup>129</sup>

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<sup>128</sup> Boekholt et al. (1998, p. 3), for example, define the *critical mass* of regional high-tech clusters or ‘Kompetenzzentren’ as ‘the [unspecified] number of institutions, firms and people working in a particular technological area [that] is sufficient to create synergy effects and economies of scale’. See also Footnote 137.

<sup>129</sup> In addition to the different definitions applied, different terms have also been used interchangeably to describe clusters, or specific cases of it (such as industrial districts). For instance, Boekholt et al. (1998, pp. 1 and 3) refer to the German term of *Kompetenzzentrum* (see Footnote 137). Martin & Sunley (2001, p. 18) point

Instead, it presents a list of some basic common characteristics that clusters are supposed to exhibit as well as a congregation of different typologies of clusters. While the former list obviously highlights the similarities, latter supports the view that clusters (of competitive industries) can take different forms and be based upon different competitive advantages.<sup>130</sup>

Rosenfeld (2002, p. 6) succinctly identifies the basic *distinctive characteristics* of clusters.

His outline is borrowed and recited here in very brief form:<sup>131</sup>

- Clusters are based on systemic relationships among firms.
- Clusters are geographically bound.
- Clusters have life cycles.
- Clusters are not defined by organisational membership.
- Clusters produce externalities
- Clusters are defined by relationships.

Cooke (1998, pp. 10-11) also mainly differentiates between the notions of ‘innovative regional cluster’ and ‘innovative industrial cluster’ (depending on whether they are geographically defined or not). Thus, the former rather represents a geographically localized and the latter a globalized, more virtual version of a cluster. This later more virtually defined cluster to some extent reflects various contributions (Clark, 1999, p. 154; Dunning, 1993, p. 105; Rugman & D'Cruz, 1993, p. 34) towards the conceptualisation of what is termed here

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out that French analysts (e.g. Crouch et al., 2001; Crouch & Trigilia, 2001, p. 213 and cf. index) rather refer to ‘local production systems’ (LPS). This, of course, potentially causes confusion and misinterpretations, increasing the ‘fuzziness’ of the conceptualisation..

<sup>130</sup> Nonetheless, it could alternatively also be argued that, in contrary, the typecasting is born out of conceptual polyphony. This alternative view, however, is not shared here.

<sup>131</sup> Elsewhere, Rosenfeld (1997, p. 9) also distinguishes between networks and clusters with a tabular juxtaposition.

‘international industrial clusters’, which highlight the influence of multinational business activity (MBA) and hence the potential multinational nature of clusters.<sup>132</sup>

In addition, often in the more practical policy-maker’s domain, references are made to local ‘clustering’ or swarming of similar business in the same neighbourhood.<sup>133</sup> It can be argued that this co-location represents more the classical case of pure agglomeration. Yet, also Porter makes reference to ‘local clusters’ (1998a, p. 228 and cf. p. 227) and ‘*microclusters*’ as ‘narrowly defined clusters’ (1998a, p. 267), while Crouch et al. (2001) conceptualise ‘local production systems’ as the concentration of manufacturing activities that are identified on the basis of ‘travel to work area’ (TTWA) data.<sup>134</sup> David Campbell’s notion of ‘micro cluster groups’ also seems to go beyond cases of pure agglomeration of firms.<sup>135</sup> Campbell refers to

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<sup>132</sup> This study coins the term ‘international industrial clusters’ as a label for these contributions, while not being aware that any of the authors provided a notion of such term. However, Rugman & D’Cruz (1993, p. 34) refer to international competitiveness and the double [national] diamond, while Dunning (1993, p. 105) and Clark (1999, p. 154) point to the influence of multinational business activity (MBA) on Porter’s (1998b, p. 127) diamond.

<sup>133</sup> For instance, Diane Rayner from the Federation of Small Businesses gave the example of ‘antique shops’ that often appear to ‘cluster’ in a presentation given during a session on ‘Cluster Policies and SMEs’ at a conference on ‘Cluster Policies and Local Enterprise: Benefits to You’, held on November 28<sup>th</sup> 2002 by the Mercia Institute of Enterprises as part of the EnterpriseFest 2002 at the European Research Institute at the University of Birmingham. One can obviously think of many other examples of co-location of certain businesses in close proximity such as ‘diamond quarters’ or ‘caravan sales streets’ and so on. This co-location basically produces simple agglomeration advantages in terms of reputation and marketing.

<sup>134</sup> Unfortunately, local production systems (LPSs) were not defined consistently in the different national studies compiled by Crouch et al. (2001) but they ‘were usually identified with industrial districts’ (Crouch & Trigilia, 2001, p. 212-213). Burrioni & Trigilia (2001, Footnote 2 on p. 47) define a *local production system* as ‘a Travel to Work Area which has a percentage of persons employed in manufacturing activities higher than the national average’. For the different methodologies of identifying LPSs, compare Burrioni & Trigilia’s (2001, p. 51 including Footnotes 4 and 5) use of the ‘Location Quotient’ (LQ) indicator; Glassmann & Voelzkow’s (2001, p. 80 and see Notes 2 and 3 to table 4.1 on p. 83) use of the Gini coefficient and localization coefficient; Aniello & Le Galès’ (2001, p. 129 and cf. also p. 149) list of indicators; and Crouch & Farrell’s (2001, pp. 160, 164, and 173) methodology of distinguishing ‘empirical clusters’ of SMEs.

<sup>135</sup> David Campbell, Director of the Regional Centre for Clustering in North Tyneside entitled ‘Regional Service for Clustering’ (RSC, see [www.clustering.org.uk](http://www.clustering.org.uk)) has elaborated their RSC cluster development approach and his notion of ‘micro cluster group’ in his presentation entitled ‘Creating Innovative Clusters’ at a Conference on ‘Employment creation through support for sectors and clusters’, held on December 9<sup>th</sup> 2003 by the Institute of Local Government Studies, School of Public Policy, The University of Birmingham, at Garth House, University of Birmingham Conference Park, Birmingham. David Campbell highlighted in particular their ‘*Bit of a Do*’ *Wedding Cluster* ([www.bitofado.com](http://www.bitofado.com)) as a successful best practice model.

Please note that this study made reference to this initiative purely on the creative aspects. The author abstains to comment further on this as no evaluation of the cluster development programme and funding has been undertaken due to the limits of this study. Interested readers may turn instead to Lagendijk’s (1999a) AL

them as networks or groups of small businesses that create quickly economies of scale by the pooling of marketing and research activities as well as by complementing each other's production range. The difference here is that these groups involve a collaborative dimension towards the formation of (fee-paying) specialised business clubs. They are created or policy-led in that the cooperation is reactively and proactively brought together by a regional business support service, which not only provide the partner matching and searching services but also business advice (mainly concerning marketing and accounting). Although this approach is regarded as a viable business support approach, it is viewed here more as a horizontally integrated business network than a cluster. Nevertheless, it can be argued – as Campbell does - that, potentially, 'micro cluster groups' could initiate a cluster development and turn into 'macro clusters'. However, in most cases this will remain 'wishful thinking' judging from the rareness of cases where consensus has been reached that they constitute a real phenomenon of a successful 'working clusters'.<sup>136</sup> The success of such transformation arguably depends upon conditions that are external to the group. The innovativeness and potential of the network to span advantages over to other sectors as well as its linkages to the wider business superstructure and specialized institutions are likely to be key in reaching a competitive advantage (that is difficult to copy and imitate) and a critical mass to constitute a cluster in Porterian sense.

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ADAPT report, which incorporates an analysis of SME cluster policy initiatives in Tyneside, North East England, including reference to the RSC. Interestingly, the European Commission's regular publication *European Innovation* (formerly *Innovation and Technology Transfer*) in its September 2006 issue (p. 19) has also reported upon a potentially similar policy example of the Brainstorming Innovation Group (BIG) project at Technology Enterprise Kent, in England, in setting up a "wedding ring" in which a 'wedding service supply chain' promotes 'each other's services and hence increase sales.

<sup>136</sup> While Porter (1990; 1998b, p. 149) indicates that industrial clustering is more of a common phenomenon, he also points out in his later work (Porter & Ketels, 2003, p. 28) that '[o]nly a small number of clusters tend to be true innovation centres. Others may tend to specialise in products aimed at particular market segments, or be manufacturing centres.' a later other authors have pointed out that successful, self-sufficient working cluster are a much rarer real phenomenon.

Moreover, different *drivers of clusters* can be identified and form the basis of a typology. Boekholt et al. (1998, pp. 4-5) from Technopolis compared internationally successful cases of regional high-tech clusters or ‘Kompetenzzentren’<sup>137</sup> - the German term they used for it - and mainly distinguished three different types depending on whether they were science & technology-led (which includes the classical entrepreneurial cases of Silicon Valley and Route 128 near Boston)<sup>138</sup>, industry-led (but in cooperation with academic research)<sup>139</sup>, or policy-led (i.e. rather artificially planned and brought together by policy).<sup>140</sup> Regarding the first-mentioned, Feldman et al. (2005, p. 130) actually refer to the typical case stories of Silicon Valley and Route 128 rather as ‘innovative industrial clusters’, which they contrast to their model of ‘entrepreneurial cluster’ (ibid., p. 132). Latter can be depicted as an interconnected and reinforcing system of the dimensions of entrepreneurs, government policy, and local environment. Ann Markusen’s (1996, p. 293) typology of industrial districts as ‘sticky places in slippery space’<sup>141</sup> also differentiates according to ‘firm configurations, internal versus

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<sup>137</sup> Boekholt et al. (1998, pp. 1 and 3) refer the concept of *Kompetenzzentrum* also to a type of ‘centre of excellence’ (or Competence Centre) and define it in its broadest sense as ‘a regional agglomeration that manages to create added value through a well networked “value chain” ranging from knowledge creation to commercialisation and diffusion, in one or more technology based markets. This value chain contains the elements basic research, applied research, development commercialisation and diffusion.’ This definition can be criticized for its mainly linear view of innovation.

<sup>138</sup> Porter (1998a, footnote 6 on p. 269 regarding p. 204) points out that university-centred clusters are sometimes also termed as *technopoles* and *science cities*, giving Advani (1997) as an example.

<sup>139</sup> Another distinction is made in this respect by Birkinshaw & Hood (1997, pp. 9-10 and abstract), who distinguish two polar types of industry clusters depending on the level of foreign investment. On the one side they define the *leading-edge cluster* as one that is ‘based on innovation and knowledge, with historically low levels of foreign ownership’, while on the other side the *branch plant clusters* refer to industry clusters that emerged ‘on the basis of market-access or low-cost, and with historically high levels of foreign ownership’.

<sup>140</sup> In addition to this typology, Boekholt et al. (1998, pp. 103-105) also point out that the development of regional high-tech clusters or ‘Kompetenzzentren’ follows different phases in the technology life cycles. See also Crouch & Farrell’s (2001, pp. 175-198) distinction between industrial districts, policy-stimulated clusters and market driven clusters. Roland Berger & Partner et al. (1998, pp. 10-11) similarly differentiate five types of ‘Kompetenzzentren’ or technopoles, namely industrial complexes of high-technology firms; science cities; technology parks of high-technology production firms driven by government or university initiatives; metropolitan types; and virtual types.

<sup>141</sup> With her phrase of ‘*sticky places in slippery space*’, Markusen (1996, pp. 293 and 294) describes the puzzling feature of certain places that ‘are able to sustain their attractiveness to both capital and labour’ and ‘maintain relatively high wage levels, social wages, and quality of life’ although the ‘production space’ (especially in the advanced capitalist countries) ‘has become increasingly “slippery”, as the ease to capital of moving plants grows and as new competing lines are set up in lower-cost regions elsewhere.’ industrial districts According to

external orientation, and governance structures'. Besides the traditional 'Marshallian industrial district' and its 'Italianate variant' linked to 'flexible specialization' - normally referred to as 'new industrial district' (e.g. Markusen, 1996, p. 294) or 'Post Marshallian industrial district' (Hanson, 2001, p. 44), Markusen (1996, p. 293 and see Table 1 on pp. 298-299 and Figure 1 on p. 197) adds three additional types: 'a hub-and-spoke industrial district, revolving around one or more dominant, externally orientated firms; a satellite platform, an assemblage of unconnected branch plants embedded in external organization links; and the state-anchored district, focused on one or more public-sector institutions' (e.g. military bases, universities).

Porter (1998a, p. 204 and footnote 5 on p. 269) further differentiates the nature of clusters according to their *industrial structures*. He distinguishes between clusters that 'consist primarily of small- and medium-sized firms' (referring to the Italian 'industrial districts' and footwear cluster and to the North Carolina home furniture clusters) and those clusters that 'involve both large and small firms (for example, Hollywood or the German chemical clusters).' This latter mix of large and small firms can be distinguished further into 'hub-and-spoke industrial district' and 'satellite platforms' according to Markusen's (1996, see Figure 1 on p. 197) above-mentioned typology. Similar to Porter, Crouch et al. (2001) distinguish three types of local production systems (LPSs), namely *industrial districts* of 'networks of SMEs'<sup>142</sup>; *networked firms* characterized by 'large customer firms' involved in 'subcontracting relations with SMEs'; and *empirical clusters of SMEs* with 'a lower level of

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Markusen (1996, p. 294), '[s]tickiness connotes both ability to attract as well as to keep, like fly tape, and thus it applies to both new and established regions.'

<sup>142</sup> Crouch & Farrell (2001, p. 163) neatly state that '[a]ll industrial districts will be examples of clusters, but not all clusters will form industrial districts.' Hence, as stated before, industrial districts represent one special case of a cluster or local production system. See also Burroni & Trigilia (2001, pp. 47-48) and Le Galès & Voelzkow (2001, pp. 10-11) for a more detailed definition and elaboration of industrial districts.

horizontal integration in comparison to industrial districts' (Crouch & Trigilia, 2001, pp. 213 and 221-224; cf. Rodriguez-Pose, 2001, p. 41).<sup>143</sup>

This list of different typologies of cluster presented here is certainly not exhaustive, yet it covers most of the important characteristics or criteria - labelled here as typology dimensions - according to which clusters can be classified.<sup>144</sup> Table 11 provides a useful summary to this discussion.<sup>145</sup>

The next chapter looks at governance and policy aspects including how to build successful innovation systems by facilitating cluster development and constructing institutional thickness.

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<sup>143</sup> These three types are all distinct 'from local systems characterized by one or more traditional large firms (for instance, the "one company town" model)' as Crouch & Trigilia (2001, p. 213) add. These local systems are instead labelled as 'large-firm dominated regions' (Crouch & Farrell, 2001, p. 193) as they do not constitute a cluster (of interconnected firms). Crouch & Farrell (2001, pp. 160, 164, and 173 respectively) distinguish *empirical clusters* of SMEs (according to their comparative sectoral concentration of manufacturing employment and number of firms) into industrial districts; concentrated clusters and weak clusters; and simple clusters.

<sup>144</sup> This study abstains here from making a distinction, for example, between 'traditional', 'modern' and 'high-tech' clusters (cf. Boekholt & McKibbin, 2003, p. 10; Crouch & Farrell, 2001, p. 184; Crouch & Trigilia, 2001, p. 217) because of its misleading potential to underestimate the role of innovation in traditional sectors as indicated by Porter (1998b) and Scott (1999) and since clusters often involve 'both traditional and high-tech industries' (Porter, 1998a, p. 204).

<sup>145</sup> The applied categorization in the table is simplified in the way that many notions of types of clusters fall not only into one category but can be listed under several typology dimensions. An attempt was made, however, to categorize according to priority and avoid duplicated notions for reasons of aiming to provide clarity to an already complex illustrative overview. In consequence, the table's according limitation has to be acknowledged.

Table 9 Typologies of clusters

Typology dimension	Types of Clusters	Sources/Advocates (e.g.)
Sectoral/Industrial	Sectoral clusters; Innovative industrial clusters (i.e. globalized, more virtual and not particularly geographically defined); [International industrial clusters]	Lasuén, Perroux; Cooke; Rugman, Dunning, Clark
Geographical/spatial delimitations	[National] clusters; Mega-cluster	Porter I, Porter II; den Hertog et al.
	Regional [meso-level] clusters; Innovative regional clusters	Enright, Porter II; Cooke
	Local clustering, swarming; Marshallian industrial districts, agglomerations; Local clusters, Microclusters; Local production systems	Schumpeter; Marshall, Markusen, Gordon & McCann; UNCTAD, Porter II, Crouch et al.
Modes of cooperation/ Degree of associationalism	Competitive clusters; Vertical clusters; Industrial complex model of clustering; Innovative clusters; Concentrated clusters	Hanson; Arndt; Gordon & McCann; UNCTAD, Simmie; Crouch et al.
	Associational clusters; Integrative networks; Network (or club) model of clustering; Micro-clusters, Micro cluster groups; Organized clusters; New industrial districts (Italian type)	Hanson; Arndt; Gordon & McCann; Crouch et al., Campbell; UNCTAD; Markusen, Hanson
	Informal / Simple clusters (of SMEs); Marshallian industrial district	UNCTAD / Crouch et al.; Markusen, Hanson
Evolutionary/ Development stages	Embryonic, growing, mature, and decaying clusters	Rosenfeld, Boekholt et al., Martin & Sunley, Porter
	Working, latent, potential, and ‘wishful thinking’ clusters	Enright, Rosenfeld, Martin & Sunley
	Absorptive, self-sufficient, knowledge intensifying, and self-creating clusters	van den Hove et al.
Driving factor/ Modes of governance	Science-led clusters; University-centred clusters, technopoles, science cities	Boekholt et al.; Porter II, Martin & Sunley, Advani
	Industry-led / Market-driven clusters	Boekholt / Crouch et al.
	Policy-led / Policy-stimulated clusters; Artificially constituted clusters; State-anchored industrial districts	Boekholt / Crouch et al.; UNCTAD; Markusen
	Entrepreneurial clusters	Feldman et al.
Industrial structure/ Firm configurations	Clusters of SMEs, industrial districts	Porter II, Crouch et al.
	Clusters of large and small firms	Porter II, Crouch et al.

Source: Own creation.



## CHAPTER 6

### INNOVATION POLICY: FROM THEORY TO STRATEGY

The previous chapter discussed the regional innovation system strand and the concept of the cluster. This extends the understanding of both the conceptualisations and the tools for identifying industrial organization and competitive environments that is pivotal to the forming of suitable and successful policy. The thesis now turns to governance aspects of clusters and regional innovation systems; in particular, what policies are pursued, and by whom. It looks at institutionalist policy suggestions for constructing institutional thickness as well as the flaws in policy. It maps out what is currently theorised as being part of the regional innovation system, as a prelude to the empirical investigation. The findings from the case studies challenges the assumptions made about regional innovation systems, in particular the governance aspects.

The starting point for discussing policy interventions is the role that is attributed to the state. For instance, Cooke & Morgan (1998, p. 17) point out that, while there is a consensus in that ‘the state has a legitimate duty to set the basic framework conditions – law, security, social and economic infrastructure, and so on’, which, in a broad sense, includes the basic infrastructure provision of ‘such public goods as education, training, and basic research’ (ibid., p. 18) – there is ‘little or no political agreement as to what role the state should play on economic development’ (ibid., p. 17).

*Rationales for policy intervention: Market failures versus government failures?*

The rationale for policy intervention must be explained by the need to offset certain market failures such as market power (e.g. monopoly), information problems (e.g. uncertainty concerning investment risks and quality standards), imperfect private capital markets, externalities and public goods (e.g. free-rider problem) (Department of Trade and Industry, 2003a, pp. 63-66; Navarro, 2003, p. 3; Pelkmans, 2001, pp. 273-277; Stubbs, 2001, pp. 144-145).

The ideological shifts that have taken place (following the Second World War) in this respect have been widely reported (e.g. Cooke & Morgan, 1998, pp. 17-24; Morgan & Nauwelaers, 1999b, pp. 11-12), with three main traditions being outlined: the Keynesian interventionist state, neo-liberalism with a view of the state with only 'limited nightwatchman functions' (Cooke & Morgan, 1998, p. 18), and the currently emerging 'third way' of an associational conception.<sup>146</sup> The new policy focus moreover appears to be on creating 'good business climates' (Cooke, 1998, p. 3) for all 'existing and emerging clusters' (Porter, 1998b, p. xxvii of Introduction).<sup>147</sup> The emphasis is therefore more on (the government's role as animateur) facilitating clustering, cooperative behaviour and cluster formation instead of directly

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<sup>146</sup> The first dominant conceptualisation was that of a dirigiste, '*Keynesian state*', perceived to be 'a benign force in promoting and regulating economic development' (Cooke & Morgan, 1998, p. 17); which was succeeded by the opposite '*neoliberal traditon*, which seeks to substitute the market for the state wherever possible' (Morgan & Nauwelaers, 1999b, p. 12) and which perceives the state as a 'malign force which had to be rolled back to the limited nightwatchman functions it performed in the nineteenth century' (Cooke & Morgan, 1998, p. 17). Morgan & Nauwelaers (1999b, p. 11) write that 'the state is gradually being rehabilitated as a necessary and legitimate agent in economic development, after a period when it was denigrated [...] as a "dead hand" on social and economic progress.'

<sup>147</sup> However, whether we have seen in consequence a withdrawal from industrial policy 'in large measures' as Cooke (1998, p. 3) suggests, is doubted here. The first-mover advantage in emerging technologies for firms and in consequence for regions is - as it is believed here without providing prove - still a too tempting policy objective to focus upon many governments. For instance, Raines (2002b, pp. 172-173) reports of 'some cases' where the cluster approach has been used as a medium for 'a risky strategy to develop [...] the kind of "wishful thinking" clusters discussed by Enright (2000)'.

supporting or subsidising existing clusters. How to do this in practice is generally not covered by any of the two models.

The most widely accepted implication upon policy however is that the public sector ought to ‘organise publicly funded R&D or to enhance the incentives of private firms to invest in knowledge creation’ (Navarro, 2003, p. 3). Thus, the rationale behind the advocacy of government financial support for R&D, or technology policy goes back to the particular characteristics of innovation. Arrow (1962b) has famously outlined the attributes of uncertainty, indivisibility, and inappropriability, which ‘make it inadvisable to leave the allocation of resources for invention (and, by implication, technological progress) to the market mechanism’ (Stubbs, 2001, p. 143).<sup>148</sup> Instead, government ought to pool the risks, remove obstacle and provide additional incentives to undertake and utilize R&D because its knowledge output is assumed to spill-over and thus provide a higher social return than just the individual private return of investment (cf. Department of Trade and Industry, 2003a, p. 68; Navarro, 2003, pp. 3-4; Stubbs, 2001, pp. 143-146).

#### *Providing a basic innovation infrastructure*

The advocacy of investment in the basic infrastructure provision of such public goods builds upon the insights from the ‘new growth theory’ (NGT). While traditionally the focus of economic development policies was on the accumulation of capital, the findings of the new growth theory placed a particular emphasis upon the role of human capital, knowledge and learning for economic growth. In this respect, Haas (1995, pp. 77-92) suggests there is a need

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<sup>148</sup> In explanation (cf. Stubbs, 2001, pp. 144-145) this is due to the associated high risks involved in undertaking research, the unwillingness to contribute to the costs of developing freely available public goods (i.e. free-rider problem), and the difficulty in protecting the new ideas or technology from imitation.

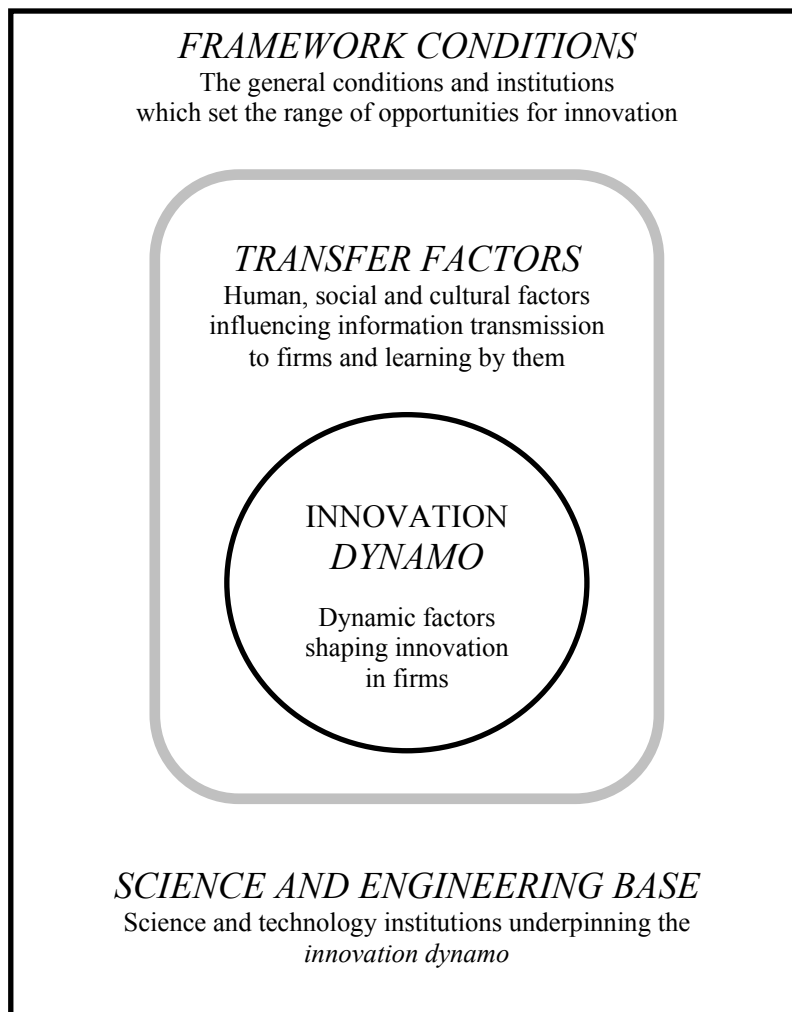
to maintain investment support but that it should focus upon innovation and education policies, while also arguing generally in favour of a supranational research and technology policy.

The conceptual framework ‘for the policy terrain for a generalised national system of innovation’ of the 2<sup>nd</sup> edition of the Oslo Manual (Organisation for Economic Co-operation and Development & Eurostat, 1997, pp. 18-24) outlines three broad categories of factors that ‘shape innovation at the firm level’ (representing the fourth category referred to as the “innovation dynamo”), namely the broader framework conditions (i.e. the surrounding environment of national institutions, legal arrangements, macroeconomic and educational settings); the science and engineering base; and factors for the transfer and absorption of technology, knowledge and skills. The following diagram (Figure 9) illustrates these four domains within the innovation policy terrain as outlined by the OECD<sup>149</sup>:

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<sup>149</sup> With its footnote 10, the Oslo Manual (ibid., § 76 on p. 19) acknowledges that “[t]his approach to mapping innovation policy issues has its antecedents in a method discussed in Department of Industry, Science and Technology (1996), *Australian Business Innovation: A Strategic Analysis – Measures of Science and Innovation* 5, Australian Government Publishing Service, Canberra.

Figure 7 The innovation policy terrain - a map of issues



Source: Organisation for Economic Co-operation and Development et al. (1997, Figure 1. on p. 19).

**Innovation Policy towards Building Innovation Systems: Facilitating cluster development and constructing institutional thickness**

It can be argued that innovation policies need to be geared towards *building successful innovation systems*, which at its core is in effect a twofold strategy: facilitating cluster development and constructing institutional thickness. A third, horizontal, axiom is that

innovation policy needs to become a holistic paradigm that dominates the policy discourse and infiltrates all policy fields with its agenda and vision.

As such the latter very much concerns the interactive way in which policy-making takes place. The consequent systemic-ness or coherence of this process is here under particular spotlight in this thesis, and not just the institutional set-up of the innovation system, the latter being seen here as a contributor to the former. Quite apart from the normative aspect, this thesis suggests that these processes are inadequately conceptualised. That they are would lead to policy and process failure. This thesis further argues that the role of inter-institutional and inter-personal dynamics and obstacles are underestimated and widely neglected in the literature.

This suggested policy agenda is reflected in the structure of this chapter. The next section first discusses the potential success factors and policy suggestions brought forward by the cluster and institutional literature, before turning to common policy obstacles and flaws/pitfalls. It begins by asking what is innovation policy.

### ***What innovation policy?***

Innovation policy is defined here not in a narrow sense, meaning all those policies that are directly aimed at fostering innovation performance of businesses, but more in a wider sense comprising a whole range of economic development policies that are geared in a strategic approach towards favourably influencing - directly or indirectly - the conditions of businesses to innovate and thus compete successfully on a global scale.

However, since innovation policy draws heavily upon other policies such as education, research & technology, regional, industrial, start-up support, SME, and cluster policy (see also Figure 10), the question can be raised whether innovation policy per se actually exists.<sup>150</sup>

The thesis returns to this issue later on. It looks at what is generally argued to be the success factors for innovation.

### *Success factors for innovation and how government can influence them*

The UK Government's Department of Trade and Industry, (2003a, pp. v and 22-23; 2003b, pp. 18 and 25), among others, has identified seven broad critical *success factors for innovation performance*, which thus determine the strength of innovation systems.<sup>151</sup> They are:

- sources of new technological knowledge;
- capacity of companies to absorb and exploit new knowledge;
- access to finance;
- competition regime and entrepreneurship;
- customers and suppliers;
- regulatory environment; and
- networks and collaboration.

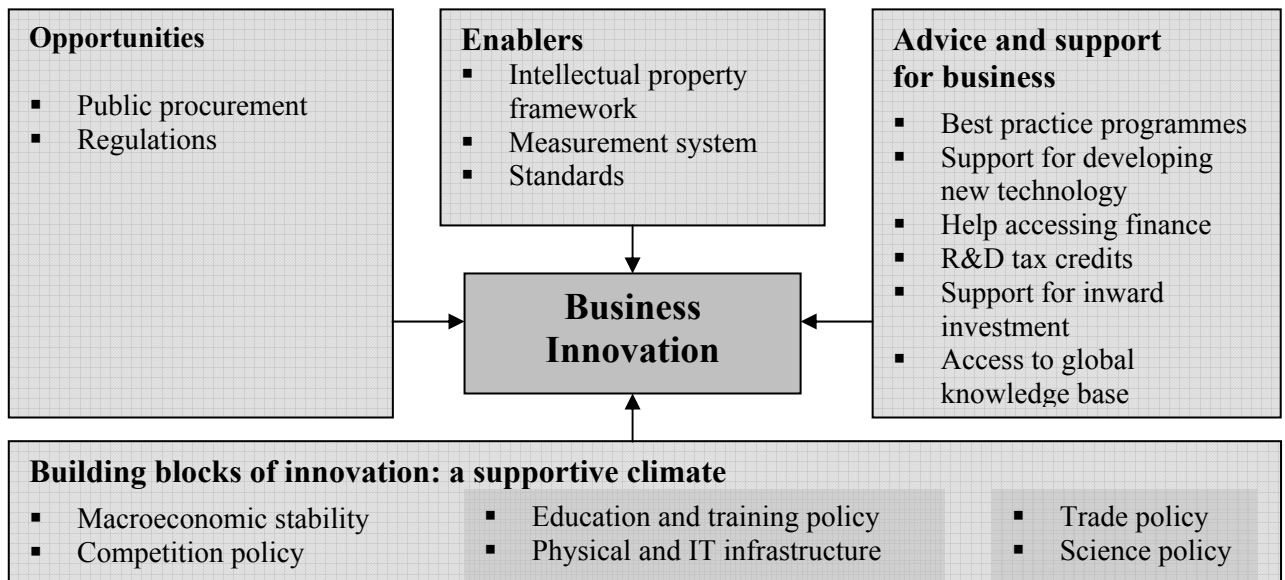
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<sup>150</sup> Philip Raines (2002a), for instance, asked the same question concerning cluster policy.

<sup>151</sup> Alternatively, according to the variables of Pfirmann's (1991, pp. 186 and 256-258) PLS-model, innovation influencing factors comprise the following list: agglomeration (population density, share of services close to the production sector and of high-value, history/age of sector e.g. past employment in industry); labour market (share of skilled and highly-qualified employees, share of employment in production); innovation infrastructure (university and non-university R&D personnel); product life cycle (Unemployment, capital intensity in production, and spatial structure); density of R&D intense sectors (share of employment in R&D intense sectors); regional average firm size (in terms of employees); regional average firm age (years since establishment); R&D input (average number of employees and expenditure for R&D per firm, share of R&D employees of all employment); R&D output (number of patent applications and granted patents per firms); innovation output (turnover share of new firm products and totally new products to the market, turnover share of products benefiting from process innovation); and growth of the gross value added in production.

Figure 10 also illustrates the ways in which government policies influences the innovation performance of businesses. While these rather generic lists of factors may, to some extent, be useful for guiding an analysis of the strength and weakness of an innovation system, they nevertheless clearly insufficiently address governance aspects, and in particular *how* to create collaborative, and not just supportive, environments for innovation at the local and regional level.

Figure 8 How Government policies influence innovation



Source: Department of Trade and Industry (2003b, Figure 1.4 on p. 26)

In their conclusion, Braczyk & Heidenreich (1998, pp. 438-439) also derive a *set of strategies* from the results of the 14 regional case-studies on ‘how to develop new regional cooperation and innovation networks within an established industrial and institutional order’. In shortened form, these strategies include:



- Dialogue-orientated economic policies that integrate different businesses into common innovative projects (possibly supported by a system of tax incentives for innovations);
- the utilization of mutual producer-user communication and coordination processes within the innovation networks for knowledge and technology transfer;
- encouraging staff mobility between the science and industry spheres (e.g. via training courses, traineeships, dissertations, etc.) by providing financial incentives and establishing science-industry linkages (university transfer and contact points);
- developing new venture capital instruments;
- reforming collective wage agreements and vocational training courses; and
- supporting business export strategies through governmental or public advisory bodies abroad (e.g. by setting up foreign branches of chambers of industry and commerce or a foreign assembly plant for domestic supplier-consumer networks).

#### *Narrow business support outreach*

In addition, there appears to be significant shortcomings and obstacles to the efficient provision of advice and support for businesses. Morgan & Nauwelaers (1999b, p. 15), for example, report that enterprise support systems often represent a weakness of LFRs, with potential assets of local knowledge and social capital not being fully mobilised and exploited. The Green Paper on Innovation (Europäische Kommission, 1995b, p. 22) states in this respect that some 60-80% of SMEs are expected to be unable or unwilling to take advantage of these support services and external competence (within the maze of funding application procedures and different support services). According to Morgan & Nauwelaers (1999b, p. 15), the problem is ‘that enterprise support agencies in LFRs often lack the skills to engage in

interactive service provision' (i.e. staff with more intimate knowledge of key sectors) that results in a 'credibility problem vis-à-vis the private sector'. The challenge is illustrated neatly by their following quote:

The challenge of interactive service provision, in which the aim is to design services *with* rather than *for* corporate clients so as to enhance the latter's absorptive capacity, cannot be met through traditional supply-side regional policy; that is to say, technology centres and the like are not likely to resolve the innovation deficit in LFR-based firms if the latter are unable to exploit these services – the 'cathedrals in the desert' syndrome. (Morgan & Nauwelaers, 1999b, p. 15)

In line with Morgan & Nauwelaers's critique, Lagendijk (1999a, p. 11) also declares that 'despite the proliferation of support initiatives [...], the effectiveness of most business support is still questionable'. Indeed, he (*ibid.*, p. 6) reports that 'a large part of the regional business support services' are characterised by a 'lack of focus, depth and continuity, as well as fragmentation and internal rivalries'. Lagendijk (*ibid.*, p. 11) makes reference in this respect to 'a kind of support fatigue' as reported by Hassink (1996), which reflects the consequent increasing mistrust and 'disillusionment' of SMEs with support agencies, that 'had to *sell* their service' to find interested clients. Similarly, Bentley & Gibney (2000, p. 221) warn of 'provoking "initiative fatigue"' by too many new policies or programmes at any given time (cf. Burfitt et al., 2002, p. 29).

As reasons for this ineffectiveness of the regional business support, Lagendijk (1999a, p. 12) identifies 'the initial organisation of the support sector and the kind of philosophy employed'. The weakness of the support measures concerned in particular the overemphasis of technology transfer (of a 'technology push' model), which 'suffered from two handicaps: a

lack of understanding of SMEs as organisations and a lack of proper demand identification'. Immanent in both handicaps is the lack of understanding of the capacities of SMEs, which are not just characterised by an 'innovation deficit' but more importantly by a lack of strategic management and learning capabilities, which in effect also means that SMEs often do not know, or are unable to articulate, their long-term needs for a competitive strategy (Lagendijk, 1999a, p. 12).

#### *Towards a more strategic policy approach*

Hence, Lagendijk (1999a, p. 26) calls for 'more *interactive* forms of business support framed within a *strategic* context'. He (1999a, p. 11) proposes a more 'integral and cluster-orientated support' approach, which can be interpreted as 'reshaping the regional specialisation within a relational perspective, that is, with emphasis on the role of linkages between businesses and with the wider regional support infrastructure' (i.e. 'intertwining policy and business learning'). Lagendijk's cluster policy suggestions, that he (1999a, pp. 4-7, 11-15, and 20-26) derived from his fieldwork, are summarised in the following comprised list:

1. Improved *holistic support measures* for general business modernisation, that provide a more 'demand-led' technology transfer advice that 'comes with a package of auditing, diagnosis and support in other areas such as funding and assistance with organisational change', management and skills upgrading and so on (thus covering both technological and organisational dimensions of innovation).<sup>152</sup>

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<sup>152</sup> The Economist (2003), for example, reports that 'governments, development agencies, academics, corporate executives and even venture capitalists give most attention to the riskiest and toughest to implement successfully – the creation of new knowledge'. In that way, according to the Economist, they appear to have a kind of 'tunnel vision', attracted by the 'glamour of an R&D breakthrough' and the 'gambler's dream of winning the jackpot'.

2. Shift from a routine to a more sophisticated, *specialised business support*, that involves a ‘certain degree of targeting’ (i.e. ‘cluster-as-target approach’) in order to provide advanced intelligence (e.g. technology or marketing watch) in support of strategic learning capabilities as well as the (re)shaping of related business activities in specific sectors.<sup>153</sup>
3. Improved *streamlined organisation and communication* between support service providers and with its business clients, e.g. with a so-called ‘one-stop-shop’ as point of referral and/or strategic coordinators, in order to efficiently provide a full range of tailored expertise of the wider business support network].<sup>154</sup>
4. Instil *collaborative attitudes* by encouraging inter-firm learning and by tailoring support to groups of related firms (i.e. ‘cluster-as-method approach’), e.g. by ‘intertwining policy and business learning’ with the development of ‘club goods’ (e.g. relational assets, institution building, specialised infrastructure, and so on).<sup>155</sup>

Raines (2002b, p. 175) similarly outlines the following five key principles underlying a cluster policy framework or potential paradigm. According to Raines (2002b, p. 175), spatial development and *cluster policy should*:

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<sup>153</sup> The difference in this cluster targeting as opposed to traditional industrial policy is that support measures, though specialised, are likely to be rather indirect facilitations (and not direct subsidies) and less exclusive in their application.

<sup>154</sup> Confer also Skambracks (1999, pp. 46-50) suggested development of a ‘one stop-agency’ and Bentley & Gibney’s call for ‘a more “joined up” approach to both strategic and inter-organisational processes and day-to-day management of RDA business (Roberts; and Shutt, chapters 3 and 4)’.

<sup>155</sup> Regarding the latter promotion of the supply of local and regional public goods, Martin & Sunley (2001, pp. 38-39) identify ‘four main varieties’. These strategies of cluster policy include ‘creating co-operative *networks and encouraging dialogue* between firms and other agencies’; ‘*collective marketing* of an industrial specialism’; the ‘aim to provide local *services for firms* such as financial advice, marketing and design services’; and to ‘attract investors and business to fill’ the gaps or ‘weaknesses in existing cluster value chains’.

1. be skewed towards economic specialization;
2. be less ‘vertical’ and (in sectoral terms) generic and more ‘horizontal’ and sector-specific;<sup>156</sup>
3. target networks rather than individual firms;<sup>157</sup>
4. allocate responsibility for developing policy responses to cluster development to the level of governance at which the cluster operates;<sup>158</sup> and
5. be founded on a long-term approach to economic development.

In practice, these strategic directions may comprise the following actions or ‘strategic axes’ (see Table 10), which Nauwelaers & Morgan (1999, Table 12.1 on p. 232) identified.

However, the practical development of cluster and networking orientated strategies towards the creation of holistic and systemic innovation support systems appear not be a straight forward task but instead is seen to face several obstacles, to be discussed later on.

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<sup>156</sup> This means an ‘increasing desegregation of policy fields, so that measures arising from training, innovation and business development policy areas could be easily combined and tailored in support of specific clusters’ (Raines, 2002b, p. 175).

<sup>157</sup> Hence, this is expected to lead ‘to a reduction in direct incentive-based support for businesses and a more clearly-defined role of the public sector addressing target market externalities within each cluster. (Raines, 2002b, p. 175).’

<sup>158</sup> This ‘could lead to greater autonomy for, and resources allocation to, regional/local public authorities’ (Raines, 2002b, p. 175).

*Table 10 Major strategic axes defined in RTPs and similar operations*

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***Strategic Axes for Regional Innovation Policies***

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Bridge the gap between HEIs and industry  
Identify and support clusters of enterprises  
Raise demand for innovation in SME's  
Increase demand for skilled people in SME's  
Increase supply of adequate human resources for innovation  
Build a permanent Advisory Board of policy  
Provide adequate finance for innovation  
Raise awareness of innovation  
Adapt training and further education to SMEs' needs  
Organise co-operation between supply organisations  
Foster the attractiveness of the region for high-tech companies  
Support external orientation of SME's  
Strengthen the technology transfer offer (in Objective 1 regions)  
Develop support tools for the observation of SME's needs  
Develop non-technical support to innovation

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Source: Nauwelaers & Morgan (1999, Table 12.1 on p. 232).

Note that RTPs are Regional Technology Plans, pilot projects and precursor of the Regional Innovation Strategies (RIS) financed under Article 10 of the ERDF (cf. Landabaso & Reid, 1999, p. 32)

***Cluster policy for innovation systems***

As a result of the paradigm change towards the realisation of its importance, innovation has gained practical policy relevance. Policy-makers at multiple levels of governance have started to refocus their business support policies towards helping businesses to innovate. Indeed, policies to foster innovation have become a growing part of economic development policies and certain structures and policies have been designed that are supposed to favour the innovation process.

### *Practical Policy relevance of cluster policy*

Raines (2002a, p. 21) reports that the cluster approach ‘has been promoted by international organisations, such as the European Commission [(e.g. European Commission, 2003e; S. A. Rosenfeld, 2002)], OECD [(e.g. Organisation for Economic Co-operation and Development, 2002a, pp. 63-66; 1999c, 2001)] and UNIDO [(e.g. Cooke & Memedovic, 2003)]’, which has also contributed in raising its profile (see also Raines, 2002c, pp. 1-2).

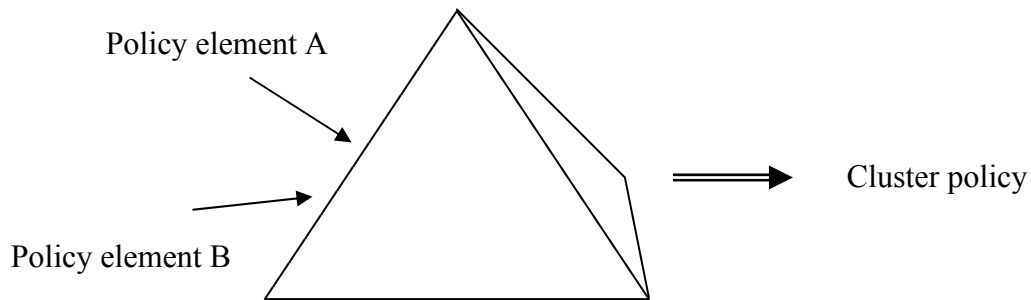
Furthermore, Raines (2002b, p. 176) concludes that ‘[t]he clear value of the cluster approach has been less in generating a new policy framework than in providing significant tools for making the existing policy frameworks operate more effectively’.<sup>159</sup> Raines has used the metaphor of a ‘prism in reverse’ to depict this kind of streamlining of different policies, e.g. ‘industrial policy (including SME policy), regional development policy, and science and technology policy’ (Boekholt & Thuriaux, 1999, p. 384; cf. Raines, 2002a, p. 30). The following quote and Figure 9 illustrate this in more detail:

Cluster policy frameworks have demonstrated how measures drawn from different policy fields can be combined to enhance their overall effectiveness. In effect, the cluster approach has acted as a *prism in reverse* – a device for bringing together different policy elements and discussing them on particular parts of the economy. (Raines, 2002b, p. 176, emphasis added)

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<sup>159</sup> It’s not surprising then, that Raines (2002b, p. 166) finds ‘a clear degree of operational continuity in most of the case studies’.

Figure 9 Raines' reverse cluster prism



Source: Own creation based upon Raines (2002b, p. 176) and influenced by Raines (2002a, p. 30).

### *Providing specialised and advanced public goods for clusters*

Closely linked to this institutional 'practical agenda', are supply-side measures (Amin & Thrift, 1995, p. 55) of an industrial policy in support of or in 'building clusters' (Amin, 1999, p. 370). According to Amin & Thrift (1995, p. 55), they concentrate on the 'circulation of information and skill formation (training)', thus creating what Le Galès & Voelzkow (2001, p. 1) call sector-specific '*local collective competition goods*' and what is otherwise known or described as 'collective assets or public goods' (Porter, 1998b, pp. xxii-xxiii of Introduction), 'club goods' (Lagendijk, 1999a, p. 15), 'regional economic commons' (A. J. Scott & Storper, 2003, p. 587) or 'public knowledge commons' (Antonelli, 2003, p. 596) that provide 'untraded interdependencies', synergies, and 'super additive gains' (cf. Dosi, 1988, p. 226).

In effect, they represent a form of agglomeration advantages that reduce transaction costs, provide economies of scales and specialization, knowledge externalities and so on. They mostly 'are associated with proximity and interfirm exchange' (Amin, 1999, p. 368), but



which a pure market governance model often fails to sufficiently provide for (cf. Le Galès & Voelzkow, 2001, p. 7).

These “club goods” occupy a bridge position between business support structure and client groups of related businesses” and thus ‘are crucial to the intertwining of policy and business learning’, which - according to Lagendijk (1999a, p. 11) – ‘makes “intelligent clusters”’.

This sort of cluster policy involves the setting up of efficient knowledge-transfer networks and an enterprise support system that provides institutional support, incentives and input for innovation such as market intelligence, finance and so on (Amin, 1999, p. 370; Amin & Thrift, 1995, p. 55) in a geographical and sectoral context.<sup>160</sup> The creation of such ‘club goods’ includes both creating assets of ‘more conventional nature’ (e.g. specialized infrastructure) and of ‘associational nature’ (e.g. relational assets, institution building, and intelligence gathering) (Lagendijk, 1999a, p. 15).

Consequently, aligning the type and development phase of clusters to policy should follow a strategic and integrative approach. According to Ache (2002, pp. 14-15; and cf. Raines, 2002a, p. 23), the various interrelated ‘networks contribute to the working’ of the ‘local innovative milieu’ and clusters (or innovation systems, in the rubric used here) by performing, what he labels, ‘the search-selection-signalling-transcoding-transformer-control – or SSSTTC

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<sup>160</sup> Following their empirical studies on the regions of Baden-Württemberg, Emilia-Romagna, Wales and Basque Country, Cooke & Morgan (1998, p. 7) have argued in this respect that ‘the regional governance and enterprise support system plays an increasingly active role in the pursuit of economic development’.

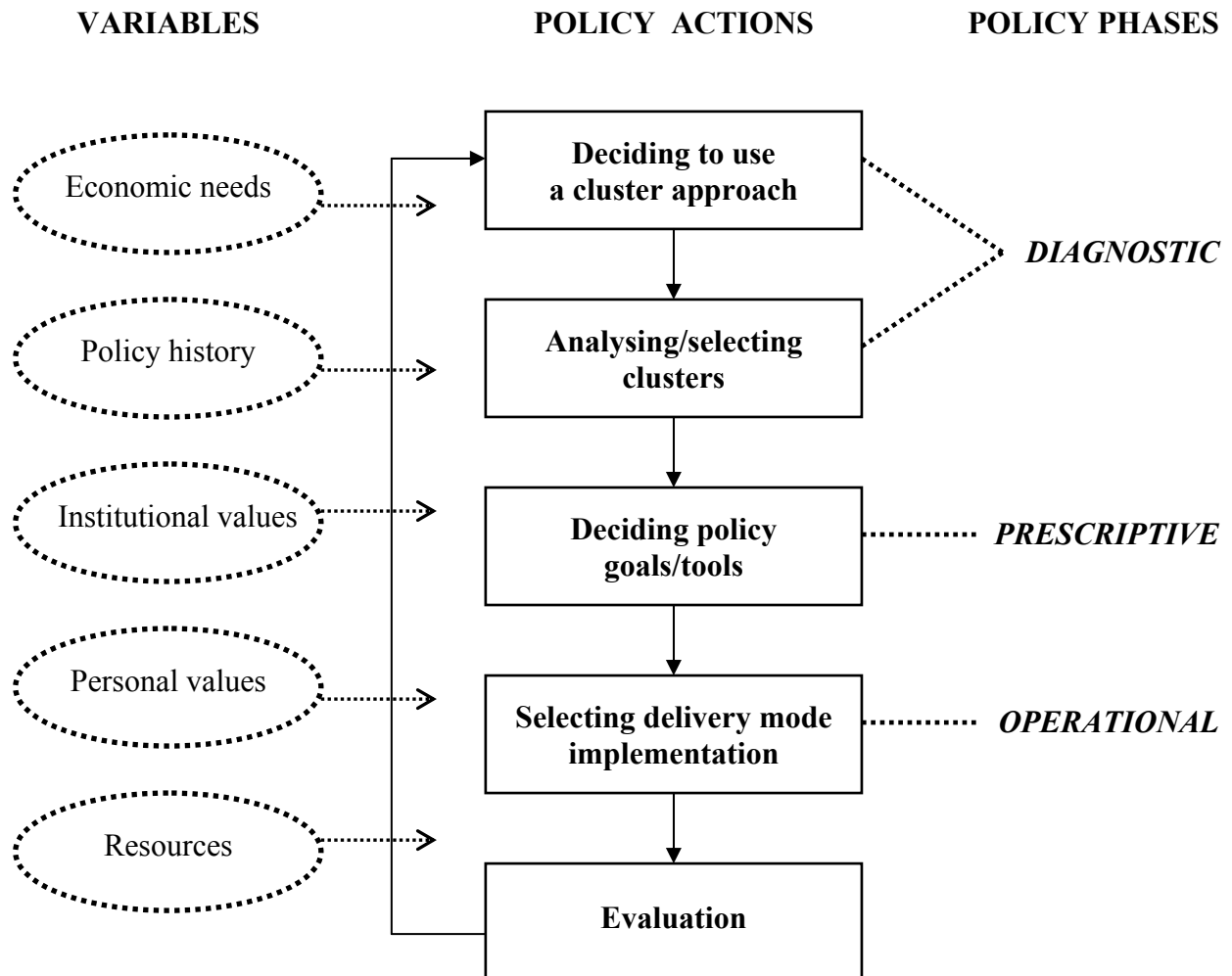
– function’ of the all important ‘response capacity’ to change.<sup>161</sup> These functions are seen as ‘the “glue” which keeps a cluster together’(Ache, 2002, pp. 15 and 10).

These functions, that are strung together in sequence, very much mirror the policy actions of the different phases of the cluster policy life-cycle (see Figure 10) as discussed by Raines (2002b, pp. 160-172) and others (e.g. Benneworth & Charles, 2001, pp. 390-396; Lagendijk, 1999a, pp. 20-22). Raines’ three broadly identified policy phases - diagnostic, prescriptive and operational – are similar to the policy cycle used within policy evaluation research (cf. Wollmann, 2002b, p. 380) and basically represent the core elements of a strategic management process (strategic analysis, strategic choice and strategy implementation) as, for instance outlined by Johnson & Scholes (1997, see Figure 1.4 on p. 24 for a summery model).

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<sup>161</sup> This SSSTTC function includes policy intervention as ‘information broker’ (search function) or as ‘technology monitor’ (i.e. ‘lighthouse’ signalling function) and certain decision-making routines, e.g. for selection and control functions (Ache, 2002, pp. 14-15; Raines, 2002a, p. 23).

Figure 10 The different phases of the cluster policy life-cycle



Source: Raines (2002b, Figure 11.1 on p. 161) in slightly adapted form, which was based in part on Benneworth & Charles (2001, Figure 1 on p. 392), itself going back to Hogwood (1987).

Table 11 provides an overview of some of the ‘good practice recommendations’ for SME clustering policy initiatives as summarised by Lagendijk (1999a, p. 8).<sup>162</sup>

<sup>162</sup> Confer also drivers for success and failure in cluster initiatives as outlined by the cluster management guide published by CLOE (2006, pp. 11-12) - a pan-European network of cluster regions.

Table 11 Good practice in clustering

<b>Do</b>	<b>Don't</b>
<ul style="list-style-type: none"> <li>• facilitate clusters</li> <li>• use clusters as demonstration models</li> <li>• encourage firms to submit new funding applications</li> <li>• strive for broadening of the clusters (e.g. through association building)</li> <li>• assess carefully the (potential) position of regional businesses in the global market</li> <li>• engage with large firms, support agencies in/outside the region, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• build clusters</li> <li>• see clusters as 'static' end goals</li> <li>• be committed to the survival of firms or clusters</li> <li>• fund single clusters in the long term</li> <li>• provide unfocussed support/intelligence</li> <li>• focus on innovation when the key issue is modernisation</li> <li>• compete with other business support agencies</li> </ul>

Source: Lagendijk (1999a, Table 2 on p. 8)

Raines (2002b, pp. 166-170) also classifies the following three particular holistic cluster policy measures:

1. *Supporting specific linkages and projects* (i.e. encouraging 'interactions between different cluster agents' including business networking and university-business linkages).<sup>163</sup>
2. *Improving common resources* (i.e. public goods as 'the collective sources of the cluster's competitiveness' such as general or specialised infrastructure).
3. *Promoting community-building* (i.e. cluster 'identity-building' by encouraging more frequent and prolonged communication via cluster fora, websites, newsletters and so on; as well as 'identity projecting' by collective marketing exercises and 'branding', for which visibility is enhanced by geographical concentration).

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<sup>163</sup> Lagendijk's (1999a) suggested measures concerning encouraging linkages and cooperation, as discussed earlier (see p. 125), seem to rightly take a wider view in that they also comprises the policy dimension besides businesses and university research.

Rosenfeld (2002, p. 15 and see elaborations on pp. 16-31) also suggests a menu of actions to support clusters in less favoured regions (see Table 12), which provides a long list of policy recommendations that cover a wide range of economic development goals.

Table 12 Menu of Actions to Support Clusters in Less Favoured Regions

<b>Menu of Actions</b>	
<b>A. Actions for understanding and benchmarking regional economies</b>	<ul style="list-style-type: none"><li>• Identify clusters</li><li>• Model and map systemic relationships</li><li>• Benchmark against competitors</li></ul>
<b>B. Actions for engagement</b>	<ul style="list-style-type: none"><li>• Recognise or, where an unmet needs exist, create cluster associations</li><li>• Formalise communication channels</li><li>• Foster inter-firm collaboration</li></ul>
<b>C. Actions for organising and delivering services</b>	<ul style="list-style-type: none"><li>• Organise and disseminate information by cluster</li><li>• Establish one-stop cluster hubs</li><li>• Form cross agency cluster teams</li><li>• Create cluster branches of government</li><li>• Facilitate external connections</li></ul>
<b>D. Actions for building a specialised work force</b>	<ul style="list-style-type: none"><li>• Qualify people for employment</li><li>• Use clusters as context for learning</li><li>• Establish cluster skill centres</li><li>• Form partnerships between educational institutions and clusters</li><li>• Create inter-regional cluster alliances</li></ul>
<b>E. Actions for stimulating innovation and entrepreneurship</b>	<ul style="list-style-type: none"><li>• Invest in innovation and business start-ups</li><li>• Support cluster based incubators</li><li>• Encourage entrepreneurs' networks</li><li>• Innovation networks</li><li>• Establish cluster-based technology hubs</li></ul>
<b>F. Actions for marketing and branding a region</b>	<ul style="list-style-type: none"><li>• Target inward investment</li><li>• Promote clusters</li><li>• Form expert networks</li><li>• Look for opportunities to brand regions</li></ul>
<b>G. Actions for allocating resources and investments</b>	<ul style="list-style-type: none"><li>• Give incentives or set aside funds for multi-firm projects only</li><li>• Invest in cluster R&amp;D</li><li>• Fund critical foundation factors</li></ul>

Source: Rosenfeld (2002, p. 15 and see elaborations on pp. 16-31 including Benchmarking Guide on pp. 18-19)

### ***Institutionalist policy suggestions for constructing institutional thickness***

Although the ‘cluster-as-method’ approach already stresses the need for ‘instilling collaborative attitudes’ and creating ‘club goods’ (Lagendijk, 1999a, pp. 6-7 and cf. pp. 15 and 22-23), institutionalist policy suggestions place a focussed emphasis upon these objectives and especially how they should be addressed and implemented. However, it is argued here that much of the cluster literature does not sufficiently address implementation issues.

Amin (1999, p. 368) has derived five *general axioms of economic governance* as a ‘set of “orientations” to economic success’ (Amin & Thrift, 1995, pp. 54-56) from the new institutionalist understanding, namely that policy action should aim to ‘strengthen networks of association’, to encourage voice and negotiation as part of a participatory and inclusive institution-building process - that is ‘filling-in’ and not ‘hollowing out’ (Amin & Thrift, 1995, p. 55) -, to ‘mobilize a plurality of autonomous organizations’, and to build up a ‘broad-based local “institutional thickness”’ (Amin, 1999, p. 368). The final, kind of horizontally overlapping, axiom is that all of the policies ‘have to be context-specific and sensitive to local path-dependencies’, which in more simple words means to gear policy towards regional endogenous strength and weakness, capacities and capabilities. All in all, the institutionalist perspective favours ‘bottom-up, region-specific, longer-term and plural-actor based policy actions’ (Amin, 1999, p. 366).

At the core of these policy proposals is the regional institution-building process with the aim to eventually construct an ‘*institutional thickness*’ (Amin & Thrift, 1995, pp. 54 and 55) that facilitates the transfer of knowledge and collective learning processes (cf. Boschma, 2004, pp.

1006-1007), with regions ‘*becoming*’ (Storper, 1995, p. 192) intelligent ‘learners’ (Hudson, 1999, p. 69).<sup>164</sup> Accordingly, the interlinked enterprise support system would constitute a functioning regional innovation system.

At the same time of creating ‘reciprocal routines’ (cf. Meyers, 2004b, p. 486), the institution-building process still needs to incorporate an ‘institutional reflexivity’ and adaptability (Cooke, 1995, pp. 240-241). This means that regions need to display critical anticipative foresight function (cf. also Amin, 1999, p. 371), in order for regions to successfully embark upon the ‘high road’ to regional economic success, of ‘learning, reflexivity and associative governance’ (Cooke, 1995).<sup>165</sup> In order to ‘alter the economic trajectory’ of regional economies (Amin, 1999, p. 368), local governance (i.e. social or political arrangements) first has to ensure that a flexible and responsive ‘*institutional capacity*’ (Amin & Thrift, 1995, p.

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<sup>164</sup> See in this respect also the BEST project expert group report on improving technology transfer published by the European Commission (2004c) and Boschma’s (2004, p. 1007) comments on knowledge transfer. There is an obvious affinity between the notions of intelligent ‘learners’ (Hudson, 1999, p. 69), ‘intelligent region’ (Cooke & Morgan, 1991; Landabaso, 1996), and ‘intelligent clusters’ (Lagendijk, 1999a, pp. 15 and 26).

<sup>165</sup> The importance of institution-building has also been recognised at the highest level of the European Union not only for democracy but for economic development to. For example, the Madrid European Council stressed in December 1995 the importance of adapting the applicant countries’ administrative structures to create the conditions for a gradual and harmonious integration, in addition to the formal accession criteria of the European Union – known as *Copenhagen criteria*.

The Copenhagen European Council or Summit, as it is often referred to in the media, defined in June 1993 the sine qua non conditions for accession to the European Union. In short, an applicant country wishing to join the European Union has to fulfil the following three criteria (cf. Despondt, 2005, pp. 68 and 139): political stability (with stable institutions guaranteeing democracy, the rule of law, human rights, and respect for minorities), economic stability (that is a functioning market economy), and the legal criteria (of having to incorporate the *acquis communautaire* - which is the body of Community law -, and to subscribe to the objectives of the EU). To explain latter, the *acquis communautaire* means basically the Community law in a broader sense, which thus comprises ‘all the rules constituting the Community legal order, including general principle of law, Court of Justice case law, law stemming from Community external relations, and supplementary legal provisions contained in conventions and similar agreements concluded between Member States giving effect to the treaties’ (European Commission, 2005q, p. 34).

Putnam (1993, p. 84) also stresses that it is a very established empirical generalisation that ‘effective democracy is correlated with socio-economic modernization’



54)<sup>166</sup> is existent or build up, that allows a region ‘to upgrade, transform or restructure specific institutions (such as specific laws)’ (Boschma, 2004, p. 1008).

This institutional capacity forms an essential part of less-favoured regions (LFRs) being able to absorb effectively financial support for innovation projects, for example by the EU’s Structural Funds.<sup>167</sup> Morgan (2001a, p. 25) has stressed, for example, that in particular lagging regions, where the need for these resources is greatest, often lack such an ‘absorptive capacity’.<sup>168</sup> Oughton, Landabaso, & Morgan (2002, p. 98) have labelled this problem as the ‘regional innovation paradox’.<sup>169</sup> This was tackled by later generations of EU innovation policy with the Regional Innovation Strategy (RIS) programme. The European Commission acted as an ‘animateur’ as Landabaso & Reid (1999, p. 19) argue and aimed to develop ‘an adequate level of “social capital” in the less-favoured regions, to complement the massive investments in infrastructure by the Structural Funds’ (ibid., 1999, p. 20 ).

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<sup>166</sup> Although in the framework of Development Cooperation, External Assistance and Aid Delivery, the concepts paper and guidelines of the Project Cycle Management (PCM) with regards to ‘Institutional Capacity Assessment’ by EuropeAid (European Commission, 2004i, pp. 95-99; 2005h) make an interesting read and may serve as a source of ideas concerning *institutional capacity*. See also Alphametrix & Applica (2002, pp. 133-149).

<sup>167</sup> For instance, Rosenfeld (2002, pp. 9-10) lists the following barriers facing clusters in less favoured regions: deficits in physical infrastructure, lack of access to capital, weak technology institutional structures, regional insularity and lock-in, lack of skills and opportunities to acquire them, and cluster hierarchies (i.e. dominance of branch plants or few large companies, with the effect that not all small companies benefit from clusters).

<sup>168</sup> As a very simplified example illustrating the importance of absorptive capacity, one can think of government policy promoting the information society, e.g. aiming to increase IT skills amongst young pupils. In pursuit of such goal, it is not enough to just endow schools with a set of new computer equipment and Internet accesses, as this becomes only valuable once teachers would be trained and have acquired themselves the IT skills to utilize the equipment and, more importantly, to be able to teach computer-related skills. This example is particular useful as it also illustrate thereby the necessary order of investment. First, priority ought to be given to the training of teachers (serving here as a comparative example for institutional capacity, otherwise some value of the investment is wasted as unused equipment is becoming obsolete due to the short economic value half-life of computers. Similarly, any policy measures ought to evaluate first whether a critical mass of expertise, businesses as well as linkages between the both are present before committing scarce resources to over-ambitious short-term targets.

<sup>169</sup> According to Oughton, Landabaso, & Morgan (2002, p. 98), ‘[t]he regional innovation paradox refers to the apparent contradiction between the comparatively greater need to spend on innovation in lagging regions and their relatively lower capacity to absorb public funds earmarked for the promotion of innovation and to invest in innovation related activities, compared to more advanced regions.’

This was by means of building a relational infrastructure in the socially inclusive process of developing regional strategies for innovation (Morgan, 2001a, p. 25). However, Morgan (2001a, p. 25) concludes that the RIS programme remained only ‘modest’ as it was ‘too small to have much strategic impact’ (especially in regard to regions lacking existing governance structures).<sup>170</sup> Amin (1999, p. 375) also highlights that some of the institutionalist axioms are especially conceptualised for old industrial regions that are ‘characterized by certain impediments to economic renewal’, and hence are not necessarily applicable to all type of regions in the same way.<sup>171</sup>

The regional practical policy agenda (Amin & Thrift, 1995, p. 50; Raines, 2002a, p. 24) emphasises the setting-up of networks of intermediate institutions (organisations) as a ‘third way’ of governance (between market and state) in ‘attempts to produce associative economies’ (Amin & Thrift, 1995, p. 54; Le Galès & Voelzkow, 2001, pp. 5-9).<sup>172</sup> Building ‘economies of association’ (Cooke & Morgan, 1998, p. 79) that provide ‘club goods’ (Cooke,

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<sup>170</sup> A key reference with regards to the RIS programme is the edited book by Kevin Morgan and Claire Nauwelaers (1999c) entitled *Regional Innovation Strategies : The Challenges for Less-favoured Regions*. In it, Morgan & Nauwelaers provide a chapter on the theoretical background to the ‘regional perspective on innovation’ (Morgan & Nauwelaers, 1999b) as well as a summery chapter with an outlook (Nauwelaers & Morgan, 1999), while Landabaso & Reid (1999) describe the development process of the programme at the European Commission in order to animate regions. The remaining chapters report empirically on the experience of various European regions in creating regional Innovation Strategies, such in Limburg; Lorraine (Nauwelaers, 1999); Wales; Central Macedonia; Castilla y León; South Brandenburg (Boekholt, 1999); on the prospects for building Technology Policy in Central and Eastern Europe; as well as draw in experience from the United States (S. Rosenfeld, 1999) and Quebec, Canada.

<sup>171</sup> Amin (1999, p. 375) lists as ‘impediments to economic renewal’ the following: ‘fragile small-firm entrepreneurship; domination by externally owned or controlled firms with poor levels of local economic integration; restricted diversification, innovation and learning capacity; and state dependency and institutional closure’. He also highlights in this context that, for example, lagging rural regions face a different set of impediments’ than the one listed here that is more typical for old industrial regions. Furthermore, Amin (1999, pp. 366 and 375) also draws attention to the need to sustain macro-economic support for the less-favoured regions (LFRs), as otherwise in its absence, ‘the “new regionalism” will amount to very little’.

<sup>172</sup> Le Galès & Voelzkow (2001, pp. 5-9) elaborate on the different modes of governance. With reference to Hollingsworth & Boyer (1997a, p. 9) they do not just differentiate between the markets (horizontal co-ordination by competition), the state (hierarchical control), and associations (‘concertation’ of interest by negotiations) as possible models of social order and components of a governance system, but also list the community (coordination by solidarity among members) and the vertically integrated firm (organizational co-ordination of agents by hierarchy).

1997, p. 365) and ‘institutional thickness’, entails connecting the various sectoral and other enterprise support organisations, political institutions and social citizenship (Amin, 1999, p. 368) such as trade associations, sectorally-based service centres, lobbying groups, university technology transfer units, trade unions, chambers of commerce, local authorities, regional development agencies and so on, in order to ‘consolidate local ties and encourage continual upgrading and capacity-building across sectoral networks of horizontal and vertical interdependencies’ as suggested by Amin (1999, p. 371).

It is argued here however, that in practice such institutional thickness or capacity is difficult to find and therefore not many regional innovation systems may be using their full innovation potential.

#### *Limitations of the institutional turn*

These new orientations marked an ‘*institutional turn* in regional development studies’ (Amin, 1999, p. 368, emphasis added) and policy-making, contributes to overall rise of regional conceptualisations of the economy (e.g. innovative milieu, learning region, regional innovation system). Amin identifies two main conceptual strands that have incorporated insights from institutional economic theory. One strand is the ‘new economic geography’ with the cluster concept and its ‘renewed interest in endogenous growth theory, which acknowledges the economic externalities and increasing returns to scale associated with spatial clustering and specialization (Krugman, 1995a; Porter, 1994)’, the other strand is ‘economic geography’ with the concept of ‘learning regions’ that emphasise ‘local social, cultural and institutional arrangements’ (Amin, 1999, pp. 368-369).

However, some clear words of caution have been raised regarding the ‘institutional turn’ in ‘new regionalism’. Morgan (2001a, p. 24) highlights that ‘it may be a planner’s conceit to think that “institutional thickness” is always necessary for successful innovation’ as innovation is in some prosperous technology districts mainly driven by clusters of leading-edge firms instead of being induced by supporting institutions – and which actually appear to be ‘under-populated’ in these cases such as Silicon Valley for instance. Institutions matter concerning the innovation process, but Morgan (ibid., pp., p. 24) points out that ‘the recent “institutional turn” in economic geography is wont to give the [wrong] impression that supporting institutions matter as much, if not more than, the firms at the heart of the innovation process, when the causality tends if anything to run the other way’ (cf. Cooke, 1998, p. 18; Martin & Sunley, 2001, pp. 43-44).<sup>173</sup>

Amin (1999, p. 375) similarly points to flaws in the ‘belief that building local capabilities might be sufficient for establishing a privileged position within global networks’. First, there is the potential detrimental institutional lock-in that can reinforce ‘path-dependencies which are inappropriate for economic renewal’, and secondly, it neglects the superiority of the importance of ‘the ability of places to anticipate and respond to changing external circumstances’ over the ‘intrinsic supply-side qualities’ and simple presence of institutional arrangements. Hence, this also stresses the region’s wider external connectivity as a source of variety (Boschma, 2004, p. 1006).

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<sup>173</sup> Morgan’s caution is, for example, supported by Martin & Sunley (2001, pp. 43-44), who stress that ‘[w]hile institutions and a networked semi-public sphere may often be necessary for innovative and dynamic firm performance, such factors are unlikely to be sufficient.’ See also Cooke (1998, p. 18), who in a more contained form points out that the ‘crucial innovation business is carried out above and beyond it [i.e. the mere ‘public-private consortium domain of an RIS’], in the real economy’.

Even though institution-building should not be overstated and not be seen as a panacea to economic development, it still remains one of the strategic options that regions need to have in order to improve their business superstructure or ‘innovation system’. Every region still needs to evaluate, whether it is a suitable (existing resources, capabilities and environment), feasible (financially, time horizon) and acceptable (to stakeholders, i.e. ability to avoid ‘localist sentiment’) strategy to pursue.

### ***The nature of the regional policy- and decision-making process***

As already emphasised before, essential for this process is its ‘broadening’ (Amin, 1999, p. 373), meaning that decision-making is participatory, open and extended by involving a plurality of independent representative associations and perhaps also by drawing in experts and representative (e.g. through specialist committees) as Amin (1999, p. 373) suggests (see also Einfeld, 2002; Holzinger, 2002; Wollmann, 2002a).<sup>174</sup> According to Morgan & Nauwelaers (1999b, p. 17), this requires ‘more robust multi-level partnerships [...], in which the regional actors are genuinely empowered to develop bottom-up initiatives that draw on their local knowledge’.<sup>175</sup> The key to the success of this ‘broadening’ is that such a process ‘does not degenerate into localist sentiment’ (Amin, 1999, p. 373) and alienates some of key influential actors. Thereby, if successful, a process of institutional reform may limit the over-dominance of vested interest and ‘capture’ by elite coalitions (cf. G. Bentley & J. Gibney, 2000, pp. 222-223; Pelkmans, 2001, p. 277; Schmidt, 2002, p. 203) and the consequent ‘institutional sclerosis’ (Amin, 1999, p. 373) that results from it. It is likely, however, that this

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<sup>174</sup> Nauwelaers & Morgan (1999, pp. 231-232) state in this respect that ‘[l]etting neutral observers write analyses of the regional situation [...] has proved to be an excellent means of starting the process’ of the regional dialogue because it ‘(often for the first time)’ provides ‘an objective assessment’ and ‘germs for discussion’.

<sup>175</sup> Morgan & Nauwelaers (1999b, p. 17) add, however, that these bottom-up initiatives ‘need to be prosecuted alongside more supportive top-down measures from the “higher” levels of the member states and the [European] Commission.’

process of change will at the same time face ‘institutional pressures’ (cf. Raines, 2002b, pp. 173-174 in a different context) to keep the status quo.

It is argued here that much of the literature neglects the likely opportunism in institutional change. Therefore, the axioms of an inclusive, participatory policy-making – although highly advocated – are not seen here as a simple policy panacea. Hence, one concern of this thesis is how these obstacles to change can be overcome successfully, and how a process of institutional reform can be facilitated to tackle structural economic change, and one that involves a ‘broadening’ and participatory process but also achieves to keep all main institutional actors on board. Hence, an emphasis is placed upon institutional (in the meaning of organisational) structures and their possible effect upon the various agents as well as upon people as the mover and shakers of networks and initiators (cf. Malecki, 1997, p. 262).<sup>176</sup> This would make the link between regional strategy and policy-making, on the one hand, and institutional structures, capabilities and behaviour on the other.

Correspondingly, such an approach has the inherent tendency to please too many stakeholders. Due to the consensus threshold, it is thus likely to achieve agreements, after a prolonged process, only on a minimum common denominator (Schultze, 2002, p. 259). In practice, this interlocking of interests perhaps could even lead to decision-making based at least partly on exchange of favours, package deals, and so on, which all contribute heavily to inertia of the system and prevent effective and efficient policy-making. In a way, the price for the ‘broadening’ of the process could be sacrificing the newly advocated prescribed policy aim of ‘strengthening the strength’ (Raines, 2002b, p. 172; Schätzl, 2001, p. 239). Therefore,

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<sup>176</sup> For a managerial more corporate view on ‘structures for a changing environment’, see for example Rickards (1985, pp. 72-76 including Fig. 4.1 on p. 73).

it has to be at least questioned whether this process actually leads to a more *regional* strategy and approach as envisaged. This also leads to a number of conflicts over goals.

### *Secrecy versus openness*

Among the conflict over goals is over secrecy (and openness) in decision-making. Even though there are some incentives for secrecy, as hidden information is potentially valuable and it, for example, can provide a tactical advantage in the political bargaining game, generally, an open government approach is to be favoured, as Stiglitz (1998, pp. 15-17) points out. Secrecy is more likely to result in government failures (e.g. destructive competition) and to distort the flow of information and public perception as it can exacerbates biased and non-realistic media reporting. Consequently, openness instead facilitates to establish credible commitments.

### *Expertise versus democratic values*

In recognition of the non-scientific tone of political discourse among the electorate and its difficulty in being able to properly evaluate scientific expert arguments, independent agencies have been established in many areas at all levels (local, regional, national and supranational<sup>177</sup>). This has moved some critical parts of the decision making away from the political scene.<sup>178</sup>

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<sup>177</sup> At supranational level, the European Union has over the years set up a number of Community agencies in various fields in order to accomplish a very technical, scientific or managerial task. Prone to some confusion, the Community agencies have been designate different terms (such as Centre, Foundation, Agency, Office, Observatory, Authority or Institute). The all have their own legal personality and are distinct from the common European Community Institutions (Council, Parliament, Commission, etc). There are currently around 20 European community agencies, for which a list can be found at [http://www.europa.eu.int/agencies/index\\_en.htm](http://www.europa.eu.int/agencies/index_en.htm)

<sup>178</sup> Similar to Stiglitz's surprise of the non-scientific tone of political discourse and the subsequent difficulty by the electorate in evaluating expert arguments (1998, p. 17), the author of this study was equally surprised by the

Even though there is ultimately a political responsibility for these agencies, there is a clear lack of direct democratic accountability. While for some areas, it may be preferred that these agencies are at distance from political pressure (i.e. collecting and reporting statistics), this may not be the case for others such as macroeconomic policy and its trade-off between inflation and employment, as Stiglitz (1998, p. 17) rightly pointed out. Hence, the choice between the externalisation of decision-making to experts and maintaining democratic accountability represents the second goal conflict.

#### *Adversarial versus consensus system*

Similar to the recognition that market economy involves both competition and cooperation, the political process exists of a similar mixture of a ‘adversarial and consensus system’ (J. E. Stiglitz, 1998, pp.18- 20). The open consensus approach is clearly favoured by Stiglitz, who illustrates the greater likelihood of improvements by discussing the following three contrasts between the two systems concerning the difference between dialogue and debate, national versus private interests, and the settlement of issues. Regarding latter, for example, Stiglitz argues that mutual acceptable agreements in a consensus system are more likely to stay closed, while in an adversarial system an issue is never over.

However, Stiglitz admits that ‘consensus-based rhetoric sometimes only lightly clothed an underlying adversarial process’ (J. E. Stiglitz, 1998, p. 19). Therefore, despite its merits, the aim ought to be not an obligatory consensus-based approach but to attain efficient policy-

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lack of knowledge about the current academic discourse by policy-makers interviewed. This is covered in more detail later on.



making – whether consensus based or not. This follows from the argument presented here that individual policy actors follow their own rationales and that therefore it cannot be expected that widespread national or regional utilitarianism will be found.

Nauwelaers and Morgan (1999, p. 225) also state that experience from the EU's Regional Technology Plans (RTPS) and similar exercises in North America have 'showed that targeting consensus might end up in constructing feeble strategies, which would gather a wide, but at the same time weak and meaningless support.' They point out (*ibid.*, pp., p. 225) that '[a] search for consensual views on each element of the regional innovation strategy is a utopian task', but that instead 'higher degrees of *transparency* and *inclusiveness*' in the policy-building process can be achieved, e.g. by the 'institutional innovation' of the creation of a Steering Committee (this was made compulsory for the RTP/RIS scheme).

Similarly, Shutt (2000, p. 72) also indicates that the building of a 'regional consensus' (by RDAs) often involves the 'general acceptance of many long-standing economic development strategies and initiatives that are failing'. Thus, existing strategies and priorities are not questioned and critically reviewed, and hence unlikely to take a risky approach by stimulating 'experiment and debate' (Shutt, 2000, p. 87). Accordingly, developing an 'integrated approach to regional economic development' and dealing with a range of 'wicked issues' – that 'tend to cut across traditional policies, boundaries, funding streams and departments' – may well be difficult (*ibid.*, p. 62 and cf. pp. 69 and 87).

'In order to open and foster' a high-quality regional dialogue, Nauwelaers & Morgan (1999, pp. 226-227) have identified the following three necessary key ingredients:

1. The presence of a well-endowed and legitimate animateur, stimulating and organising the multilateral dialogue<sup>179</sup>
2. The need to overcome rigidities of institutions and individuals
3. The need for an innovative and strategic capacity within the public sector itself

### *Overcoming opportunism*

This shows that there are several potential conflicts and tensions between various diverging vested interests over aims (cf. G. Bentley & J. Gibney, 2000, pp. 222-223; Nauwelaers & Morgan, 1999, p. 225), different political targets and different policies such as between the aims of economic and employment growth, and the aim of narrowing regional inequalities (cf. Raines, 2002b, pp. 173- 174). With regards to cluster policy, Benneworth & Charles (2001, pp. 396-397) also identify these goal conflicts, as illustrated by the following quote:

There is an intimate interrelation between the policies used to initiate and support clustering and the (successful or otherwise) experience of governments with particular industrial sectors. At the heart of the problem experienced by governments is the tension between the need for government to represent all its constituency (which is easily done in welfare and education policy areas) while supporting excellence without favouritism. (Benneworth & Charles, 2001, pp. 396-397) <sup>180</sup>

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<sup>179</sup> With regards to the possibility of the role of animation being delegated to external bodies, Morgan & Nauwelaers (1999, p. 226) point out that a consultancy-led exercise (such as in South Brandenburg) ‘was seen to be a danger, since it could easily weaken the commitment of regional actors and their sense of ownership of the whole exercise.’

<sup>180</sup> Akin, Martin & Sunley (2001, p. 40) state, for instance regarding a UK cluster mapping exercise (Department of Trade and Industry, 2001a, 2001b), that ‘there is an obvious tension between mapping significant industry clusters wherever these happen to be on the one hand (and many are in South East England), and ensuring an even spread between the various Regional Development Agency areas, on the other.’

It can also be argued that these goal conflicts comprise the overall trade-off dilemma between cohesion policy (for ensuring political harmony), on one hand, and economic development policies (for ensuring competitiveness and maximising economic growth), on the other. While the former policy is more likely to support an even spreading of competencies and excellence, the latter would probably advocate a bundling instead.

Furthermore, Klijn, Edelenbos, & Steijn (2005, p. 6 and footnote 1 on p. 25) report the difficulty in achieving joint decision-making, coordination and cooperation because of opportunism, while DeBresson & Amesse (1991, p. 368) also show that the functioning of networks depends upon opportunism.

Morgan & Nauwelaers' (cf. 1999, p. 237) work has shown that innovation-orientated regional policies, that aim to foster regional development by building a favourable milieu for innovation, rely heavily on its proper management and 'human qualities' of its actors. In this context, Bentley & Gibney (2000, p. 222) also highlight that '[e]ffective political organisational co-operation at regional level (between the RDAs and other business support organisations) and at local level (including local authorities, which are charged to varying degrees with designing and delivering economic development initiatives) is essential.' As critical operational issues, they have identified (ibid., pp., p. 222) the following four themes: vested interests and 'creative space'; integration and co-operation; core functions and human resources; financial resources.

Akin to the cluster policy cycle outlined above (Figure 10) and the menu of action (Table 12), Landabaso (2002, Annex III on p. 37) has provided a schematic overview of the Regional

Innovation Strategy (RIS) work programme and methodology that is reproduced below in Table 13 in simplified form. The development of the RIS programme at the European Commission was inspired by the regional innovation systems literature and funded under Article 10 of the ERDF since 1994 (cf. Europäische Kommission, 1995a; European Commission, 1999a, 2002j; Landabaso & Reid, 1999; Morgan, 2001a, pp. 25-26; Morgan & Nauwelaers, 1999c; Oughton et al., 2002, pp.104-108). The programme has been ‘defined as a “social engineering” action at the regional level whose main aim is to stimulate and manage co-operation links among firms and between firms and the regional R&TDI actors, which may contribute to their competitive position through innovation notably by facilitating access to “knowledge” sources and partners’ (Landabaso, 2002, p. 25).

Table 13 Regional Innovation Strategy (RIS) work programme and methodology

<p><b>Phase 1: Regional RIS forum: ‘coalition development’, establishment of a Public-Private Partnership</b></p> <ul style="list-style-type: none"> <li>• ensure broad-based input into steering committees</li> <li>• network creation,</li> </ul> <p><b>Phase 2: Research into Regional Innovation System</b></p> <ul style="list-style-type: none"> <li>• Regional Innovation System Analysis [with the following Research Tools:] <ul style="list-style-type: none"> <li>○ SWOT analysis</li> <li>○ Technology and Market Trends assessment</li> <li>○ Technology Foresight and Assessment</li> <li>○ Regional Benchmarking</li> <li>○ Regional Innovation System assessment</li> </ul> </li> <li>• Needs Assessment (Innovation Audits/Interviews in SMEs)</li> <li>• Steering Committee selects critical issues for increasing coherence and efficiency of the Regional Innovation System</li> </ul> <p><b>Phase 3: Assessment of innovation support infrastructure</b></p> <ul style="list-style-type: none"> <li>• Regional organisations supporting innovation promotion <ul style="list-style-type: none"> <li>○ Effectiveness and coherence of activities</li> <li>○ Evaluation of innovation/technology schemes</li> </ul> </li> <li>• Extra-regional agencies supporting innovation already active in region <ul style="list-style-type: none"> <li>○ Comparison between own and firms assessment of effectiveness</li> </ul> </li> <li>• Identification of potential extra-regional providers of innovation support services pertinent to industrial needs</li> </ul> <p><b>Phase 4: Steering Committee decides on key issues for scenarios arising from phases 2&amp;3</b></p> <ul style="list-style-type: none"> <li>• Strategic Panels, Working Groups, Seminars, External experts</li> <li>• Overall coherence = capacity for delivering services and potential for synergies through co-operation <ul style="list-style-type: none"> <li>○ Available resources</li> <li>○ Missions</li> <li>○ Feasibility</li> </ul> </li> </ul> <p><b>Phase 5: Strategy Formulation by steering Committee and Action Plan implementation.</b></p> <ul style="list-style-type: none"> <li>• Strategy formulation and action plan implementation <ul style="list-style-type: none"> <li>○ Launch actions coherent with Structural Funds and private sources of funds</li> <li>○ Identify means for continuing of mobilising of local and extra-regional actors &amp; agencies</li> <li>○ Regional mechanism for co-ordinating and evaluation &amp; monitoring innovation action</li> </ul> </li> </ul>
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Source: Simplified and slightly altered version of Landabaso’s (2002, Annex III on p. 37) schematic presentation

*The Systemness of the triple helix of university-industry-government relations*

Given the reported problems in the governance and functioning of innovation systems in general, the dynamics or extent of systemic-ness of the varieties of institutional arrangements and policy models within innovation systems need to be analysed. In order to do so, Etzkowitz & Leydesdorff's (2000, pp. 111-113) 'triple helix' model of university-industry-government relations (cf. also Etzkowitz, Webster, Gebhardt, & Terra, 2000, pp. 314-315) can be a very useful tool.<sup>181</sup> The model particularly focuses upon 'the units of operation that interact when a system of innovation is formed' and thereby aims to capture the complex 'interacting subdynamics' and 'emerging overlay of communications, networks, and organizations' (Etzkowitz & Leydesdorff, 2000, pp. 112-113).

Lundvall (1992a, p. 9) points out that 'if innovation reflects learning and learning comes from routine activities, innovation must be rooted in prevailing economic structure'. Indeed, as shown above, it is the current normative policy interest to attain such a 'triple helix' configuration of university-industry-government (see Figure 13 below) that goes beyond the mere encompassing or linking of the three different institutional spheres or helixes (see Etzkowitz & Leydesdorff, 2000, p. 111; Etzkowitz et al., 2000, p. 315). Its great attraction is that it is supposed to feature dynamic intersections which generate 'a knowledge infrastructure in terms of overlapping institutional spheres, with each taking the role of the other and with [tri-lateral networks and] hybrid organizations emerging at the interfaces' (Etzkowitz & Leydesdorff, 2000, p. 111).<sup>182</sup> Often, these '[t]rilateral networks and hybrid

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<sup>181</sup> In this context, Etzkowitz & Leydesdorff (2000, pp. 109 and cf. 113) also state that '[t]he institutional layer can be considered as the retention mechanism of a developing system'.

<sup>182</sup> Etzkowitz & Leydesdorff (2000, p. 112) indicate that currently '[t]he common objective is to realize an innovative environment consisting of university spin-off firms, tri-lateral initiatives for knowledge-based

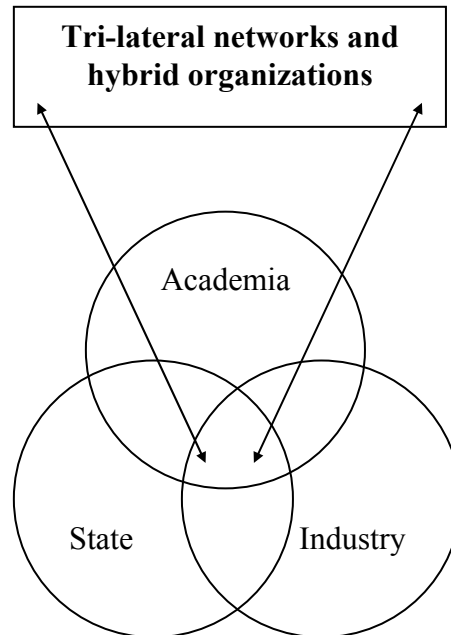
organizations are created for resolving social and economic crises' and, therefore, they epitomize the social structure of 'dynamics of *change*' in innovation and production systems (Etzkowitz & Leydesdorff, 2000, p. 115). Their advantage is seen in 'serving to institutionalise and reproduce interface as well as stimulate organizational creativity and regional cohesiveness' (Etzkowitz et al., 2000, p. 315).

The creation of these hybrid institutions in clusters and milieus is regarded as a way to establish a 'wide coalition amongst stakeholders' by 'building bridges between different elements of a societal space', as Ache (2002, p. 18) indicates. He also concludes in this respect that the region is the main arena for this 'social engineering' of an 'institutional fix' (2002, p. 19). Raines (2002a, p. 24) agrees by stressing that 'it is particularly regional institutions that are regarded as having a strong policy rationale'. According to Cooke & Morgan (1998), 'institutions can act as "animateurs" of local innovation systems, not only identifying the points in the regional economy where self-sustaining innovation can be activated, but also becoming major actors in promoting the creation of networks' (Raines, 2002a, p. 24). Hence, proposed policy measures often include setting up 'cluster fora' (Raines, 2002b, p. 169) or 'steering committees' supported by strategic panels, working groups, seminars, and external experts (Landabaso, 2002, Annex III on p. 37). Yet, it is argued that this alone is not enough.

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economic development, and strategic alliances among firms (large and small, operating in different areas, and with different levels of technology), government laboratories, and academic research groups.' Regarding the 'triple helix' configuration of university-industry-government relations (Etzkowitz & Leydesdorff, 2000, see Fig. 3 on p. 111), this study obviously refers to the 'Triple Helix III' variant and not to the 'etatistic' model ('I') and neither to the 'laissez-faire' model ('II').

*Figure 11 The Triple Helix Model of University-Industry-Government Relations*



Source: Etzkowitz & Leydesdorff (2000, Fig. 3 on p. 111)

This is different from the regional, and in particular, the national system of innovation approach and there is an important difference in the conceptualisation of the 'triple helix' by Etzkowitz & Leydesdorff as opposed to the regional, and national system of innovation approach (Lundvall, 1988, 1992b; Nelson, 1993), in that the university is attributed a much more important role in technology and knowledge transfer for industrial innovation 'as a knowledge-producing and disseminating institutions' in a knowledge-based economy (Etzkowitz & Leydesdorff, 2000, p. 109; Etzkowitz et al., 2000, pp. 314-315).

While the national innovation systems strand in general provides 'little room for 'intermediate institutions' (Cooke & Morgan, 1998, p. 27), the regional innovation systems strand instead comprises the 'full panoply of innovation organizations' (ibid., p. 71) including universities.



Yet, it can be argued from the earlier discussion that the regional innovation systems strand is preoccupied with the two dimensions of industry (or business superstructure in Cooke's rubric) and state (or governance). Hence it can be seen that the triple helix model places an additional spotlight on the university sphere.

While it is argued in this thesis that the plurality of these 'trilateral networks and hybrid organizations' is conducive to a given innovation system, a potential bottleneck of a policy approach in creating additional business support organisation is the potential existence of an already 'complex organisational landscape' (Harris, 2005, p. 9) or 'institutionally congested' governance structure as the new organisations (here referring to RDAs) are hardly entering a 'regional institutional "desert"' as Roberts (2000, p. 50 and cf. p. 39) remarks (cf. G. Bentley & J. Gibney, 2000, p. 221). In this case, institutional innovations are likely to be needed in order to improve coordination and coherence and avoid fragmentation.

#### *Competitive bidding as an effective tool of pooling resources of excellence*

In recognition of the importance of 'tri-lateral networks and hybrid organizations', an advocacy of supporting measures fostering the university-industry-government interactions can be found in the literature. However, it is predominantly focussed upon the university-industry dimensions.

As an operational strategy of bringing together different partners from business and research sectors, competitive bidding for funding appears to be an effective tool for the pooling of resources of excellence as Burfitt, Gibney, & Schierenbeck (2002, pp. 32-33) conclude from

their research into the German ‘centres of competence’ (*Kompetenzzentren*) or ‘networks of competence’ (*Kompetenznetze*,<sup>183</sup>) support scheme (see Bühner et al., 2002; Bundesministerium für Bildung und Forschung, 1999, 2000; Bundesministerium für Bildung und Forschung, 2002; Federal Ministry of Education and Research, 2003a, 2003b). There was a particular focus upon the ‘Competence Centre for Minimally Invasive Medicine and Technology’ in Tübingen-Tuttlingen (MITT) in Baden-Württemberg.

There are some obvious advantages that derive from using a competition not just as a selection and funding allocation method (e.g. see Wels, 2005) but also as a tool in bridging the ‘different worlds’ of academia and industry. First, competitive bidding generally intends to give the impetus and provide the rewards ‘to be more imaginative and efficient’ (Turok, 2004, p. 1072). Secondly, the monetary incentive of the funding prospect may overcome an existing scepticism or resistance of businesses towards collaborating with other businesses and university partners. It further may galvanise research actors that are perhaps normally less-driven by monetary objectives. Thirdly, in order to be successfully selected and to get most out of the potential collaboration, applicants themselves are expected to search by self-interest for matching partners with the utmost level of excellence. Fourthly, a competition procedure bears an attribute of a potentially objective process of allocating scarce funding resources and can thereby help to overcome an existing tradition of funding distribution that may have appeared to rather satisfy vested interest of locations and/or actors. Finally, competition winners can be branded and easily marketed, helping to create a sense of identity for new networks.

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<sup>183</sup> Please consult also the English-version of the online platform ‘Kompetenznetze.de’ for the networks of competence at <http://www.kompetenznetze.de/index.php3?aufl=2&sprache=2>

Such an approach has, however, no universal application. Indeed, as Turok (2004, p. 1072) states there has so far only ‘been insufficient consideration of the circumstances in which competition is appropriate and where it is not’. As a first disadvantage of the competitive bidding, the application process and the involved formalities and bureaucracy can serve as an obstacle, failing to galvanise certain actors. Hence, it depends upon the initiative of movers & shakers with a sense of driving an idea forward. Secondly, supported networks are furthermore likely to remain at least initially somewhat exclusionary clubs, which consequently produces rather economies of scales and collective goods internal to the network. Thirdly, the survival of the supported networks and hybrid organisations is likely to be a sensitive issue, with the risk of becoming “‘babies” of the facilitating organisation’ (Lagendijk, 1999a, p. 24) that receive perpetual assistance. Finally, the involved ‘adaptive costs of collaboration and cooperation’, as reported by Polenske (2004, pp. 1031-1033), has to be considered. Indeed as Burfitt, Gibney & Schierenbeck (2002, p. 29) report from their fieldwork, engaging SMEs in firm-to-firm collaboration is a difficult process. SMEs often fear exploitation (i.e. lack of trust) and are wary of the opportunity costs by committing (their limited time and resources available) to engaging in short-lived networks.

### ***Innovacracy***

Besides the cluster policy approach and efforts to construct institutional thickness, it is argued here that the predominance of innovation in all policy aspects is an essential third pillar in building innovation systems. To describe this predominance, the term *innovacracy* is coined here to refer to the governance of innovation.<sup>184</sup> However, innovacracy is only understood

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<sup>184</sup> Inasmuch, the term *innovacracy* links the term ‘innovation’ (deriving from the Latin word *innovāre*) with the combining form of ‘-cracy’ (deriving from the ‘Greek *-kratia*, from *kratos* power’), ‘indicating a type of government or rule’ – cf. Collins English Dictionary (1994, pp. 798 and 370 respectively).

here as a paradigm in waiting, a proposal, since innovation has not yet become the predominant order towards which policy-making as a whole is geared to.

In line with Lagendijk's recommendations such a paradigm would involve a holistic policy approach that includes the recognition that an overemphasis on *technical* innovation while neglecting other aspects such as *organisational* innovation for business modernisation, can be detrimental for the business support system.

In order to constitute successful economic development policy, the different policy fields such as education, research but also housing, environment, and so on all ought to be aligned with an underlying focus upon a common strategy for innovation and competitiveness. Assessing this alignment is however a difficult undertaking. In this respect it has to be acknowledged that the notion of innovacracy is a fuzzy description for a fuzzy concept. Whether indeed innovation policy as such, exists is therefore investigated by this thesis.

Furthermore, appropriate and successful innovation *policy* does not necessary equal successful economic development as such and vice versa (cf. Benneworth & Charles, 2001, p. 397). This is because other factors such as factor endowments or general regulatory conditions (at national level and that cannot be altered at regional level) have a more profound impact. As a result the thesis focuses attention upon the analysis of the systemic-ness of potential innovation systems, and in particular the inter-organisational dynamics.

## **Potential flaws in policy**

There are, on the one hand, examples of practical attempts at economic restructuring, cluster exercises, innovation policies unsuccessful that go underreported. The rareness of successful clusters and working innovation systems on the other hand, illustrates that securing structural change is difficult and that policy, if at all, only plays a limited part in contributing to this process.<sup>185</sup> The thesis turns to look at the issues relating to policy failures.

### *Lack of commitment*

The potential list of pitfalls in policy-making starts with a look at the issue of commitment to the task. Commitment is needed. However, policy makers may lack a sense of realism in terms of the availability of budgetary resources and the time span needed to achieve structural change. While, for instance, policies for radical economic structural change envisage rather a time horizon of around 25 years or so, this conflicts with the agendas of politicians, who want quantifiable results to present to the electorate within the period of office. This will affect the degree of commitment to policy ideas, as they will support the quick fix policy approaches.

### *Everybody's eggs in one basket: Biotech everybody?*

From a strategic management perspective it is generally accepted that if many economic actors in the business world opt for an apparently successful strategy, the profits will most likely only be marginal.<sup>186</sup> A similar doctrine applies to regional development policy (and

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<sup>185</sup> The litany of policy pitfalls is underreported mainly because the majority of academic contributions highlight and focus upon success models and cases and not so much upon the deprived and failed cases.

<sup>186</sup> In this context, one could refer here to game theory or, better, to the *cobweb theorem* (cf. Pass et al., 1993, pp. 71-72; Pollert et al., 2004, pp. 90-91), which is often illustrated at the example of the so-called 'pig cycle'. The

thereby to the business environment, which regions have to offer). If most regions follow a similar regional innovation strategy, efforts to upgrade and establish centres of excellence in the same areas will counterbalance each other. This consequently implies the need for a more case-specific regional structural approach that would sit alongside a national structural approach or even a European approach.

This way of thinking however may lead to the support for more adventurous or risky approaches (as for example demanded by the European Commission for the implementation of Innovative Actions) that are different from the current fashionable policy approaches. A key example of this is the drive to establish a strong presence in the new and upcoming growth sector biotechnology and nanotechnology. In doing this, there is a risk that regions will not opt for an innovative, endogenous strategy but instead will fall into the trap of following strategies that try to create fashionable clusters. Also they will simply copy policies of prosperous and successful model regions and industries, whilst neglecting other approaches. In particular, they will make the mistake of not following its own path-dependency (Cooke, 1997, p. 362). Innovation policies which are set up fairly independently from the particular region's composition of businesses, institutions and culture will be more likely to fail. Cooke (1997, p. 369) notes in this respect the difficulties, which peripheral regions from the Basque region of Spain to the Republic of Ireland have experienced (Cooke, 1996; Cooke & Morgan, 1993).<sup>187</sup>

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theory explains the oscillations in the prices of agricultural markets with the time lags with which supply reacts to prices (due to the delay between planting and harvesting). For economic development policy, the key would not be prices but perhaps industrial sectors or future technologies. The time lag here can just be the same, or more likely worse. For example, structural change is often given a mid-term time tag and 25 years are a rather realistic time horizon for harvesting the economic benefits of policy-making.

<sup>187</sup> The Basque case has shown that there is a need for prioritisation of sectors and technologies and for efficient monitoring and evaluation procedures for the industrial clusters policy. In addition, the specific political problems such as the threat of terrorism in combination with unfavourable economic features made it difficult for the regions to overcome its unattractiveness to foreign investors (Cooke & Morgan, 1993, pp. 179 and 181).

### *Having all one's eggs in one basket: the competency trap*

Besides the potential pitfall of following fashionable but unsuitable strategies, there is also the danger of a region becoming locked-into the specialism of the locality and of the 'strong ties' (Grabher, 1993a). Capello (1996, see the 2nd explanation group in section 3.3) reports, in this respect, that the 'cumulative concentration of material and immaterial resources in specific directions increases the risk connected to system irreversibility, yet in the presence of strong external turbulence and the need to change competitive strategies and conduct (Camagni, 1995).'

This institutional 'lock-in' means that while a region, for example, has become too specialised and good at doing something, at the same time it reduces its adaptive capacity to absorb new ideas. This is due to dominant organizations being opposed to change that may undermine their vested interests and positions (Boschma, 2004, p. 1004; Turok, 2004, p. 1076). In other more simple words: old habits die hard.

### *Missing policy diagnosis and evaluation*

The importance of finding suitable strategies and focus areas or clusters becomes clear. Therefore, a more advanced pre-assessment and benchmarking of a region's strength independent from general fashion is needed to find a successful trajectory for the development of a region. As Lagendijk (1999a, p. 20) reports, it is often not found in practice. However, this demands undertaking benchmarking exercises and the implementation of ongoing

performance indicators, which regions and its institutions are sometimes reluctant to introduce. This is often out of fear of being branded as an underperformer and the consequent public criticism following any publication of such results.<sup>188</sup>

*Big boys not raising the flags – Lack of signalling from the top/Lack of high-level support*

What is needed for a successful implementation of a holistic approach towards a regional innovation systems is not only the willingness and endorsement of the main actors (key players or ‘movers and shakers’) and bodies to collaborate but also the commitment of high-profile policy makers to signal the importance and acceptance of relevant policies. This could be compared to the necessity for commitment to the implementation of new business management approaches in companies, such as TQM.<sup>189</sup> This need may often be neglected or perceived as being of inferior importance to success but some examples indicate that failure is more likely once top-level involvement and commitment has faded or was absent. It is strange that there has been insufficient attention in the past to the involvement or commitment of top-level policy makers and hence this thesis also looks into this aspect

The majority of research studies related to cluster theory focus on specific sectors only. Although this is a useful approach to identifying the particular sector needs and the status quo, this kind of cluster thinking can tend to fall short in addressing a region’s underlying

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<sup>188</sup> An example for such reluctance might be the ending of North Rhine-Westphalia’s participation in the European Regional Competitiveness Benchmarking pilot project lead by EURADA.

<sup>189</sup> In the Eighties, many companies tried to copy the success of Japanese business culture models that placed quality at the centre of all management aspects. Yet, so many large businesses were reported to have failed, for instance, the implementation of Total Quality Management (TQM) approaches and execute a organisational culture change because they only selectively tackled a few aspects and did not whole-heartedly showcase and set an example from the top to all employees of what the new approach entails. Especially the lack of this signalling from the top was reportedly on of the key factors often missing that is necessary to overcome encrusted routines, beliefs and structures and carry out an institutional change.



problems and structure. It can neglect other clusters and linkages, e.g. same basic training needs and so on.

*The theory-practice gap and the consequent absence of theoretical influence in policy development*

In addition, policy failure occurs because many policy suggestions that feature in the literature are derived from the policy initiatives found in case-studies and thus do not reflect ‘pure’ academic thinking. Hence, theory may sometimes be rather led by policy rather than policy being theory-led (cf. also Lovering, 1999). This is an aspect that is worth further investigation. However, taking an opposite view, Landabaso (2002, p. 21) reports upon ‘an important “divide” between academic thinkers and regional planners’ in Europe, illustrated by the following quote:

This has had as a consequence a relative detachment of academic thinkers from practical experimentation and evaluation of results, which in turn, has meant that many of the good economic theories and considerations put forward are of a ‘diagnosis’ nature rather than clearly identifiable policy recommendations and tools amenable to testing and evaluation of results. Moreover, in the absence of the necessary feed-back from practical policy experimentation to further policy theory reflection, much of the regional economic literature has had a descriptive nature of existing regional ‘success’ stories in an attempt at drawing a universal explanatory ‘model’, rather than to concentrate in helping planners to improve their policy making step by step in a realistic, effective and pragmatic way. (Landabaso, 2002, p. 21)

This apparent theory-practice gap appears to be fuelled from both sides. Wollmann (2002b, pp. 382-383) points out that knowledge utilization research (cf. U. Beck & Bonß, 1990; Krautzberger & Wollmann, 1988; Weiss, 1991; Wittrock, 1991) has shown that paradoxically, despite the popularisation of policy and programme evaluation and monitoring, the results of such exercises as well as of social science research do generally not immediately find their application in policy and administration practice. Hence, he points that the interaction and learning processes are only incremental at best.

*Business support: too many initiatives, too many organisations, no one-stop-shop*

Linked to the idea of ‘support fatigue’ noted earlier (Hassink, 1996; cf. Lagendijk, 1999a, p. 11) and especially ‘initiative fatigue’ (G. Bentley & J. Gibney, 2000, p. 221), businesses are faced with too many initiatives, which are often set within a complex and fragmented organisational maze of business support organisations. Greenbaum & Bondonio (2000, p. 331) also add, with reference to Lehman (2004), the potential trap of programmatic approaches, i.e. where the programme is spread, to gain political support; and through increased budgets. An improved ‘streamlined organisation and communication’ of the business support structure as suggested by Lagendijk is essential in this respect to increase inter-operability as well as visibility, and is best achieved by the setting up of a ‘one-stop-shop’ as a first point of contact that coordinates and channels business advice.

### *Lack of systemic-ness of the governance of the innovation and business support framework*

The results from the 2005 European Innovation Scoreboard (EIS) published by the European Commission (2005f) imply that to improve their innovative capability, countries ought to focus their policy endeavours on weak dimensions of their innovation system instead of further consolidating their strength (as discussed in chapter 3). It is argued here that these results potentially provide an argument for raising the importance of the systemic-ness between the different dimensions of the innovation system, of which ‘governance’ represents one.<sup>190</sup> This perspective is extended by the view that the governance dimension itself also relies heavily on its own systemic-ness. This means that not only the important aspects of innovation need to be sufficiently interlinked but also the various actors and policies within the governance dimension of the innovation system too.

### ***Concluding remarks***

This chapter has outlined some of the normative policy strategies suggested in current theoretical conceptualisations. Furthermore, this chapter has presented some potential policy flaws and traps and thereby, illustrated that successful practical policy-making or policy implementation remains a difficult task. This thesis argues that in particular the systemic-ness of the governance of the innovation and business support framework plays an important role in contributing to the working of regional innovation systems. It is the particular objective of

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<sup>190</sup> In reiteration, the *seven dimensions of innovation* according to the 2005 EIS are (structural) innovation drivers, knowledge creation (i.e. R&D activity), innovation & entrepreneurship (at the firm level) – all grouped under innovation inputs -, application and intellectual property – both grouped as innovation outputs - (European Commission, 2005f, pp. 6-8), plus innovation demand and governance – added from the EXIS report (Arundel & Hollanders, 2005).

this thesis to ascertain *how* the systemic-ness influences its functioning. The next chapter outlines the methodology adopted in this thesis in investigating the issues.

## CHAPTER 7

### METHODOLOGY

This chapter discusses the methodological approach employed in this thesis to reach its research objectives and to answer the research questions as outlined in the introduction. First, it elucidates why the specific research topic was chosen. Secondly, it presents the general epistemological perspective. Thirdly, it explains why a qualitative methodology was chosen in weighing up the advantages and disadvantages of a qualitative versus a quantitative approach. Fourthly, it presents the research focus and propositions. Fifthly, the research design is illustrated, which introduces the methods of information gathering and elucidates the reasons behind the selection of case-studies and the sampling of interviewees. Finally, the analytical framework is presented, which forms the basis for collecting the information. It also discusses some of the limitations of the research.

#### **Choice of research topic**

The initial question for discussion is why focus on governance aspects of regional innovation systems? At its core, this thesis argues that actual practical innovation and technology policy-making per se has at large remained what Rosenberg (1982) called a ‘black box’, meaning that it involves some key factors and process that are less understood or underestimated.<sup>191</sup>

This may seem odd considering the large amount of best practice models and case studies describing success stories of regional innovation systems or clusters (e.g. Boekholt et al., 1998; Roland Berger & Partner et al., 1998; Saxenian, 1996 on Silicon Valley). However,

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<sup>191</sup> This standpoint is also supported by den Hertog, Oskam, Smith, & Segers (2003, p. 25), who classify ‘implementing systemic innovation policies’ as a ‘black box’ in their preliminary assessment of the mismatch between ‘policy’ and ‘research’ themes - or central nodes of dynamic innovation. Following their classification, they believe that this is a theme that is not yet well covered in innovation research nor yet recognised and addressed in innovation policy.

despite the maturity of conceptual models, there still remains, first of all, a shortness of practical policy advice for developing and implementing a suitable and endogenous policy in less favoured areas, which actually differ or go beyond describing the deficiencies in comparison to the success stories or theoretical models. Furthermore, there is a need for explaining policy failures in other areas, which do not manage to build an efficient innovation system despite seeming to be not less favoured in terms of crucial factor endowment.

It is the argument of this thesis that some processes in policy-making and implementation concerning policy strategy content and inter-institutional aspects of an innovation system are overlooked or misunderstood. While it can be suggested that most ingredients of a successful innovation system or a cluster have been identified (e.g. Braczyk, Cooke, & Heidenreich, 1998; Lagendijk, 1999), it is argued however, that current models and their affiliated policy suggestions do not sufficiently take account of the dynamics of the relationships between these ingredients within an economic system. Accordingly, importance has been attached to these aspects in the research fieldwork.

The thesis sees the apparent *theory-practice gap* as one potential contributor to policy shortcomings in reaching the EU's so-called Lisbon objective of becoming by 2010 'the most competitive and dynamic knowledge-based economy in the world' (Council of the European Union, 2000, paragraph 5).<sup>192</sup> If this is the case, the question must be raised, how this gap is fuelled – if it exists. It is potentially either fuelled by the unawareness and ignorance of

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<sup>192</sup> On the policy shortcomings see in particular the mid-term review report by the high-level expert group (HLEG) chaired by former Prime Minister of the Netherlands Wim Kok on the delivery of the Lisbon strategy entitled 'Facing the challenge' (European Communities, 2004, p. 6) that is available at [http://europa.eu.int/comm/lisbon\\_strategy/index\\_en.html](http://europa.eu.int/comm/lisbon_strategy/index_en.html) and the so-called Aho group report of another independent HLEG chaired by former Prime Minister of Finland Esko Aho was on recommendations for 'Creating an Innovative Europe' (Aho, Cornu, Georghiou, & Subirá, 2006) that is available at [http://ec.europa.eu/invest-in-research/action/2006\\_ahogroup\\_en.htm](http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm).

policy-makers and practitioners towards theory, or by the detachment of academics to the 'real' practical world whose conceptualisations thereby misguide policy, or indeed both.

Regarding the former, academics have indeed 'noticed the difficulties of getting across the content of the concepts developed by economic geographers and regional scientists to policy makers and practitioners' (Grabher & Hassink, 2003, p. 699) as, for instance, reported by Martin & Sunley (2001; 2003, p. 9), who single out only Porter's cluster concept as one that has had an 'impact on policy-makers'.

Either way, policy strategies are seen here as to underestimate or inadequately consider the obstacles towards their successful implementation in terms of pre-requisites for the suitability, feasibility and stakeholders' acceptability of regional economic and innovation strategies. Consequently, this thesis critically analyses the current main conceptual models upon which contemporary policies are based. This concerns foremost the regional innovation systems concept, which is reviewed to ascertain its value for policy development and implementation in particular concerning governance arrangements and dynamics.

As the main conceptual reference model, this study emphasises the regional innovation systems strand and Porter's cluster approach, as they are perceived here as being the concepts that have most significantly informed many contemporary policy developments. However, the analytical focus is placed mainly upon the regional innovation system concept, as it is viewed to comprise a 'cluster' perspective of the 'business superstructure' dimension in combination with a 'governance infrastructure' dimension (cf. Cooke, 1998, pp. 19-24) that is of particular interest to this thesis. As the concept considers governance aspects, which have increasingly

received more attention, it is arguably the concept with a slightly more operational policy focus.<sup>193</sup> Constructing institutional thickness and facilitating cluster development in a holistic approach are seen as key ingredients of innovation policy towards building successful innovation systems.

### **Presenting the ontological and epistemological perspective**

The interpretative framework of this thesis for the accumulation of knowledge follows a reflexive, social constructivist approach. The epistemological perspective of *social constructivism* views reality as being ‘socially constructed’ by interactive and subjective interpretations, identities, beliefs, attitudes, and perceptions of various actors and the researcher itself (cf. Berger & Luckmann, 1966; Easterby-Smith, Thorpe, & Lowe, 1991, p. 24; Meyers, 2004a, pp. 455-456 and 463-464).

This social constructivist paradigm is based upon a *relativistic* ontological presupposition, which means that the recognized reality or truth may differ between individuals or cultures. Accordingly, an abstract, subjective construct (such as an innovation system for instance) is only to be accepted when the actors (consensually) believe it does (cf. Meyers, 2004a, p. 456). Hence, social constructivism opposes the ontological position of ‘hypothetical realism’ - that features in the alternative positivistic and critical rationalist inquiry paradigms - which assumes that entities have a real existence separate from individuals, and that an universal or absolute reality is objectively recognizable, or respectively, subjectively at least partly recognizable (Kappelhoff, 1995, p. 32). Correspondingly though, social constructivism turns

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<sup>193</sup> This has also been fuelled by the ‘European Commission’-led push towards more bottom-up regional innovation and economic development governance stemming from the initiated process of developing Regional Operational Programmes for the implementation of the European Regional Development Fund (ERDF) and from the programmes supporting the development of Regional Innovation Strategies (RIS, RIS+ and others).



social science into ‘double hermeneutics’, in that it is regarded as the constructed interpretation of a course of individually constructed interpretations (Meyers, 2004a, p. 464).

The thesis also took recourse to questions that are central to other epistemological perspectives that are more or less close to the social constructivist paradigm, namely phenomenology, hermeneutics, ethnomethodology, systems theory, and grounded theory (see Easterby-Smith et al., 1991, p. 24; Patton, 2002, Exhibit 3.6 on pp. 132-133). The following table by Patton (2002, Exhibit 3.6 on pp. 132-133) provides an overview of the core questions that drive the various theoretical traditions for qualitative inquiry that is associated with the social constructivist paradigm.<sup>194</sup>

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<sup>194</sup> With regards to utilization-focused evaluations of programmes and projects, Patton also provides elsewhere (1997, see Menu 8.1 on pp. 192-194) an useful and extensive overview of different types of evaluations and their defining approach or questions.

Table 14 Variety in Qualitative Inquiry: Theoretical traditions

<i>Perspective</i>	<i>Disciplinary Roots</i>	<i>Central Questions</i>
1. Ethnography	Anthropology	What is the culture of this group of people?
2. Autoethnography	Literary arts	How does my own experience of this culture connect with and offer insights about this culture, situation, event, and/or way of life?
3. Reality testing: Positivist and realist approaches	Philosophy, social sciences, and evaluation	What's really going on in the real world? What can we establish with some degree of certainty? What are plausible explanations for verifiable patterns? What's the truth insofar as we can get at it? How can we study a phenomenon so that our findings correspond, as much as possible, to the real world?
4. Constructionism/ Constructivism	Sociology	How have the people in this setting constructed reality? What are their reported perceptions, "truth", explanations, beliefs, and worldview? What are the consequences of their constructions for their behaviors and for those with whom they interact?
5. Phenomenology	Philosophy	What is the meaning, structure, and essence of the lived experience of this phenomenon for this person or group of people?
6. Heuristic inquiry	Humanistic psychology	What is my experience of this phenomenon and the essential experience of others who also experience this phenomenon intensely?
7. Ethnomethodology	Sociology	How do people make sense of their everyday activities so as to behave in socially acceptable ways?
8. Symbolic interaction	Social psychology	What common set of symbols and understandings has emerged to give meaning to people's interactions?
9. Semiotics	Linguistics	How do signs (words, symbols) carry and convey meaning in particular contexts?
10. Hermeneutics	Linguistics, philosophy, literary criticism, theology	What are the conditions under which a human act took place or a product was produced that makes it possible to interpret its meaning?
11. Narratology/ narrative analysis	Social sciences (interpretative): Literary criticism, literary nonfiction	What does this narrative or story reveal about the person and world from which it came? How can this narrative be interpreted to understand and illuminate the life and culture that created it?
12. Ecological psychology	Ecology, psychology	How do individuals attempt to accomplish their goals through specific behaviours in specific environments?
13. Systems theory	Interdisciplinary	How and why does this system as a whole function as it does?
14. Chaos theory: Nonlinear dynamics	Theoretical physics, natural sciences	What is the underlying order, if any, of disorderly phenomenon?
15. Grounded theory	Social sciences, methodology	What theory emerges from systematic comparative analysis and is grounded in fieldwork so as to explain what has been and is observed?
16. Orientational: Feminist inquiry, critical theory, queer theory, etc.	Ideologies: Political, cultural, and economic	How is X perspective manifest in this phenomenon?

Source: Patton (2002, Exhibit 3.6 on pp. 132-133). Note that 'etc.' was used here to replace 'among other'.

By following a social constructivist approach, this thesis takes an *institutionalist perspective* in that the behaviour and decision-making of economic actors is regarded as being based upon beliefs and attitudes (Blyth, 2002, preface on p. ix) that are influenced by habits and routines of individuals, groups and institutions (Amin & Thrift, 1995, p. 51; Boschma, 2004, p. 1007). This means in consequence that the collective outcome is shaped by an ‘instituted process’ (cf. Amin, 1999, pp. 366-367; Amin & Thrift, 1995, p. 50; Coriat & Dosi, 2002, pp. 98-99). However, actors are not just seen to be responding to institutional structures and their contextual environment but, at the same time, also seen to ‘actively construct’ or ‘enact’ their environments (cf. Kappelhoff, 1995, p. 32; W. R. Scott, 1998, p. 140; Watzlawick, 1985; Weick, 1979, p. 132). Social constructivism places an emphasises on this reciprocal ‘co-constitution’ (Meyers, 2004a, p. 464; Pettman, 2000, p. 11), i.e. the determining interdependence between the collective behaviour of actors and social structures (Meyers, 2004a, p. 456).

Importantly, social constructivism assumes in this respect the *changeability and adaptability* of actors, interests, processes and structures, which are ‘embedded’ in a specific historical, socio-economic, political and cultural context (M. Granovetter, 1985). Therefore, this thesis is based on the postulated possibility that systems full of conflictive behaviour and interactions can be transformed into cooperative associative systems (cf. Meyers, 2004b, pp. 482-484).<sup>195</sup> Accordingly, it rejects the perspective of power and competition as being a pure antagonistic ‘zero-sum game’. Instead, cooperation is seen as possible not because of altruistic intentions that aim for the overall societal best for a region but instead due to *boundedly rational* calculated decision by actors, which are influenced by ‘perceptions of self interest’ (Coriat &

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<sup>195</sup> Thus, this study has recourse to conflict and cooperation theories (see Meyers, 2004a; Meyers, 2004b).

Dosi, 2002, pp. 99-100) and the assumed benefits resulting from cooperation.<sup>196</sup> The interest of this thesis thus lies in how regional innovation systems are constituted and how do they function.

### **Outlining the methodological research approach**

This thesis takes a *qualitative* (as opposed to quantitative) methodological research approach as it is regarded to be most suitable for gaining an in-depth insight and understanding of the complex dynamics, perceptions and relationships between actors within the governance and business support infrastructure of regional economies or regional innovation systems.

Easterby-Smith et al. (1991, pp. 21-32) juxtapose the positivist paradigm and associated quantitative methods of data collection with the phenomenological paradigm - from which the social constructivist paradigm derived (cf. *ibid.*, p. 24) - and the associated qualitative methods, which are summarised in the following Table 15. This contrasting of strength and weaknesses of each approach illustrates clearly that for the purpose of this thesis a qualitative methodology is best.

This thesis has taken a phenomenological, qualitative *fieldwork method* to study networks of organisations in different social settings in order to arrive at an in-depth understanding of the meanings that people place upon interpersonal and inter-organisational behaviours, relationships, and processes (cf. Easterby-Smith et al., 1991, p. 37). A quantitative

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<sup>196</sup> This entails that actors interdependently adjust their behaviour towards a common objective or that of other actors in the hope of mutual benefits. Meyers' (2004b) summary of theories of international cooperation and interactions includes an useful overview of the concept of (rationalistic) cooperation. As an explanation why cooperation occurs, he (2004b, pp. 484-485) refers to optimistic and pessimistic expectations about future behaviour of other actors. Hence, cooperation is driven by the optimistic expectations of future beneficial cooperative behaviour of other actors as a consequence from the current own cooperative behaviour, or by the pessimistic expectations of a non-cooperative 'shadow of the future' (Axelrod, 1984).

experimental research design would have found this difficult to grasp since it is – as Easterby-Smith et al. (1991, p. 32) put it – ‘not very effective in understanding processes or the significance that people attach to actions’ (see also Table 15 below).

*Table 15 Advantages and disadvantages of competing methodological paradigms*

<i>Positivist paradigm and associated quantitative methods</i>	<i>Phenomenological paradigm and associated qualitative methods</i>
<ul style="list-style-type: none"> <li>+ wide coverage of the range of situations</li> <li>+ fast and economical</li> <li>+ maybe considerable relevance to policy decisions (if aggregated from large samples)</li> <li>– tend to be rather inflexible and artificial</li> <li>– not very effective in understanding processes or the significance that people attach to actions</li> <li>– not very helpful in generating theories</li> <li>– they make it hard for the policy-maker to infer what changes and actions should take place in the future (because of the focus on what is, or what has been recently)</li> <li>– may only provide illusions of the ‘true’ impact of social policies as Legge (1984) points out</li> <li>– most of the data gathered will not be relevant to real decisions although it may be used to support the goals to decision-makers</li> </ul>	<ul style="list-style-type: none"> <li>+ ability to look at change processes over time</li> <li>+ ability to understand people’s meanings</li> <li>+ ability to adjust to new issues and ideas as they emerge</li> <li>+ ability to contribute to the evolution of new theories</li> <li>+ way of gathering data which is seen as natural rather than artificial</li> <li>– data collection can take up a great deal of time and resources</li> <li>– analysis and interpretation of data may be very difficult</li> <li>– qualitative studies often feel very untidy because its harder to control their pace, progress and end-points</li> <li>– problem that many people especially policy-makers may give low credibility to studies based on phenomenological approach</li> </ul>

Source: Shortened summary of Easterby-Smith et al. (1991, p. 32).  
 Note that a ‘+’ denotes an advantage and ‘–’ denotes a disadvantage.

The social constructivist paradigm and the qualitative research methods is particularly suited to this thesis, which furthermore aims to investigate subjective obstacles to systemic

cooperation and thereby explore possible alternatives, practically and theoretically. The research is not just *pure theoretical research*, which in reflection re-examines the regional innovation systems concept in different organisational and social contexts and thus contributes to theoretical developments; but it is *applied research* too since the inquiry aims to ‘explain what is happening’ and is guided by practical, applied questions (cf. Easterby-Smith et al., 1991, pp. 6-7; Patton, 2002, Exhibit 5.3 on p. 224).

Correspondingly, this thesis provides a critical interpretation of how and why systemic governance is constructed and thus identifies obstacles and enablers for policy practice. Yet, this thesis is not ‘problem-solving research’ but instead a kind of ‘testing-out research’ of propositions concerning the regional innovation concept in that it is ‘trying to find the limits of previous proposed generalizations’ and ultimately aims to improve it. Thus, as outlined in the introduction, the objective of the thesis is to focus on the question: What are the ways of making regional innovation systems work? However, the investigative focus this thesis asks ‘how and why’ systemic governance – which is perceived as one of the key determinants for regional innovation systems – is, or is not, functioning. Therefore, the research equally involves a clear ‘*explanatory*’ dimension (cf. Yin, 1994, pp. 6-7). This allows for a *case-study* approach. This is because the ‘what’ questions are *not* ‘a form of a “how many” or “how much” line of inquiry’ and means that any of the five research strategies outlined by Yin (1994, pp. 5-6) can be used - including an *exploratory* case study.<sup>197</sup> Thus, it is compatible with the explanatory ‘how and why’ questions, which favour the use of case studies as well as histories and experiments as research strategies (cf. Yin, 1994, pp. 6-7).

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<sup>197</sup> The alternatives for an explorative study are using the strategies of a survey, an experiment, an archival analysis and history. In contrast, the different type of ‘what question’ (in terms of ‘how many’ or ‘how much’) ‘is more likely to favor survey or archival strategies than others’ (Yin, 1994, pp. 5-6). Confer also Philips & Pugh (2000, pp. 50-52).

### **A case-study approach to research strategy**

Undertaking case studies ‘is a way of investigating an empirical topic by following a set of pre-specified procedures’ (Yin, 1994, p. 15). Its inquiry thus benefits from the theoretical propositions that guide data collection and analysis. According to Yin (1994, p. 10 and cf. pp. 30-32), the goal of the case study is to ‘expand and generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization)’.

The sources of evidence for the case studies include primary documents, secondary documents, and systematic interviewing. Even though, in general, case studies can include quantitative evidence (cf. Yin, 1994, p. 14) they are overwhelmingly limited here to qualitative evidence. The following sections describe the research design of the thesis.

### ***Research focus and propositions***

In order to achieve its objectives and to answer the research questions the research approach follows in particular *three dimensions to the debate*, which scrutinizes the regional innovation systems model from a governance perspective as opposed to a business perspective (e.g. Evangelista, Iammarino, Mastrostefano, & Silvani, 2002).<sup>198</sup> These dimensions correspond to propositions that can be decoded from the concept: the region, innovation, and the system:

1. This thesis investigates *whether the region is the appropriate unit* to conceptualise an innovation system, especially with regards to the governance dimension.

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<sup>198</sup> Thereby, this thesis in a way is complementary to the different approaches of testing regional patterns of innovation and cluster, and their systemicness from business surveys such as the CIS (see e.g. Evangelista et al., 2002, pp. 180-182).

2. The *status of innovation* is tested, i.e. whether it is in practice a dominating paradigm, meaning whether innovation is currently prioritised over other policy fields in a way that justifies the label of innovation policy.
3. The *systemic-ness of innovation systems* is explored to identify contributing factors to governance coherence and cooperation.

The following elaborates on these three dimensions in more detail and presents the propositions of this thesis concerning them.

1. First, it is argued that the regional innovation system strand neglects important *sub-regional governance dynamics*. It is argued that the amalgamation of the governance dimension and the business dimension implies that both dimensions are in a way aligned at the regional level. It is argued that this is not necessarily the case. Accordingly, it is hypothesised that there are significant sub-regional dynamics within the governance of regional innovation systems that potentially do not justify the regional conceptualisation of innovation systems. If there are significant differences in sub-regional case-studies within the same regional setting in terms of governance arrangements, structures and systemic-ness, this gives credence to the hypothesis that there is not one homogenous innovation system and that the regional innovation systems concept is at least insufficient in describing the dynamics of the governance dimension. Indeed, the modalities of regional innovation systems by Cooke (1992; 1998, pp. 19-21) such as the grassroots, network and dirigiste types are regarded to insufficiently describe the complex realities of policy-making and thus are of little guidance to policy development. Furthermore, the question is raised of whether the region is the appropriate level of innovation policy-making and implementation and whether the sub-regional or urban level ought to be attributed a more important role within the multi-level governance system of innovation systems. In consequence, this process also involves



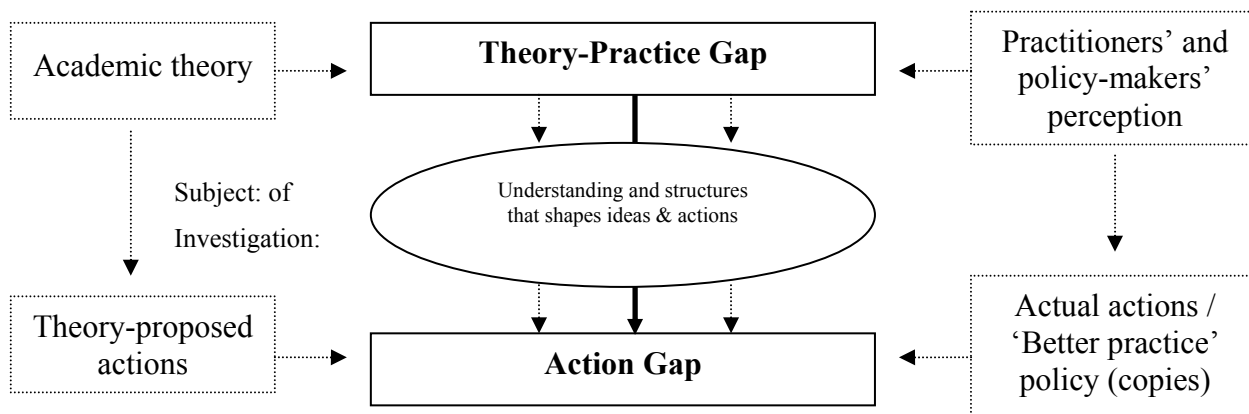
considering the proposition of an alternative or complementing conceptualisation towards local or urban innovation system, at least in terms of the governance infrastructure dimension.

2. Secondly, this thesis suggests that many policy shortcomings have been fuelled by a *theory-practice gap*. The thesis investigates the potential divergence between academic understanding and conceptualisations and policy-maker's and practitioner's perceptions, beliefs and understanding on what regional innovation policy is and what it should entail.<sup>199</sup> The following diagram (Figure 12) illustrates that an apparent gap is potentially widened from both sides either by the fuzziness, detachment and policy distance and thus lack of applicability of conceptual models (cf. Markusen, 2003a, p. 705) or by the insufficient knowledge or understanding of these models by practitioners and policy-makers. To identify any apparent theory-practice gap and poor theory transfer to policy-making practice and/or vice versa requires a good understanding of both perspectives. Thus, the thesis investigates the innovation focus of the conceptualisation of regional innovation systems. It is argued here that although innovation should be a paradigm for policy-making, it is not yet. Innovation is regarded as the underlying contributor to competitiveness and economic growth; yet, the question remains whether policies have been attuned fully towards this common realisation. Moreover, this raises the question of whether innovation policy as such actually exists.

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<sup>199</sup> More precisely following the social constructivist perspective taken by this study, the potential theory-practice gap rather represents the gap between the *researcher's interpretation* of how academics understand and conceptualise regional innovation policy, on the one side, and the *researcher's interpretation* of policy-maker's and practitioner's perceptions, beliefs and understanding on the other.

Figure 12 The theory-practice gap



Source: Own creation

3. Thirdly, and most importantly, it is suggested that the *systems dimension* of the regional innovation system is not sufficiently specified. The fuzziness of the systems dimension means that the regional innovation system concept is prone to misleading policy development, but it also limits the value of the concept as an analytical tool.<sup>200</sup> The mere existence of elements of an identified system ‘as an enabler of local forms of competitiveness’ (Lagendijk, 1997b, p. 23) gives the wrong impression that such a system is functioning or indeed existent. In this respect, it is suggested that of importance is not whether certain systemic parts exist, but whether they are connected or well-connected elements of an associational system, i.e. whether the actors of the governance system elements cooperate and are coherent in their joint overall strategic regional policy approach (cf. European Spatial Planning Observation Network, 2005, pp. 72-73). How to achieve this systemic-ness, is at the centre of the explorative investigation. Consequently, the question is raised of whether a region that is

<sup>200</sup> Inasmuch this critique mirrors to some extent the critique addressed at the cluster concept (see Lagendijk, 1997b, pp. 18-19; Martin & Sunley, 2001, 2003).

empirically valued as to encompass an insufficiently connected system of elements of the business and innovation support superstructure would still deserve being described as a (albeit weak) regional innovation system.

### ***The governance approach and the definition of systemic-ness***

The focus of this research is the system of business support and policy for innovation and regional technology transfer, which represents one important (but not omnipotent) feature of the regional innovation systems concept. Correspondingly, the emphasis is placed upon *governance conditions*, i.e. on elucidating the structures and relationships between the innovation actors. This comprises analysing the *systemic-ness* of the institutional governance framework, which is defined here as strategic and effective governance which encompass a ‘well connected and functioning’ status of the structure and relationships between innovation actors that goes beyond its mere existence of an institutional business support and governance superstructure. Insofar, it is supposed to actively facilitate the clustering or ‘clusteredness’ of the business dimension of a regional innovation system. Certain conditions (or incentives) are assumed to be needed to constitute the ‘well connectedness and functioning’ of an innovation system, such as that key actors are being generally cooperative and coherent in an overall strategic approach which must be present. Before identifying certain criteria or success factors for such conditions these conditions, this thesis is first having recourse to the term of ‘good governance’ for some specification.

While the notion of policy-making concerns foremost the formulation of action plans and programs by decision-makers<sup>201</sup>, the so-called *governance approach* (Le Galès & Voelzkow,

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<sup>201</sup> While policy-makers can, for example, comprise officials and politicians, *practitioners*, in contrast, are consequently rather seen as those actors that are involved in the implementation of policy-making, e.g. the

2001, pp. 5-6) consequently begs the investigation of the conditions, dynamics and institutional factors that influence the inter-institutional inclusiveness, coherence and cooperation of various stakeholders within the economic system (including practitioners).<sup>202</sup> Thereby, this approach addresses the questions of who makes policies, and how they could and should be done operationally.

Accordingly, *good governance* at the local or regional level is basically the ‘cooperation and coordination between levels of government (vertical), between sector policies (horizontal), between territories and between governmental and non-governmental actors’ that provides ‘integration and coherence between fields of competences, sector policies and spatial development approaches creating the conditions for collective and harmonised action’ (European Spatial Planning Observation Network, 2005, p. 72).<sup>203</sup>

In its White Paper on European Governance, the European Commission (2001, p. 10) has furthermore outlined the following *five principles of good governance*: openness (i.e. active communication in clear and simple format), participation (i.e. inclusive policy chain – from conception to implementation), accountability (i.e. clear roles of responsibility and decision-making processes), effectiveness (i.e. effective and timely delivery upon needs, objectives and

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various actors in the organisational governance and business support infrastructure. Accordingly, this study defines the terms practitioner and (policy) practice in a wider sense while policy-maker and policy-making are interpreted in a more narrow sense.

<sup>202</sup> Following the European Commission’s (2002e, p. 21) definition of ‘*governance (of innovation)*’, this concerns all those stakeholders – such as scientists, industry, consumers and public authorities – that are involved ‘in the process of innovation policy design, implementation and evaluation’.

<sup>203</sup> In other words, good governance ‘comprises the capacity to (a) integrate and shape local/regional interests, organisations, social groups, as well as (b) to represent them to external actors, to develop more or less unified strategies in relation to the market, the state, other cities or other levels of governance’ (European Spatial Planning Observation Network, 2005, p. 73).

evaluation) and coherence (i.e. consistent approach within a complex system).<sup>204</sup> These principles of good governance – though coming from a slightly different ‘European’ angle – are applied here also to the *systemic-ness* of innovation systems.

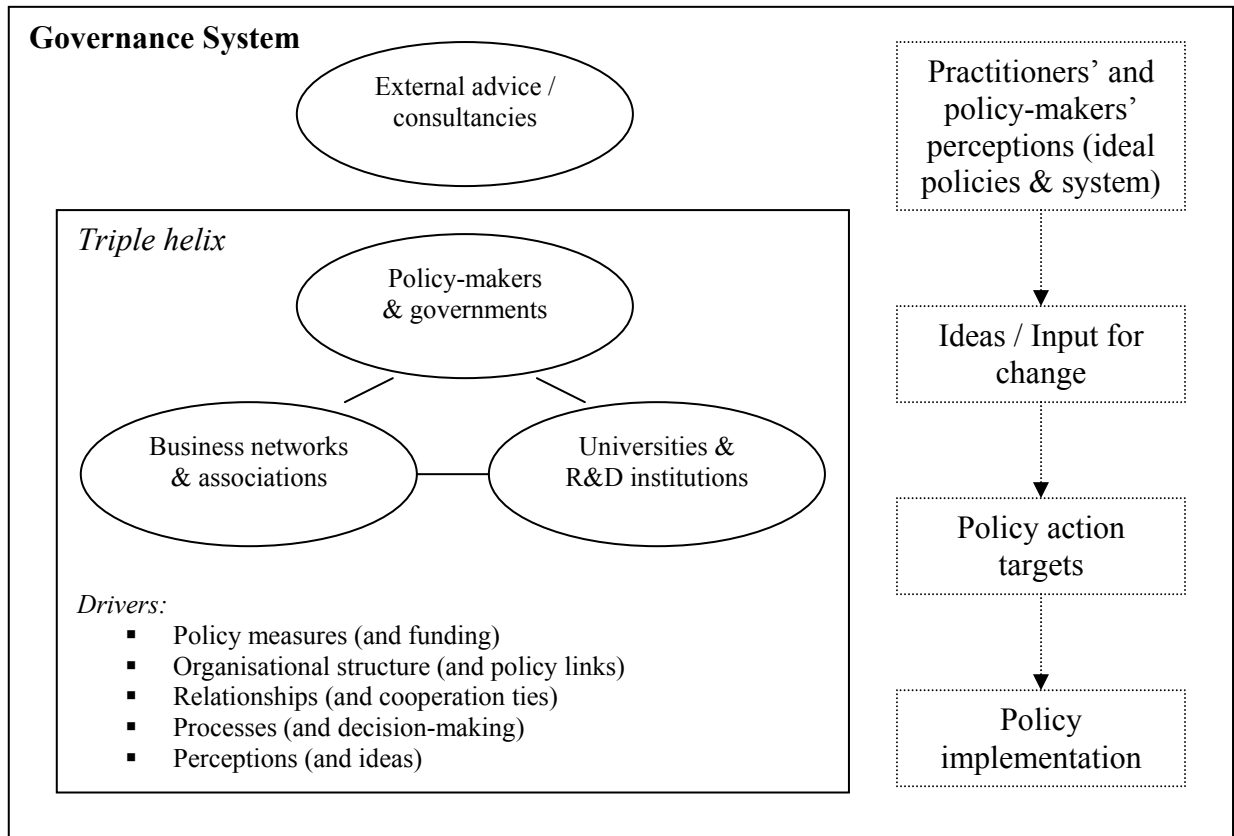
As the systemic-ness of the governance dimension of regional innovation systems is under the spotlight here, businesses are not at the centre of this research - although they are *the* essential innovation actor.<sup>205</sup> The thesis rather attaches importance to actors of the governance sphere, which are attributed an important facilitating role for regional innovation systems as sources of innovation input and as animateurs or mediators for collaboration and networking. However, by taking a regional perspective and concentrating on aspects of the governance system (see Figure 13 below), this study covers the business dimension indirectly. The case studies look at the relationships with business networks and associations, such as the chambers of commerce and industry, which serve as a kind of limited proxy for the business dimension.

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<sup>204</sup> The application of these five principles is further said to reinforce the principles of subsidiarity and proportionality, which concerns the questions of whether activities are actually necessary, whether the choice of governance level for implementation is appropriate, and whether the selection of measures are proportionate to its objectives (cf. European Commission, 2001, pp. 10-11).

<sup>205</sup> With regards to the systemicness of the business dimension, see the list of key ingredients for systemic performance by Evangelista et al. (2002, pp. 180-182), which they applied to their analysis of data from the Community Innovation Survey (CIS). Note that – besides the presence of innovative firms and their innovation expenditure – these key ingredients also include two further aspects with regards to the governance dimension. They are the relative importance attributed by firms to the *favourable institutional context* (i.e. systemic interaction with suppliers, customers, competitors, university) as well as to *hampering factors to the introduction of innovation* such as the lack of technological information and services, technical expertise, technological infrastructure, and legislative and regulatory constraints (as a proxy for the effectiveness of public policy).

Figure 13 Governance system



Source: Own creation

### *Limitations of the governance approach*

In consequence, the thesis does not make causal statements in terms of overall economic effectiveness or success of the regional innovation system, but only on its systemic-ness of governance. Neither business innovation output nor the causal linkages between innovation-policy, innovation, and economic growth are evaluated in detail, this is beyond the scope of the thesis.<sup>206</sup> Even if such evaluation were possible, innovation and economic growth are influenced by such a complex system of multiple determinants that it would be difficult to

<sup>206</sup> Thus, it was not the intention to assess the economic success or existence of (regional) innovation systems as others (Evangelista et al., 2002) have done.

establish conclusive evidence for the effect, or causal relationship, that systemic policy has upon economic development.

Accordingly, the analysis is *not* based upon regional economic indicators such as productivity, employment and other statistics. Rather the research is based on the *postulate* (i.e. unproven underlying assumption in the process of reasoning) that successful systemic innovation governance makes a difference to the innovativeness of businesses and economic development of its region(s). The extent to which policies and institutional systemic-ness influence the business innovation output is not investigated and remains an ‘open question’.

This thesis also aims to avoid a kind of *institutional* ‘productivist’ bias that exaggerates the economic contributing role of organizations of regional governance and business support to the economy (cf. Lovering, 1999, pp. 385-386).<sup>207</sup> Thereby, the institutional dynamics are not to be seen as *the* ‘driving influence of the regional economy as a *whole*’ as it is only one complementary part of the regional economy, which is ultimately driven by its business base.

In consequence, the institutional dynamics and governance structures are not judged on the economic success of their regional economies. The relationship between output and outcome in this respect is a complex one, and confusing them easily done.<sup>208</sup> Even so, there is

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<sup>207</sup> Lovering (1999, pp. 385-386) actually criticizes the exaggerated and partial economic claims with a “‘productivist’ bias that is manifested in the habit of assuming that the driving influence on the regional economy as a *whole* can be understood by an analysis of only one type of industrial actor’. In addition to this ‘tendency to act out “Sayer’s error” as Lovering (1999, p. 384) calls it, that is to make the ‘classic error of bad geography, namely, confusing development *in* a region with the development *of* a region (Sayer, 1985)’, Lovering (1999, pp. 384-389) also names the philosophical and methodological looseness (i.e. ontological and epistemological fuzziness) and the lack of attention to the political sociology of regional development (i.e. the reduction of ‘culture and the absence of power) as problem areas of the New Regionalism package.

<sup>208</sup> Economic development, for instance, is seen to be based upon an array of influencing factors, of which the governance dimension is one contributing one. In effect this means that any success or failure in terms of economic development cannot be conclusively attributed to policy endeavours alone. Furthermore, with multiple

consensus at least among the institutionalist approaches of the new economic geography and the learning regions strand that regional-level institutional arrangements play *a* critical role in securing economic success in a globalizing economy (cf. Amin, 1999, p. 370).<sup>209</sup> However, Amin (1999, p. 375) points that building local institutional capacity and capability is not a sufficient route for establishing a privileged position within global networks. It is not just the presence of institutions and institutional advancement but their anticipative capabilities with regards to change.

### ***Method of generalisation***

The thesis does *not* follow a hypothetico-deductive approach of empirical hypothesis testing - that is associated with critical rationalism (Kappelhoff, 1995, p. 14) and the dominant scientific paradigm associated with quantitative research methods (see Patton, 1997, Exhibit 12.3 on p. 299) -, but an *inductive* inquiry approach (cf. Patton, 1997, p. 279) that investigates and contrasts subjective interpretations of a construct and thus aims to capture its inherent dynamics. Consequently, this thesis uses an exploratory approach of naturalistic inquiry (see Patton, 1997, pp. 277-279), which objective is to generate theory rather than its verification. As Patton (1997, p. 279) writes, '[q]ualitative researchers ask questions rather than test hypotheses.'

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levels of governance involved, this means that, for example, policy-making at sub-national level – even if judged as 'good' could be overshadowed by general systemic conditions (of the innovation system) that are set at the national level. Consequently, the effect of policies for areas with high structural unemployment, for instance, have to be judged carefully, avoided pointing the finger to easily at policy.

Not so much the success of the policies as such is analysed but more the success of the policy-making *process*. The evaluation of the former would in any case be a difficult undertaking as it is difficult to assess the output and especially its influence upon the economic development (in comparison to situation where none policy activities would have been present). Since there are many influencing determinants to it, it is hard to single out the effect of just one factor.

<sup>209</sup> Nelson & Winter (1982) have called such an approach that treats some variable as important 'appreciative theorizing' as Edquist (1997, p. 28) points out. This is also based on the understand that the dualism of theoretical and methodological perspectives of 'new' economic geography 'encompasses both qualitative versus quantitative ways of knowing, and cultural versus economic explanations for regional growth' (Plummer, 2003, p. 688).



Nevertheless, the clear-cut distinction between inductive and deductive method may well be ‘overstated’ in research practice. Markusen (2003, pp. 748-749), for instance, contests both the notion of ‘purely deductive theorizing’ as well as that of ‘purely inductive thesis’ and argues that there is no such thing as ‘the posing of causal relationships without insight from experience or reading other people’s work’ and she views research questions in a way as the ‘deductive propositions one brings to the inductive exercise’. This seems to be true for this research. While this thesis started from an inductive approach to the fieldwork, the writing-up has appeared to follow much more of a deductive format.

Inherent to an inductive approach is that it is not possible to reach a conclusive proof for the findings. Observations are selective and bound to their specific context and milieu only and thus do not allow easily for making generalisations. To overcome the ‘problem of induction’, Karl Popper (1959) suggested looking for ‘disconfirmatory evidence’ (cf. Easterby-Smith et al., 1991, p. 39), i.e. to apply methodological falsification (see Kappelhoff, 1995, pp. 14-15).

A method of ‘*analytical generalisation*’ is adopted, which means that ‘a previously developed theory is used as a template with which to compare the empirical results of the case study’ (Yin, 1994, p. 31). While case studies are not (statistically) generalisable to populations, they are to theoretical propositions and thus can help to expand and (analytically) generalise theories. In this context, Yin (1994, pp. 10 and 31) points out that ‘[i]f two or more cases are shown to support the same theory, replication may be claimed’ For this reason, the selected conceptual research model (i.e. regional innovation system) and subsequent propositions were

outlined and, accordingly, a suitable type of case-study design chosen, which is described next.

### ***Case study design***

A comparative case method was chosen to scrutinize the regional innovation systems concept with regards to the propositions concerning sub-regional dynamics of governance. In order to investigate if there are significant differences of sub-regional governance dynamics within regional innovation systems, four case studies of city-regions (at the urban, sub-regional level) were selected within a homogenous setting of the same uniform region, the German Federal State (*Land*) of North Rhine-Westphalia. In logical consequence, these homologous city-regions are expected - by 'literal replication' (cf. Yin, 1994, p. 46) - to yield similar results in terms of governance characteristics, structures and dynamics.

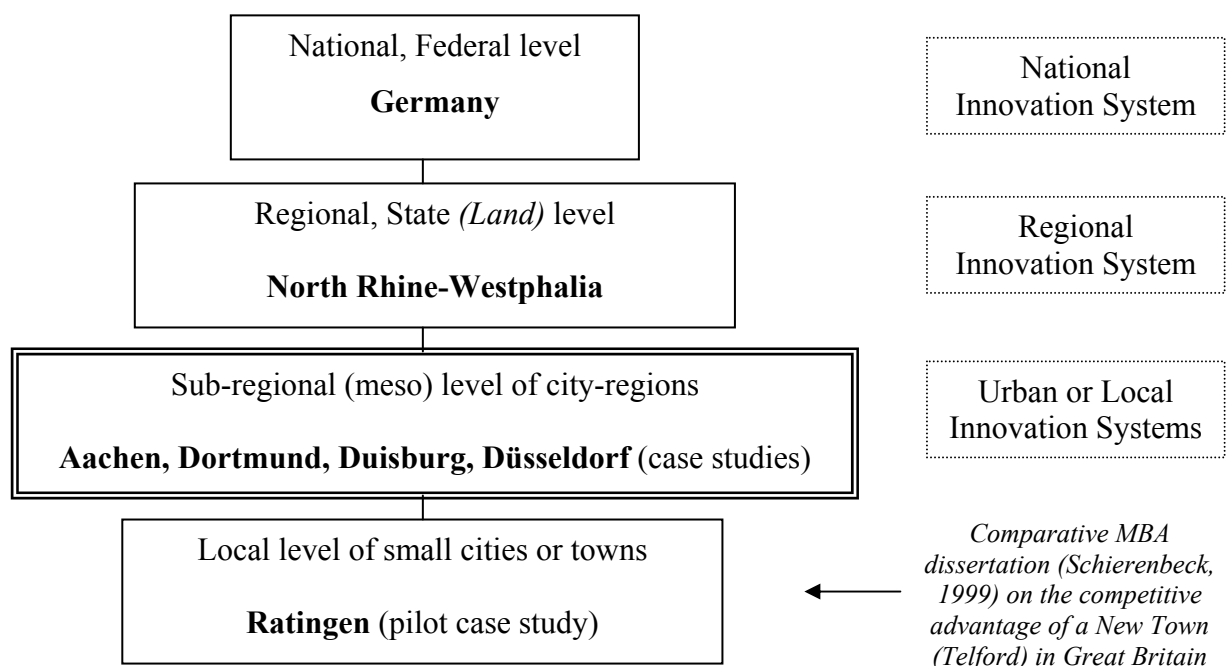
However, the overall research design can be said to be also *semi-embedded* because this thesis furthermore draws insights from multiple units of analysis.<sup>210</sup> Although this admittedly complicates the research design, there are insights that can be gained from it as these additional units of analysis concern multiple spheres of governance. First, this comprises a pilot case study that was done of the small city of Ratingen, and revealed that the local level (i.e. sub-unit of the city region of Düsseldorf) was inadequate to investigate innovation policy-making due to the apparent lack of a critical mass of institutional capacity and innovative activities to constitute an innovation system. As a result of these findings, the

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<sup>210</sup> The label of 'semi-embedded' is used here to indicate that the other, multiple units of analysis do not follow the replication logic that was maintained for selection of the four holistic case studies of the city-regions (as introduced later on), e.g. due to taking recourse to the triple helix model for the sampling approach.

research design was modified to study city-regions.<sup>211</sup> Secondly, the thesis also investigates the dynamics at multiple levels of governance, at the wider regional (*Land*) level of the Federal State of North Rhine-Westphalia (i.e. the supra-unit of city-regions). Finally, the national level is also looked at, for contextualisation of the idiosyncrasies of the overall national innovation system. Figure 16 illustrates these complex connections.<sup>212</sup>

Figure 14 Multiple units of analysis and spheres of governance



Source: Own creation.

<sup>211</sup> The small city of *Ratingen* lies in the non-metropolitan county (*Kreis*) of Mettmann near Düsseldorf in North Rhine-Westphalia. The choice of Ratingen as the pilot study was further influenced by the author's earlier comparative MBA dissertation (Schierenbeck, 1999) on the competitive advantage of a New Town (Telford) in the English West Midlands, which formed an initial intention to undertake a comparative analysis between them and their regional settings. While some similarities could be observed between Ratingen's and Telford's efforts of business support and general economic development policy (with infrastructure and local business taxation issues prevailing), specific policies to build clusters and to foster innovation, however, cannot be said to be found. Hence, the search for innovation governance and thus the unit of analysis turned to larger cities and city-regions, where it was hoped to find such policies.

<sup>212</sup> Herrschel & Newman (2002, Figure 5.1 on p. 117) provide a very useful comparative glossarial juxtaposition of the different spheres of government between Britain and Germany, which the reader can find reproduced in the appendix IV. It helps to find the closest equivalent comparative terminologies for the different levels of government and governance.

*Selection of research setting: The German Federal State of North Rhine-Westphalia*

The German Federal States (*Länder*) are *the* example of a form of decentralised regional government with the widest ranging powers as they have elected parliaments with budgetary and legislative powers.<sup>213</sup> By looking at different sub-regional cases within such an established decentralised and regionalised system, it can be suggested that it is possible to get insights in how to govern and coordinate a system with a more strategic, endogenous approach.

North Rhine-Westphalia was chosen because first, the researcher knows the region. Secondly, North Rhine-Westphalia is often portrayed as microcosms mirroring the diversity of Germany as a whole. It comprises well-off areas and deprived areas (with high unemployment) as well as so-called traditional industries and modern industries and services. It also reflects the overall political landscape in Germany. Thirdly, North Rhine-Westphalia is reported to have followed a (sub-) regionalised policy approach (e.g. see Grabher, 1993a, p. 272; Heinze & Voelzkow, 1997). Lastly, it is a region that is lagging behind in terms of economic performance, especially in comparison to other West German *Länder*.<sup>214</sup> It is a former heavily industrialised region that was once Europe's coalmining and steel-producing powerhouse and it has a long history in attempting to execute structural and institutional change.<sup>215</sup> Thereby,

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<sup>213</sup> The Austrian *Länder* and the Belgian provinces are the other key examples of federal states in Europe.

<sup>214</sup> Within the EU-27 however, North Rhine-Westphalia is depicted, for instance, by the ESPON programme (European Spatial Planning Observation Network, 2005, pp. 27, 23 and 29 respectively) to have a 'moderately below average' or 'average' economic success and performance in relation to the aims of the Lisbon agenda as well as an 'average' efficient labour market.

<sup>215</sup> For example, the ZIM programme was already set-up in 1990.

this thesis is different from other case studies in that it investigates a region still struggling with industrial change. It does not investigate an economic growth (success) story<sup>216</sup>

*Limitation of research design: alternative perspective*

The choice of North-Rhine Westphalia as regional setting can be criticised. It is a German Federal State with a population and economic power (GDP) equalling or exceeding that of many counties, which means it could be regarded as a near national innovation system. Also, it can be argued that North-Rhine Westphalia may not necessarily correspond to a sufficiently homogenous and self-contained region, or regional systems of innovation, as it is too extensive, economically heterogeneous and includes distinct local sub-systems within them (cf. Evangelista et al., 2002, p. 176). However, the latter is exactly what is of particular investigative interest. Therefore, North Rhine-Westphalia is seen here as a self-contained ‘administrative region’, which includes distinct sub-regional sub-system (i.e. city-regions) within it.

Moreover, the thesis does not make international inter-regional comparisons like others (e.g. Hassink, 1992; Hoppe, 2000). However, this is not the aim of the thesis; it focuses instead upon differences in the *intra*-regional sub-settings and governance dynamics.

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<sup>216</sup> In contrast, Baden-Württemberg, for instance, has very much been selected as a model region due to its continuous GDP growth after 1993 (see Glassmann & Voelzkow, 2001, p. 106).

### *City-regions as the core unit of analysis*

The analytical focus of this thesis therefore is *intra*-regional governance dynamics at the overlapping *meso level* between the local level of towns and small cities, and the regional level of the Federal State (*Land*). In order to specify the core unit of analysis – and therefore of the cases (Yin, 1994, p. 21) – reference is made to concept of city-regions (see Giordano & Roller, 2003; Herrschel & Newman, 2002; Parr, 2005; A. J. Scott, Agnew, Soja, & Storper, 2001), which are viewed here as capturing this meso level. *City-regions* are conceptualised here as sub-regional entities below the State or *Länder* level and above the level of a town or small city; they ‘may be seen as comprising two distinct but interrelated elements: the city (sometimes a regional or national metropolis), possessing some specific functions or economic activities; and a surrounding territory, which is exclusive to the city in question’ (Parr, 2005, p. 556).<sup>217</sup> In short, a city-region is an entity that is not merely a city or local level; yet that is smaller than a region, in fact a subset of it.

Accordingly, this conceptualisation was employed for the selection of the four sub-regional case studies. In consequence, city-regions are seen to be epitomised by the German *Kreisfreie Städte*, which are ‘unitary urban authorities’ or ‘metropolitan districts’ with sub-regional

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<sup>217</sup> The term *city-region* points to an entity that consists of ‘a city within a wider territory, with which it is closely interrelated in a variety of ways’ (Parr, 2005, p. 556). Confer also Herrschel & Newman (2002, pp. 1-2). For the purpose of an analysis of regional per capita income growth, Cheshire & Carbonaro (1997, pp. 41-42) do not use administrative regions as their observational units but instead *Functional Urban Regions (FURs)* that are defined in terms of concentration of employment and specified by the following: ‘To each concentration - or core – are added all spatial units from which more workers commute to the core in question than to some other core. This set of spatial units forms the hinterland of each core, so that each FUR consists of a city-core and its labour market sphere of influence’ (ibid., p. 42). Latter could thus also be called labour market hinterland. FURs are similar to the SMSAs concept by Glaeser, Kallal, Scheinkman, & Shleifer (1992) as well as to ‘Travel to Work Areas’ but, as Cheshire & Carbonaro (1997, footnote 5 on p. 42) add, ‘FURs are typically more self-contained than Travel to Work Areas which have fixed levels of self-containment’.

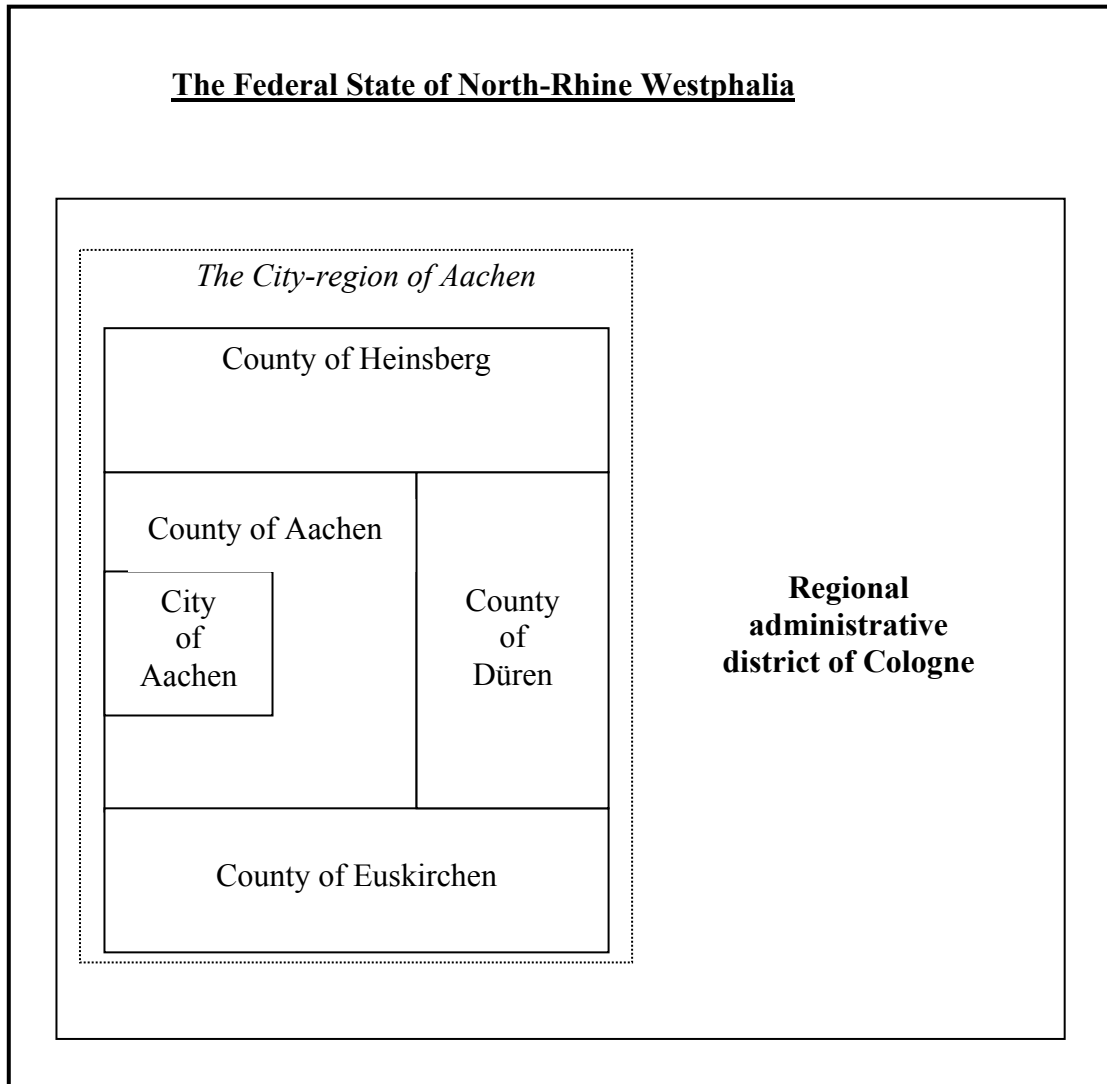
functions (cf. Herrschel & Newman, 2002, Figure 5.1 on p. 117), together with their surrounding non-metropolitan counties.<sup>218</sup> The following Figure 15 clarifies this understanding at the example of the city-region of Aachen. It further illustrates the existing multiple levels of administrative (i.e. functional) delimitations within the Federal State of North-Rhine Westphalia.

City-regions are conceptualised here as having a kind of *critical mass* of institutional innovative capacity and infrastructure – in terms of education and training institutions (especially university), business support organisations and business base – in order to develop innovation policy or to constitute an innovation system. Using the triple helix model of university-industry-government relations (Etzkowitz & Leydesdorff, 2000) as a methodological tool to investigate the systemic-ness of systems, this thesis consequently lays down the *prerequisite* for meeting this critical mass that city-regions need to be endowed with a higher or further education institutions, seen as ‘unique resources’ or ‘urban assets’ of cities and city-regions in the global knowledge-based economy (Turok, 2004, p. 1071) and a key element of innovation systems since they play a major role in developing sectors with ‘strong scientific underpinnings to technologies’ (Nelson & Winter, 1977, p. 73).

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<sup>218</sup> Appendix V reproduces Herrschel & Newman’s (2002, p. 117) Figure 5.1 that juxtaposes the different British and German government spheres. Please note that though that this overview takes foremost a British view with regards to the regional sphere. It thus can be criticized for presenting the region mainly as a ‘sphere of competitive influence by central and local government’ only. While this view may reflect the weak roles of central government-led Government Offices (GO) for the regions, and of Regional Development Agencies (RDA) in Britain, it gives the wrong impression that the regional level in Germany is of equally weak influence. Regional (State) governments in the German political system have in comparison clearly a much stronger *regional* role and powers as the decentralised Government Offices, Regional Assemblies, and the RDA quangos of the British system.

Figure 15 The city-region of Aachen and multiple administrative delimitations



Source: Own creation, but see also Heinze, Voelzkow, & Eichener (1997, p. 18) for the delimitation of the regionalised structural policy in North Rhine-Westphalia and Herrschel & Newman (2002, Figure 5.1 on p. 117) for an overview of the different government spheres in Germany (see appendix IV).

#### *Selection of case studies of city-regions*

The case study areas were chosen for the following reasons. First, the size of urban centres of the city-regions were to be of at least around 250,000 people (cf. Parr, 2005, p. 564).



Secondly, the city-regions had to host a university, one of the key elements of an innovation system (Etzkowitz & Leydesdorff, 2000). Aachen was specifically selected for its renowned university and Dortmund for its supposedly innovative restructuring approach. Düsseldorf was primarily selected in order to include *the* city-region, which hinterland comprises the pilot case study of Ratingen. The selection of Duisburg was more arbitrary, but to help with the ideas that half of the case studies were within the geographically central and populous Ruhr area (*Ruhrgebiet*), while the other half were outside.

The selection of four geographical areas, which are all sub-units of the same functionally administrative region, bears some analytical advantages concerning the economic and institutional contexts. These geographical areas are comparable as sub-systems in their functional and administrative role not only with each other but also in relation to their same higher-level region, i.e. in terms of regional-local interdependencies (cf. Herrschel & Newman, 2002, p. 1).<sup>219</sup> Though economically heterogeneous, the geographical areas are similar in size and more importantly similar concerning the level of ‘influence of subjects, instruments and actions external to the defined space’ of the local sub-system level (cf. Evangelista et al., 2002, p. 176).<sup>220</sup>

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<sup>219</sup> In the introduction to their book on the *Governance of Europe's City Regions*, Herrschel & Newman (2002, p. 1) for instance write the following: ‘Only by looking at individual examples of city-regional governance can difference, unique features and similarities be identified, and the relevance of the specific circumstances – external and internal – be assessed. (...) Only in this way [of a comparative approach] does it seem possible to study the nature and workings of city regions under different conditions and evaluate the relative importance of (a) the general constitutional provisions for ‘regions’, institutional practices and arrangements as ‘external factors’, and (b) the relationship between cities, and cities and ‘their’ region.’

<sup>220</sup> This ‘influence of subjects, instruments and actions “external” to the defined space’ of the local sub-system level normally tend to increase ‘as the size of the administrative region diminishes’ as Evangelista et al. (2002, p. 176) point out.

## **Methods of data collection**

As argued, to look at the systemic-ness and dynamics of the innovation system involves the study of inter-organisational activities and relationships within social settings that are based upon the meanings and significances that individual actors place upon behaviours, structures and processes. Hence, a ‘fieldwork’ approach was chosen (cf. Easterby-Smith et al., 1991, p. 37) in order to understand these meanings and significances. The fieldwork comprised multiple sources of evidence. It included a detailed desk-study of secondary literature and documentation (such as written reports, administrative and other internal documents, formal studies, and newspapers articles), but is predominantly based upon 50 semi-structured in-depth interviews with 47 practitioners, policy-makers, and academics within North Rhine-Westphalia.<sup>221</sup> To a low extent, direct observation from field visits about the conditions of technology centres, business parks, buildings or work spaces have also yielded some indications about the organisation’s or site’s climate (cf. Yin, 1994, p. 87). The triangulation of data concerning general case facts is also helped by the sampling strategy of interviewees. The research timeframe focuses upon the 2-year period between February 2001 and January 2003 during which especially three extensive rounds of interviews were undertaken (winter/spring 2001, winter/spring 2002, and autumn/winter 2002/2003). The thesis also considers recent development since the fieldwork was undertaken. The methods of data collection are elaborated in the following.

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<sup>221</sup> Note that three people were interviewed twice. However, the author also wishes to acknowledge that his conceptualisation was to some extent also influenced and informed by two further initial interviews and desk research in the English West Midlands region, by an earlier Master dissertation (Schierenbeck, 1999) on the competitive advantage of a New Town in the West Midlands (Telford); by the fieldwork (that included 13 interviews) for a research report on the infrastructure and public sector support (German national programme for regional ‘centres of competence’) for the medical technology industry in the German Federal State of Baden-Württemberg (Burfitt et al., 2002); and by other research undertaken on the New Media Cluster in Cologne (Collinge & Schierenbeck, 2004), on the automotive industry in Baden-Württemberg (MacNeill et al., 2003; MacNeill et al., 2004; Schierenbeck et al., 2004), and on government initiatives to assist manufacturing industry in the West Midlands (Schierenbeck & Bentley, 2002). Further impetus came from numerous conferences, seminars and meetings attended by the author with varying degree of relevance to this study.

### *Sampling: Selection of interviewees*

The investigation of the systemic-ness and dynamics of the governance of a regional innovation system and its sub-systems, uses the triple helix model of university-government-industry relations (Etzkowitz & Leydesdorff, 2000) as an analytical tool. The research proposition is that the systemic-ness of dynamics within the regional innovation system and sub-systems can be analysed by investigating the main organisational actors that are hybrid, intermediate or closely connected to the other helixes outlined by the model. Hence, the interviewee's corresponding organisations included universities' technology transfer units as university-industry interfaces, business support units or agencies of the political-administrative actors such as the relevant government authorities, and business associations as a tentatively weak proxy for the business dimension. The sampling strategy can be said to be theory-based and purposeful (cf. Patton, 2002, Exhibit 5.6 on pp. 243-244).

This applies a '*positional approach*' (cf. J. Scott, 1991, p. 58) which involves a 'formally defined position', to define the target population of thesis. The alternative, a '*reputational approach*' would mean that sample selection would have been nominees provided by informants. Applying a '*positional approach*' gives internal validity (see J. Scott, 1991, p. 33). As Laumann, Marsden, & Prensky (1983, p. 22) point out: 'it is scarcely informative to learn that a network (or interviews) constituted by a snowballing sampling procedure is well-connected' (cf. J. Scott, 1991, p. 58). The approach to sampling further represents a *cross-sectional design*, which 'involves selecting different organisations or units in different contexts' (cf. Easterby-Smith et al., 1991, p. 34) and thus is conducive to the holistic case study design and would enable critical assessment of the extent of systemic-ness.

Consequently, the samples for each case study city-regions consist of a homologous set of representatives from the key organisations of the governance and business support infrastructure. It includes interviewees representing – respectively – technology transfer units at universities, business associations or networks such as the chambers of commerce as a proxy for the industry dimension), and the local development agency (i.e. the city’s office and agencies charged with business development) as well as innovation and technology parks and support organisations, corresponding to the relevant crucial institutional and technological sub-systems (see Cooke, 1997, p. 362) and spheres of the triple helix model. This group was complemented by interviewees from the pilot study of the city Ratingen, which represents the local level. Key organisations for business support and technology transfer at the wider regional and national level were also interviewed, reflecting the semi-embedded nature of the research design. While active staff of these key governance organisations were chosen so that feed-back on interinstitutional relations was likely, it has to be admitted that – in retrospective – board members of development agencies coming from the business sector could or should have enriched the list of selected interviewees by adding another business viewpoint on perceived governance aspects.

Finally, a limited number of additional interviewees were added from *non*-selected case city-regions that represent a best-practice model and the academic community. Their selection followed a ‘reputational approach’ (cf. J. Scott, 1991, p. 58) since they were recommended.

The following table gives an overview of the interviewees. A list of interviewees can be found in appendix V.

Table 16 Overview of types and numbers of interviewed stakeholders according to level of governance

Level of governance	Government (Ministries and urban authorities' offices responsible for business development)	Government related organisations for business development (quasi-RDAs, LDAs)	Chamber of commerce and industry (IHK)	Business associations and networks	Innovation & technology parks and support centres	University technology transfer units	Academics	Sum ( $\Sigma$ )
<i>National/Federal Level (external)</i>								
Germany	1							1
<i>Regional Level (external)</i>								
North Rhine-Westphalia	3	4	0	0	2	2 (*)	5 (*)	16
<i>City-Regions (internal)</i>								
Aachen	1	-	1	1	1	1	1	6
Dortmund	1	2	1	1	1	2	1	9
Duisburg	0	1	1	1	1	1	1	6
Düsseldorf	1	1	2	0	1	1	0	6
<i>Local Level (internal)</i>								
Ratingen	1	1	-	1	-	-	-	3
<i>Sum (<math>\Sigma</math>)</i>	8	9	5	4	6	7	8	47

Source: Own creation. Total number of people interviewed: 47. Total number of interviews: 50

(\*) Note that the numbers for the (external) regional level comprise here two interviewees from university technology transfer organisations as well as five academics, of which only one interviewees' institution has an explicit regional reference. Although, they cannot be attributed to the higher, primary regional level, but rather correspond to external non-case study city-regions, they are included here for more simplicity of presentation.

The sample can be criticised for being small but this is due to the general limitations in scope of the thesis and the fact that the interviewing process was time-consuming. However, the fieldwork fulfilled its purpose in gathering in-depth information in relation to the research questions. Furthermore, it can be argued that '[t]here are no rules for sample size in qualitative inquiry' and as Patton says:

‘it is necessary to place these small samples in the context of probability sampling. A qualitative inquiry sample *only seems small* in comparison with the sample size needed for representativeness when the purpose is generalizing from a sample to the population of which it is a part. (Patton, 2002, p. 244)

### ***Qualitative interviewing***

The thesis looks at the meanings and significance that actors in an innovation system place upon their and other actor’s behaviours and relationships, as well as on processes and structures. To investigate this, the qualitative research method of open-ended and semi-structured in-depth face-to-face interviewing is particularly suitable.

According to Easterby-Smith et al. (1991, p. 74), semi-structured or unstructured interviews are appropriate when ‘it is necessary to understand the constructs that the interviewee uses as a basis for their opinions and beliefs about a particular matter or situation’; and when it is the ‘aim to develop an understanding of the respondent’s “world” so that the researcher might influence it’ (i.e. action research). As Patton (2002, p. 348) puts it, ‘[t]he fundamental principle of qualitative interviewing is to provide a framework within which respondents can express *their own* understandings in their own terms.

### ***Confidentiality and sensitivity***

Easterby-Smith et al. (1991, p. 74) add that qualitative interviewing becomes especially useful when either a ‘logic is not clear’; the ‘subject matter is highly confidential or commercially sensitive’; or ‘when the interviewee may be reluctant to be truthful about this issue’. The latter applies where the *sensitivity* stems from issues around inter-organisational (and thus

also interpersonal) behaviour and relationships, which was a topic for the interview. The sensitivity was reflected by the hesitation or refusal by the majority of the interviewees to have the interviews tape-recorded. This perhaps high level of wariness may be explained by public scrutiny and press attention that some interviewees mentioned. One should bear in mind that the time period under investigation could be labelled as one of an economical and political struggle for economic change in general in Germany and and that in particular some of the city-regions with high unemployment in North Rhine-Westphalia may not be able to nor perhaps want to sell themselves as economic success stories. While tape-recording allows clear transcripts, interviewees are far more relaxed, open and willing to share information when not recorded. A bias of prioritising openness in the interview over accuracy in the case of wariness meant that there were only 12 fully tape-recorded interview transcripts, in comparison to 38 where extensive notes had to be taken.

Confidentiality is important especially when interviewees are asked about their personal opinions and beliefs as well as about uncooperative or antagonistic inter-personal or inter-institutional behaviour. As Oppenheim (1992, pp. 140-141) states, respondents are often ‘perfectly willing to answer straightforwardly phrased questions about [sensitive] topics (...) once they are convinced that the information is relevant, that it will be treated confidentially (and preferably anonymously) and that the interviewer is non-judgemental.’<sup>222</sup> This involves interviewing skills and the use of methods in order to obtain this trust and contributes to better quality and depth of data (see Easterby-Smith et al., 1991, p. 77).

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<sup>222</sup> Please note that in his book, Oppenheim (1992, p. 140) primarily refers to ‘embarrassing’ questions that ask about ‘socially “taboo” topics’ or ‘socially disapproving behaviour’.

In order to *gain trust*, the purpose of the research was explained at the start of the interview. It was also explicitly stated that the concern was not with the success of individual organisations but rather the systemic-ness of the wider governance dimension.<sup>223</sup> Moreover, interviewees were assured that their comments were to be anonymised (see Yin, 1994, pp.143-144). The need for sensitivity also heavily influenced the *sequencing of questions* within the semi-structured open-ended interviews. Patton's advice (2002, pp. 352-353) was followed 'to begin with questions about non-controversial present behaviour, activities, and experiences', while in the following questions about opinions and attitudes as well as some knowledge questions were asked. The most sensitive questions on cooperative relationships were asked at the end of the interview.

#### *Advantages and disadvantages of interviews*

Face-to-face interviews can have the advantage of being 'targeted' and 'insightful' with regards to 'human affairs'; but are prone to 'common problems of bias, poor recall, and poor or inaccurate articulation' (Yin, 1994, see Figure 4.1 on p. 80, and p. 85).<sup>224</sup> Thus, Yin (ibid., pp. see Figure 4.1 on p. 80, and p. 85) suggests that it is necessary 'to corroborate interview data with information from other sources' (cf. also Oppenheim, 1992, p. 143).

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<sup>223</sup> The efforts of gaining trust begin already before the interview, as Easterby-Smith et al., (1991, p. 77) stress. This includes the process of arranging interviews (they favour phone calls as a first contact) and the preparations of the interviewer for the meeting, e.g. researching information about the interviewee and his organisation prior to interview.

<sup>224</sup> For instance, Yin (1994, see Figure 4.1 on p. 80) gives poorly constructed questions as a reason for bias as well as *reflexivity*, where the 'interviewee gives what interviewer wants to hear'. Oppenheim (1992, pp. 138-143) also highlights the 'social desirability bias' in this respect that is generally greatest for face-to-face interviews and states that non-factual questions and responses 'are generally much more sensitive to bias by wording, by response sets, by leading, by prestige and by contextual effects.



Oppenheim (1992, p. 102) also says that interviews are much more ‘expensive and time-consuming to conduct’; while they ‘have a higher response rate’ and give the interviewer the ‘opportunity to correct misunderstandings or to probe, or to offer explanations or help’ to questions. Regarding latter, Easterby-Smith et al. (1991, p. 79) list the following seven *probes*, which can help to reduce the degree of ambiguity:

1. The basic probe (e.g. repeating the initial question if interviewee is wandering off)
2. Explanatory probes (e.g. What did you mean by that?, or What makes you say that?)
3. Focused probes (e.g. What sort of...?, in order to obtain specific information)
4. Silent probe (e.g. simply pause to encourage an answer)
5. Drawing out (e.g. Tell me more about that?, or What happened then?)
6. Giving ideas or suggestions (e.g. Have you thought about...?, or Did you know that...?)
7. Mirroring or reflecting (e.g. forcing the respondents to rethink by expressing in own words what they have said, like What you seem to be saying/feeling is...)

These techniques were adopted in the interviews.

#### *Type and content of questions*

In line with the exploratory character of this research, semi-structured *focused interviews* were undertaken. They broadly followed a certain set of questions, while they also remained of an *open-ended nature*.

Indeed, the broad guiding questions (see appendix VI) predominantly consist of *open questions* as opposed to pre-coded, closed (i.e. fixed-response) questions. Open-ended response formats include their usefulness ‘for testing hypotheses about ideas or awareness’

(as opposed to specific hypotheses), and they allow for freedom and spontaneity of answers (cf. Oppenheim, 1992, Tables 7.1 and 7.2 on p. 115). Disadvantages concern the subsequent post-interview coding process, which is time-consuming and can be unreliable.

The *type of questions* included ‘factual’ questions with regards to activities, structures and processes that were in place, but the focus was on a set of non-factual questions concerning opinion and beliefs, attitudes, awareness and knowledge (cf. Oppenheim, 1992, p. 143). In this context, Patton (1997, p. 279) points out that ‘closed-ended questionnaires require deductive constraints while open-ended interviews depend upon inductive analysis’.

An important distinction was made between two groups of interviewees from the universities. While representatives from university technology transfer units were regarded as active practitioners of the university-industry interface in the innovation system, pure academics are treated here more as passive, scientific (theory-focused) actors. Hence, the nature of interview differed for this second group from the first. While interviews for the first group were similar to those with other policy-makers and practitioners, interviews with academics were carried out with a more open-ended and unstructured format and with a different set of questions, although the broad themes were identical (see appendix VI).

#### *Quality of data and supporting tools*

There is an issue about the veracity of information collected. The aim however was to gain the trust of interviewees and to overcome their reluctance to respond to sensitive issues. It can be argued that this was achieved, as respondents gave confidential reports or off-the-record

information, which were important to gain an in-depth insight.<sup>225</sup> In so doing, it can be said that interviewees can be considered to have not only been respondents but also played a role of an informant (cf. Oppenheim, 1992, p. 147; Yin, 1994, p. 84). Yet, this means that respondents might not be telling the ‘truth’ with regards to factual questions, i.e. ‘*concurrent validity*’ (see Oppenheim, 1992, p. 144) as interviewees may want to exploit the interview situation for their own objectives (cf. Easterby-Smith et al., 1991, p. 80).<sup>226</sup>

However, it is possible to gain clues to the openness of the interviewee and potential deceptive communication by looking for positive and negative signs in body-language and at the choice of words in face-to-face interviews (see, for example, Keila & Skillicorn, 2005, pp. 2 and 4). Notes should be (and were) added to the transcripts when it was thought that respondents might not be telling the truth. In general, the ‘attitude of respondents’ and consequent ‘level of confidence felt about data’, should be noted at interviews. These are useful in the process of data analysis (Easterby-Smith et al., 1991, p. 108).

In any case, it should be stressed that there is no one universal truth, not just concerning attitudes but also with regards to facts or behaviours (cf. Oppenheim, 1992, p. 147). It can be argued that qualitative research involves academic educated (inductive) guesses, in which

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<sup>225</sup> Due to the sensitivity of some of the issues (that result from the governance sphere being organisationally and individually contested) and confidentiality being assured to interviewees, it was not possible to reveal all sources of information (e.g. as ‘confidential’ classified consultancy reports classified as ‘confidential’ which were gratefully provided) nor all given background information and opinions (e.g. ‘off the record’ remarks). They have nevertheless, influenced this study’s analysis.

<sup>226</sup> As with documents, the critical interviewer should always ask why he was, or was not, given certain information and whether respondents were telling the ‘truth’ with regards to factual questions.

accuracy strongly depends upon the interpersonal communication and research skills of the researcher (see Yin, 1994, pp. 55-59).<sup>227</sup>

There are techniques which can be used to improve this process and support the interview, which were used. At the end of the semi-structured questions, interviewees were handed a pre-coded '*show-card*' matrix (see Easterby-Smith et al., 1991, p. 113; Oppenheim, 1992, pp. 140-141) and were asked to map out inter-organisational relationships according to the degree of cooperation and level of governance on this matrix (see appendix VI). They were also asked why they chose particular mapping classifications. (cf. protocol analysis in Easterby-Smith et al., 1991, p. 91). This mapping exercise was designed to serve as a kind of internal as well as an external check with respondent's data, thus potentially improving reliability and validity of questions (cf. Oppenheim, 1992, pp. 144-146).<sup>228</sup> The checks however only concern the explanatory (i.e. how and why) and not exploratory questions. (see J. Scott, 1991, p. 33; Yin, 1994, p. 33).

Exploratory questions are those such as: 'What are the ways of making innovation policy and support more effective?' Assessing the reliability and validity of answers to these questions is more difficult. The exploratory aspect of this qualitative case-study approach with in-depth

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<sup>227</sup> As *desired skills of a case study investigator*, Yin (1994, p. 56 and cf. pp. 55-59) names, for instance, that the investigator should be able to ask good questions; be a good listener; be adaptive and flexible; have a grasp of the issues being studied; and be unbiased by preconceived notions.

<sup>228</sup> Oppenheim (1992, pp. 144-145) explains reliability and validity as concepts that try 'to assess how well each question, or group of questions [*as measures*], does its job'. While *reliability* refers to 'repeatability' or 'consistency' (i.e. 'the probability of obtaining the same results again if the measures were to be duplicated'); the degree of *validity* instead gives an indication 'whether the question, item or score measures what it is supposed to measure'. Besides this standard notion of validity, Yin (1994, p. 33 and cf. pp. 32-38) further distinguishes three different *types of validity* that were summarized by Kidder & Judd (1986, pp. 26-29), namely construct validity (i.e. 'establishing correct operational measures for the concepts being studied'), internal validity (i.e. 'establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships'), and external validity (i.e. 'establishing the domain to which a study's findings can be generalized'). Furthermore, see also Patton's (2002, Exhibit 9.1 on p. 544) overview of alternative sets of criteria for judging the quality and credibility of qualitative inquiry.

interviewing of experts has allowed for an ‘inside-looking out’ perspective of regional processes and social systems, that strives to understand the beliefs, attitudes and behaviours of interviewees, and how they perceive innovation policies, systems and governance dynamics (cf. Meyers, 2004a, p. 460). Benneworth (2006, p. 4) however criticises such ‘grounding’ of knowledge through peer review visits ‘remains at best a tangential activity, removed from the real work of both government and academics’.

The following table by gives a brief overview of the key questions concerning of reliability, validity and generalisability. This thesis takes the phenomenological viewpoint.

*Table 17 Different perceptions of reliability, validity and generalisability*

	<i>Positivist viewpoint</i>	<i>Phenomenological viewpoint</i>
Validity	Does an instrument measure what it is supposed to measure?	Has the researcher gained full access to the knowledge and meanings of informants?
Reliability	Will the measure yield the same results on different occasions (assuming no real change in what is to be measured)?	Will similar observations be made by different researchers on different occasions?
Generalisability	What is the probability that patterns observed in a sample will also be present in the wider population from which the sample is drawn?	How likely is that ideas and theories generated in one setting will also apply in other settings?

Source: Easterby-Smith et al. (1991, p. 41)

Another way of supplementing interviews, is the *critical incident technique* (see Easterby-Smith et al., 1991, p. 83). This approach was used here to ask respondents for explanatory statements about past behaviour, e.g. for barriers to cooperation or systemic-ness of the governance system.

It also needs to be pointed out that the limitation of the qualitative case study approach is that the results cannot be easily generalised. The implications and lessons learned do not simply transfer to other regions and contextual settings. However, by investigating regional governance aspects, the thesis can still conclude whether there are indeed important sub-regional governance dynamics in the case studies. Having applied a ‘replication logic’ in designing the multiple, holistic case studies, the thesis at the same time is striving analytically (as opposed to statistically) to ‘generalize a particular set of results to some broader theory’ (Yin, 1994, pp. 10 and 36) viz. regional innovation systems. Consequently, some inference can be made if significant differences and results are to be found amongst the case-study areas.

### **Methods of data processing and analysis**

The data gathered consists of factual data and a mix of different *types of social data* (see J. Scott, 1991, p. 2). These were ‘attribute data’ (which relate to attitudes, opinions and behaviours of individual agents), ‘relational data’ (which relate to ties and connections between agents), and ‘ideational data’ (which describe the meanings, motives and so on). The interviews produced a large amount of data to be analysed.

#### *Analysis techniques*

As Easterby-Smith et al. (1991, p. 35) point out, there are difficulties in analysing ‘large amounts of non-standard data produced by qualitative studies’. Easterby-Smith et al. (1991, pp. 108-113) suggest the following seven stages to analyse the transcripts of unstructured in-depth interviews, which were followed in analysing the data produced from the interviews:

1. Familiarisation
2. Reflection
3. Conceptualisation
4. Cataloguing concepts
5. Recoding
6. Linking
7. Re-evaluation

There are also different methods for analysing the content of data, *office coding* as opposed to field coding was applied here as a method of interpretation (see Oppenheim, 1992, p. 116) to reveal patterns and themes.<sup>229</sup> Following this process, a '*cross-setting pattern analysis*' was applied to describe the various structures and activities at the (supra) regional *Land* level as well as in particular amongst the same processes in different settings of the comparative case study city-regions (see Patton, 2002, p. 439; and cf. Yin, 1994, pp. 106-110).

For this purpose, a content analysis was undertaken that comprised analysing interview transcripts and primary documents for recurring themes and meanings. Yet, this process was an 'open coding' in that it remained open to the data (cf. Patton, 2002, p. 453) so that themes found through content analysis were still considered for analytical success factors to be investigated by the cross-setting pattern analysis. Insofar, the qualitative analysis involved both inductive and deductive analysis. After the first step of deducing a theory-derived hypothesis and propositions, an analytical induction was undertaken where the data were examined on the basis of the existing theoretical frameworks of regional innovation systems

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<sup>229</sup> The *NUD\*IST Vivo* qualitative research support software, for instance, can be a very helpful tool in the process of coding and by easing the subsequent linking, exploring and comparing of electronic rich text documents (transcripts).

and the sensitizing concept of systemic-ness, yet with an inductive analysis to find undiscovered patterns and emergent understandings of the complex governance dynamics of regional innovation systems.

The following table gives an overview of the categories used in the data processing and analysis process for highlighting specific issues, but not by numbers and frequency.

*Table 18 Codebook for content analysis applied for interview data processing and analysis*

<b>E</b>	Environmental factors which affect support (cultural, size...)
<b>S</b>	Support/Strategies/Programmes/Projects/Initiatives (ad-hoc, sectoral...)
<b>A</b>	Advice / involvement of consultancy
<b>BP</b>	Best practice/ideas
<b>T</b>	Targeted businesses? (Size, sector, innovative, struggling?) => Mismatch?
<b>U-I</b>	Innovation (their perception / <b>u</b> nderstanding)
<b>U-IS</b>	Innovation System (their perception/ <b>u</b> nderstanding)
<b>U-IIS</b>	Ideal Innovation Support (their perception/ <b>u</b> nderstanding of best practice)
<b>U-O</b>	Own Organisation (their perception/ <b>u</b> nderstanding)
<b>M&amp;S</b>	Driving force/initiator & key people (mover & shakers)
<b>N</b>	Networking/Communication/Relationship (informal <> formal)
<b>X</b>	Cooperation & organisational conflicts => Overlapping of responsibilities?
<b>P</b>	Problems identified & reactions
<b>CP</b>	Critical incident/change process (critical path) => Flexibility? Mismatch?
<b>O</b>	Organisational set-up (Who defines aims? How financed?)
<b>G</b>	Governance/power
<b>U</b>	University linkages



In addition, the analysis of the explanatory questions (i.e. concerning critical incidents), was based on ‘a distinction between “observations” and “perceived impacts” that the respondents stated (Patton, 2002, p. 508). This meant distinguishing between the cause and (reactive) effect of reported behaviour, activities and relationships.

Relational data concerning the connected-ness between organisations of the governance system were analysed by using sociograms and mapping overlapping relationships in the framework of social network analysis (Scott, 1991, pp. 31-32). For this, the data from the supporting interview *‘show-card’ matrix* tool were used. Interviewees were asked to map out inter-organisational relationships according to the degree of cooperation and level of governance on this matrix (see appendix VI).

A general tendency could be observed in that interviewees tend to rarely rate relationships with other organisations as purely competitive in the matrix tool even if strong competitive behaviours and conflict was reported in interviews. Therefore, there is at least some reason to believe that a classification of a relationship to another organisation as being a mixture between collaboration and competition should perhaps be interpreted slightly in a more negative connotation as being not (purely) collaborative.

It should be noted that a few corrections were made to some completed matrix configurations. This was necessary to ensure a consistent presentation as some interviewees applied a flexible interpretation of the ‘level of involvement’ of organisations in the matrix. The ‘level of involvement’ of actors was intended to indicate the core operating level of organisations with whom the interviewee cooperates. Some corrections – which are indicated by stars (\*) in the

reporting tables – were therefore made to the final aggregate matrix configurations. This comprised the deletion of duplicated entries of organisations on the basis of probes and the consistent allocation of organisations to the appropriate level of their core operating level. The changes were possible to make as interviewees had been asked to enter the names of the organisations in the matrix tool.

### *Criteria for analysis of the systemicness of governance*

The thesis sought to assess the systemic-ness of governance. Questions were asked relating to the nature, quality and structure of the milieu (i.e. environment) and its actors and their interests, objectives. The importance of conflict or cooperation in explanations of the behaviour of actors and for the development of certain structures is stressed as it can provide further clues in this respect (Meyers, 2004b, p. 482). These were analysed by using concepts in the framework of social network analysis (Scott, 1991, pp. 31-32) that describe the quality of relations within interpersonal networks.<sup>230</sup> These are *reciprocity* (i.e. mutuality of appreciation or friendship), *intensity* (i.e. strength of obligations involved in relations in terms of direction, frequency and intensity), *durability* (i.e. how enduring relations are and whether they are constantly activated), *density* (i.e. connectedness and actual present completeness of networks), and *reachability* (i.e. ease of spread of information and limited number of steps necessary in contacting another). However, one could also add here the dimension of *outreach*, which could be seen in the context of this study as comprising the connectedness to other (rather as external regarded) networks or systems of governance (e.g. other levels of

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<sup>230</sup> The social network analysis (Schubert, 2002, p. 322) is based on the postulate that the features of networks (i.e. independent variable) are a major contributor to the behaviour of network actors and to the result of their interactions (i.e. dependent variable).

governance or other aggregate national networks of associations), which are likely to act as sources of variety and thus increase the quality of innovation systems.<sup>231</sup>

In the analysis of the data, there was an awareness of the role of influential actors, so-called ‘movers & shakers’, within the governance system. These often act as active spreader of information and are central recipients and distribution nodes. The important assumption from social network analysis into organisational behaviour (Heer, 2004) is that people who communicate with only few people with people of lower hierarchy are not important communication hubs (cf. also Dambeck, 2005).<sup>232</sup>

### **The analytical framework**

Turning now to the analytical framework for the fieldwork, it is useful to recall that the *aim of the thesis* is to look at the dynamics and structures of the governance of a regional innovation system. It is clear from the analysis in the foregoing chapters that the argument is that current conceptualisations of regional innovation systems do not adequately capture the regional and in particular sub-regional governance dynamics of innovation systems, and thus are of little operational guidance to innovation policy-making. The empirical work looks at the systemic-ness of the governance of the innovation system in North Rhine Westphalia.

In order to do this, a set of intangible *success factors of systemic-ness*, which are thought to characterise the dynamics and structures of the governance system, was derived from theory,

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<sup>231</sup> This partly follows Granovetter’s (1973) concept of the ‘strength of weak ties’, which states that not the many close, overlapping ‘strong’ ties in a network may be well-suited for ensuring the spread of information between contacts, but are unlikely to be the source of new information from distant parts of the network. This instead is more likely to come from the relatively ‘weak ties’ of less frequent contacts to people from different work situations (cf. J. Scott, 1991, p. 36).

<sup>232</sup> Yet, one should not forget about the potential ‘strength of weak ties’ (M. S. Granovetter, 1973).

discussed earlier (cf. also Brosza, 1993, p. 89; European Spatial Planning Observation Network, 2005, p. 73). These factors serve as *analytical criteria* and were used to analyse and compare the fieldwork results, and to explain differences. The factors that are thought to signify evidence of systemic-ness include the following:<sup>233</sup>

1. whether there is a strategic and theory-informed policy orientation;
2. whether there is organisational connectedness, cooperation and coherence;
3. the extent of inclusiveness;
4. the extent of participatory and an open policy-making process, and support for coordination; and finally
5. the extent of opportunism.

To elaborate, first, the connectedness, coherence and cooperation of different business support and policy actors within the overall regional organisational structure are seen to be the key features of strategic and effective ‘good governance’ that denotes ‘systemic-ness’. This involves support services and initiatives that complement one another and that are streamlined at certain level of governance, thereby reducing duplication and fragmentation within a system. Secondly, the coordination of different actors in an inclusive, participatory and open process of interaction (as opposed to dirigiste and intrusive) is, it is suggested conducive to systemic-ness. It limits opportunistic behaviour and gives room for innovative ideas for policy

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<sup>233</sup> See also the list of *important aspects of governance* as outlined by ESPON (European Spatial Planning Observation Network, 2005, p. 73), which are proposed as a basis for approaches to measure differences in the capacity of governance. They comprise the areas of existing institutional settings including government structures (e.g. satisfaction with actual government, number of public employees, and openness in terms of cross border activities); economic governance (e.g. network activities expressed by the number of regional cluster, e-government, and regulatory burdens); civil society (e.g. participation, trust, and information & communication patters, and ‘attachment to region’ as an indicator of decentralisation); and space (e.g. ‘flow’ characterising relations and exchange between different regions, interdisciplinarity and multi-level composition of actors involved in governance processes. Furthermore, also consult the ‘Explorative Innovation Scoreboard’ of the EXIS report (Arundel & Hollanders, 2005), which features data for the governance dimension. Moreover, confer Hoppe’s (2000, pp. 232-233) reference criteria for the detection of system immanent strength and weaknesses of implementation procedures of information and support structures.

development. The following table illustrates the different dimensions of this conceptualisation of systemic-ness. They are to be viewed as mutually reinforcing, where one dimension has an effect on another.

*Table 19 Drivers and characteristics of systemicness of the governance system*

<b>Drivers of systemic-ness of the governance system</b>	<b>Characteristics and activities</b>
<i>Policy measures (and funding)</i>	<ul style="list-style-type: none"> <li>- Strategic policy programmes and instruments</li> <li>- An outlined holistic, unified strategic orientation</li> <li>- Effective analysis informing policy (considering different needs and objectives of actors)</li> </ul>
<i>Organisational structure (and policy links) of the governance system</i>	<ul style="list-style-type: none"> <li>- Connectedness and exchange between actors (ensuring density and completeness of the network and thus avoiding fragmentation)</li> <li>- Clear-cut allocated responsibilities between actors (avoiding overlap)</li> <li>- Coordination of tasks amongst multiple actors with collective and streamlined activities and common representation (ensuring coherence between complementary competences and avoiding duplication)</li> <li>- Existence of hybrid organisations (PPP)</li> <li>- Existence of dynamic business base</li> </ul>
<i>Relationships (and cooperation ties) between actors</i>	<ul style="list-style-type: none"> <li>- Cooperative attitudes / behaviour and mutual trust (as opposed to insular objectives and conflict from competitive attitudes, opportunism or antagonism)</li> <li>- Identifiable lead organisation as a main communication or strategy hub</li> <li>- Identifiable key actors acting as animators and drivers (movers &amp; shakers) or mediators</li> </ul>
<i>Processes (and decision-making)</i>	<ul style="list-style-type: none"> <li>- Intensity (strength) and durability (consistency) of interactions that support effective coordination</li> <li>- Inclusiveness of stakeholders, i.e. participatory and open approach (as opposed to dirigistive and intrusive)</li> <li>- Openness / outreach to external actors (communication)</li> </ul>
<i>Perceptions (and innovative ideas) of innovation policy</i>	<ul style="list-style-type: none"> <li>- Theory-derived policy measures and informed actors</li> <li>- Awareness of good practice models</li> </ul>

Source: Own creation.

A set of questions, which serve as guidelines for the analysis of the results of the fieldwork, that corresponded to the research objectives was derived. These were more precise five key *analytical questions* and were used to compare and to identify similarities and differences in the dynamics and structures within the governance structures of the regional innovation system, and between its sub-systems of city-regions. These ‘filter’ questions loosely correspond to what are argued to be the success factors that could expected to be found in a functioning regional innovation systems and that deserves the mark of systemic-ness. The key questions (highlighted in bold) followed by a set of secondary questions are:

1. **What are the policy measures and *instruments*?** What is the content and objectives of programmes, projects and initiatives? At which level of governance are they developed and implemented? Do the multiple levels of governance coordinate their activities? Can a common *strategic*, holistic and collective policy approach be identified? Is the influence of a theory recognisable (e.g. has cluster policy guided them)? Was policy development informed by diagnostic and comparative analytical studies?
2. **What are the regional and sub-regional governance structures?** What is the organisational set-up of individual and hybrid business support and policy actors? Are the business support organisations connected and coherently coordinated (e.g. existence of an ‘one-stop-shop’ business support contact point) or instead fragmented?
3. **What are the relationships between the different innovation governance actors?** Who or what were the obstacles and enablers to the policy-making and its measures? What is the extent of opportunism (as opposed to trust), and cooperation for, policy development? What is the level of participation? Who are its animateurs and drivers and who can be identified as key actors or mover & shakers?
4. **What are the processes of interactions between the various stakeholders of governance actors?** What is the extent of network activities? What is the nature of information and communication processes? Is the policy development process coordinated? Is it inclusive?

5. **What are the *perceptions* of the individual actors attached to current innovation policy-making and what is their ideal form of innovation policy-making?** Do they reflect current academic thinking? By whom and how is innovation policy created and supported? Who are the active players in the development of policy measures and initiatives? Which are the influencing *sources of ideas* for new policy development?

These analytical questions form the framework for the empirical work and enabled the examination of the extent of the systemic-ness of the innovation system. The thesis contributes to an increasing awareness of how intraregional and intrainstitutional dynamics and structures can affect the building and functioning of innovation systems.

## CHAPTER 8

### FIELDWORK FINDINGS: INSIDE THE REGIONAL INNOVATION SYSTEM OF NORTH RHINE-WESTPHALIA

This chapter presents the main fieldwork findings from the investigation of the innovation and business support systems of North Rhine-Westphalia and the four case studies of the city-regions of Aachen, Dortmund, Duisburg and Düsseldorf. The first part of the chapter starts with an introduction of the German National Innovation System, providing an overview of structural strengths and weaknesses, policy approaches and important actors at the national level. It briefly adds a supranational perspective with a description of complementary policy fields pursued at EU level.

The second part follows a similar structured description of the innovation system of the Federal State of North Rhine-Westphalia, in which all of the individual case studies of the city-regions are located. It introduces policies and actors at the Federal State (*Land*) level and the meso level, which concerns especially the wider Ruhr area where two of the city-regions, Dortmund and Duisburg, are found.

The third part presents a description of the policies and strategies, business and innovation support, key actors for policy-making and implementation, as well as of some of the dynamic governance aspects that influence the working of the innovation system in each of the case studies of the city-regions of Aachen, Dortmund, Duisburg and Düsseldorf.



The subsequent chapter provides a comparative analysis of the case studies and presents the main conclusions with regards to the research questions set out in the introduction.

### **The German national innovation system**

Using Kuhlmann's (1997, p. 443) definition of an innovation system as 'the functional cluster of industrial innovation activities, research system, education system and related policy-administrative structures', this section looks briefly at the main elements of Germany's national innovation system, keeping in mind the triple helix of university-industry-government. In looking at structures, it sets the parameters of the similarities and differences of the dynamics within the governance of a regional innovation system and its sub-systems - this in terms of strategic policy measures, organisational set-up, relationships, processes, perceptions and sources of ideas - one of the key questions in the thesis. It enables consideration of who are the enablers and obstacles to innovation policy, what lessons can be learned in terms of organisational structures and processes, how policy evolves and what impetus is needed.

### ***Economic performance of the German innovation system***

Between 1980 and 2000, Germany had displayed only *modest economic growth*. An average annual GDP growth rate of just 1.8 % was achieved despite the reunification demand push (cf. Abelshauser, 2004, p. 293). Prior to the period under investigation, the GDP growth rate slowed down from a 2.9% peak in 2000 to 0.8%, 0.2% and -0.1% in 2001, 2002 and 2003, respectively.<sup>234</sup> Nevertheless, Germany stagnated at a relatively *high level of economic performance*, which in terms of GDP (25,580 Euro per capita in current prices in 2002)

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<sup>234</sup> The GDP growth rate is calculated in constant prices of 1995.

remained slightly above the average (24,250 Euro) of the EU-15 countries (cf. Statistisches Bundesamt et al., 2004, p. 440). Germany retained its competitive position with a continuous strength in export performance in high-quality and specialised products (cf. Keck, 1993, p. 136).

Yet, this period of slow economic growth was accompanied by a continuous high level of *structural unemployment* (cf. Abelshauser, 2004, p. 448), with a rate of 8.6% in 2002 above the EU-15 average of 7.6% for the same year (see Statistisches Bundesamt, Wissenschaftszentrum Berlin für Sozialforschung, & Zentrum für Umfragen, 2004, p. 438 and cf. pp. 96-120).<sup>235</sup>

The economic difficulties and the rise in (and fear of) unemployment created political and social pressure for change that caused Germany's Federal Government – led by Social Democrat Chancellor Gerhard Schröder – to implement during 2003 and 2004 the drastic reforms for growth and employment of the comprehensive *agenda 2010* (Die Bundesregierung, 2003), which are most prominently associated with the reforms concerning the labour market and social security system known as *Hartz IV*.<sup>236</sup> The system inherent problems addressed by the *agenda 2010* (including a lack of flexible wages) are very similar

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<sup>235</sup> The equivalent average rate of unemployment in 2002 in the EU-25 was 8.8% and in the Eurozone 8.3%. These figures were measured according to the ILO concept. If calculated alternatively in relation to the dependent civil labour force, Germany's unemployment rate for 2002 is 10.8% with a total of just over 4 million being unemployed (Statistisches Bundesamt, Wissenschaftszentrum Berlin für Sozialforschung, & Zentrum für Umfragen, 2004, pp. 114 and 438-439).

<sup>236</sup> The comprehensive German reform programme called *Agenda 2010* comprises several measures in five subject areas, namely labour market and employment regulation; social security systems; business; finances; and education, vocational training and innovation (see European Commission, 2003, p. 53). The labour market reforms implemented in 2003 and 2004 by the German Federal Government (cf. Die Bundesregierung, 2003, pp. 52-53) followed the recommendations of an expert group headed by the former head of human resources at Volkswagen AG, Dr. Peter Hartz. The reforms comprised four parts: the liberalisation of personnel service agencies; the introduction of mini-jobs and support for individual free-lance start-ups and those out of unemployment (*Ich-AGs*); the restructuring of the Federal Institute of Labour (*Bundesanstalt für Arbeit*); and most importantly far-reaching cuts within the social security system (*Hartz IV*) in order to enforce the seeking employment amongst the unemployed.

to those highlighted by Lahnstein's *agenda '90* in 1982 (cf. Abelshauser, 2004, pp. 441-446). This illustrates the lack of sufficient reforms over two decades and the consequent tailback of necessary reforms as Abelshauser (2004, p. 446) rightly points out. Following the implementation of the *agenda 2010* and benefiting from the economic effects linked to hosting the Fifa Football World Cup 2006, Germany appears to be in a more favourable economic situation in the recent years before the 2008 global financial credit crisis.

However, there remain significant differences in terms of economic performance and unemployment between the 16 individual Federal States (*Länder*) within Germany (see Statistisches Bundesamt et al., 2004, p. 114). There is a big gap between the unemployment rates<sup>237</sup> of *Länder* from the former West Germany (8.5% in 2002) and the "new" *Länder* from East Germany (19.2% in 2002) (Statistisches Bundesamt et al., 2004, p. 114). Secondly, there is a North-South divide amongst the West German *Länder*. While the southern States of Baden-Württemberg and Bavaria have Germany's lowest unemployment rates of 6.1% and 6.9%, respectively, the unemployment rates of the northern *Länder*, such as North Rhine-Westphalia (10.1%), are above the average of the 11 West German *Länder* (Statistisches Bundesamt et al., 2004, p. 114).

### ***Innovation performance of the German innovation system***

Germany displays a strong innovation performance (Janz et al., 2001, p. 2) that contributes to its strong export performance and to maintaining its competitive position despite its comparative high wages and additional wage costs.<sup>238</sup> Germany is part of the group of

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<sup>237</sup> The unemployment rate was measured in relation to the dependent civil employed persons as opposed to the ILO measure.

<sup>238</sup> See also the report on the technological performance and capabilities of Germany (Bundesministerium für Bildung und Forschung, 2003).

‘leading countries’ in terms of innovation performance with a high Summary Innovation Index (SII) ranking 7th in the 2005 European Innovations Survey (EIS) (European Commission, 2005a, pp. 3-4).<sup>239</sup>

This is first and foremost based upon the innovation activities and R&D spending of its businesses (European Commission, 2002a, Annex Table B on p. 24; Keck, 1993, p. 138).<sup>240</sup>

In terms of knowledge creation – as one of the key drivers of innovation –, the 2002 European Innovation Survey (EIS) shows gross expenditure on R&D (GERD) in Germany being 2.52% of GDP, which is well-above the EU-15 average of 1.95% (European Commission, 2002a, p. 24).<sup>241</sup> Business expenditure on R&D (BERD) amounts to 1.80% of GDP in contrast to the 1.28% average of the EU-15 Member States.<sup>242</sup>

However, there are strong regional differences in innovation performance among the German *Länder*. While the southern “model” States of Bavaria and Baden-Württemberg are among the top ten leading European regions as identified by the 2002 European Innovation Scoreboard (European Commission, 2002a, p. 4), the northern West German *Länder* (such as North Rhine-Westphalia) display regional innovation performances that are just above the European

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<sup>239</sup> Germany is also amongst the best 3 ranking overall sector innovation leaders for both industry and services, and Germany is among the leaders in 15 sectors out of a total of 25 sectors (European Commission, 2005a, pp. 23-25) for which data were available from 15 European countries (EU-15 except Ireland and the UK, plus Norway and Iceland).

<sup>240</sup> To some surprise, the 2005 Innobarometer (European Commission, 2005k, pp. 2-4) shows an *unfavourable innovation demand* in Germany. According to these results, citizens in Germany together with those in Poland, Latvia and Finland are least ready to embrace innovation. As the EIS indicates (cf. European Commission, 2005f, pp. 15 and 27-28), this relative reluctance to innovation ‘could be an explaining factor for the differences in the transformation of innovation inputs into innovation outputs’ (ibid., p. 28). However, Germany’s high innovation output ‘may indicate that the drivers for innovation do not lie in the public demand but rather come from the side of the firm’ (ibid., p. 28).

<sup>241</sup> The Gross expenditure on R&D (GERD) is calculated by adding the Public expenditure on R&D to the Business expenditure on R&D (BERD).

<sup>242</sup> Germany also exhibits a Public expenditure on R&D (GERD – BERD) of 0.72% of GDP that is just above the EU-15 average of 0.67% - according to the 2002 EIS (European Commission, 2002, p. 24).

average but below the average national innovation indicators when indexed to Germany's mean (European Commission, 2002b, pp. 10 and 16).<sup>243</sup>

### ***Public administrative structures in the German Federalism***

The Federal Republic of Germany is characterised by a (tripartite) horizontal and vertical separation of powers and is a democratic and social federation according to Article 20 of the *Grundgesetz* – Germany's basic (constitutional) law (Bundeszentrale für politische Bildung, 2004).<sup>244</sup> This implies a balance between the Nation State (*Bundesstaat*) and the individual Member (Federal) States (*Bundesländer*) (cf. Avenarius, 2002, pp. 45-47; Hesselberger, 2003, pp. 181, 186-188; von Lenep, 2004, p. 11).<sup>245</sup> However, even though each of the *Länder* has its own State constitution (*Landesverfassung*), and sovereignty is shared between central government and the regional governments of the federal states, in practice competences of the *Länder* are much more limited (cf. Avenarius, 2002, p. 16).<sup>246</sup> First of all, the national level has a dominating influence upon the decentralised system.<sup>247</sup> Furthermore, municipalities (*Gemeinden*) within the *Länder* have the right to autonomous self-administration of their local

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<sup>243</sup> This index is called the Regional National Summary Innovation Index (RNSII). North-Rhine Westphalia scores a RNSII of 0.82 while Bavaria and Baden-Württemberg both score a value of 1.34. North-Rhine Westphalia's Revealed Regional Summary Innovation Index (RRSII) – that also takes into account the region's relative innovative performance to the EU mean – has a value of 87 (60th rank out of 148) that is just above average but still low in comparison to the values of 151 and 146 of Bavaria (7th) and Baden-Württemberg (10th) or the value of 225 of Sweden's leading Stockholm region.

<sup>244</sup> The tripartite horizontal separation of powers comprises the legislative, executive and judicative.

<sup>245</sup> The use of the term federation for the original term *Bundesstaat* refers to the Nation State or country. The possible literal translation of this German term into 'Federal State' is thus avoided as this term is used by this thesis to refer to one of the 16 individual States (i.e. regions or provinces) within Germany and thus instead refers to the German term *Bundesland*. Its shorter form *Land* (or in plural: *Länder*) is, however, the preferred terminology (synonymously for 'Federal State') because the terms 'Federal government' and 'Federal Ministry', for instance, refer in contrast to the national level (as opposed to 'State government' or 'State Ministry' for the *Länder*). Due to Germany's federal political structure, legislative powers are shared between the National (Federal) Parliament, that is the *Bundestag*, and the regional parliaments of the 16 States (*Länder*). The Regional State Governments participate in the national legislation procedure and Federal administration with their representatives in the Upper House of the Federal Parliament, the *Bundesrat*.

<sup>246</sup> The performance of authority and the fulfilment of public tasks and duties (cf. von Lenep, 2004, p. 11) is the competency of the individual *Länder* according to Art. 30 of the German Basic Law - if no other Basic Law applies.

<sup>247</sup> National legislation takes precedence over individual *Land* legislation (Art. 31 Basic Law).

authorities.<sup>248</sup> The German public administrative system is thus characterised by subsidiarity and decentralisation (Knemeyer, 2001, pp. 171-172) due to Federalism and multilayered regionalisation (Herrschel & Newman, 2002, pp. 126-127).

The following list distinguishes the three main tiers of public administration in Germany as outlined by Knemeyer (2001, p. 172), which incorporates his distinction of three further levels of administration within the local-authority tier:

1. Federal administration;
2. *Länder* administrations (16 in total including three city-states); and
3. Local authority self-administration by:
  - 16,071 municipalities subordinated to a county (with an average population of approximately 4,850);<sup>249</sup>
  - 323 counties and 115 non-county (metropolitan) municipalities, i.e. larger cities with a status equivalent to that of counties; and
  - Regional associations of local authorities or intermediate administrative districts under a district commissioner.

*Allocation of competencies between the national level, Land level and self-administration of local authorities*

The question of allocation of competencies and responsibilities is closely linked to the question of financing, i.e. the allocation of taxation revenues. The following Table 20 based upon an illustration by Avenarius (2002, p. 57), provides a good overview of this. The

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<sup>248</sup> This right for autonomous self-administration is guaranteed by Art. 28 para. 2 of the National Basic Law, although only in those areas assigned to them within the State. Knemeyer (2001, p. 171) points out that the ‘German concept of local “self-administration” is quite simply not the same thing as self-government in the British or American mould; however, it also differs quite substantially from the French or Swiss variants, and equally form the types of local self-administration found in the Scandinavian countries’.

<sup>249</sup> See also Wehling & Kost (2003, p. 14), who identify 13,844 municipalities within 323 counties.

allocation of functions varies between the *Länder* but, broadly, they include ‘education, highways and traffic management; hospital provision; police, public safety and rescue services; regional policy and planning’ (Barter, 2000, see Tables 1 and 2 on pp. 33 and 35).

Of particular importance for the innovation system is that schools and universities fall under the competencies of the *Länder* (Avenarius, 2002, pp. 119-125), although universities nevertheless have the right to self-governance according to the higher education framework law (*Hochschulrahmengesetz*) set by the Nation State. The table also shows that the national level is mainly responsible for large research institutions and economic development.

The tasks of local authorities are distinguished between voluntary self-administrative tasks (such as maintaining museums, sport facilities, parks and, of relevance here, economic development), obligatory self-administrative duties (such as maintaining roads, social services, water and energy supply), and obligatory delegated tasks (such as building control, registration of citizens, and public order) assigned by federal or *Land* legislation (Lehmann-Grube & Dieckmann, 2001, p. 185; von Lenep, 2004, pp. 14-15; Wehling & Kost, 2003, pp. 16-18).

Table 20 Allocation of fiscal revenues and competences according to level of government

Important core tasks and responsibilities		
Municipalities	Länder (Federal States)	Nation State
<ul style="list-style-type: none"> <li>- water and energy supply</li> <li>- refuse collection</li> <li>- canalisation</li> <li>- social services (income support)</li> <li>- planning permissions</li> <li>- registrations</li> </ul>	<ul style="list-style-type: none"> <li>- schools</li> <li>- universities</li> <li>- policy</li> <li>- administration of justice</li> <li>- health care</li> <li>- culture</li> <li>- property development</li> </ul>	<ul style="list-style-type: none"> <li>- social security (retirement, unemployment)</li> <li>- defence</li> <li>- foreign affairs</li> <li>- transport infrastructure</li> <li>- monetary system</li> <li>- economic development</li> <li>- research (large research laboratories)</li> </ul>
Main sources of tax revenues		
Municipalities	Länder (Federal States)	Nation State
<ul style="list-style-type: none"> <li>- income tax share* (15%)</li> <li>- value-added tax share* (2.2.%)</li> <li>- local land tax</li> <li>- local business trade tax (levied upon working capital and profits)</li> <li>- minor taxes (e.g. dog tax, beverage tax, taxation on holiday homes)</li> </ul>	<ul style="list-style-type: none"> <li>- income tax share*</li> <li>- value-added tax share*</li> <li>- corporation tax*</li> <li>- wealth tax</li> <li>- inheritance tax (estate duties)</li> <li>- motor vehicle/road tax</li> <li>- land acquisition/transfer tax</li> <li>- beer tax</li> <li>- casino tax</li> </ul>	<ul style="list-style-type: none"> <li>- income tax share*</li> <li>- value-added tax share*</li> <li>- corporation tax*</li> <li>- tax on mineral oil</li> <li>- tax on spirits</li> <li>- tobacco tax</li> <li>- coffee tax</li> <li>- insurance tax</li> </ul>

Source: Alteration and own translation of an overview by Avenarius (2002, p. 57) with addition information from Lehmann-Grube & Dieckmann (2001, p. 191).

Note that \* denotes a shared (common) tax, while \*\* denotes some splitting of revenues. Furthermore, horizontal and vertical fiscal transfers (equalisation grants) exist between tax-rich and tax-poor Länder.



### *The German education system*

Freeman (1995, p. 6) states that ‘Germany developed one of the best technical education and training systems in the world’, which from the nineteenth century until nowadays ‘is the foundation for the superior skills and higher productivity of the German labour force in many industries’. However, while the *dual system* of vocational training<sup>250</sup> has long been hailed as a key strength of the German system<sup>251</sup>, it has arguably been inflexible in responding to new hybrid skill demands in emerging sectors (cf. European Commission, 2003d, p. 18; Heidegger & Rauner, 1997). Furthermore, ‘the higher education sector, once a showpiece of the German education system, no longer is so’ - as Keck (1993, p. 140) has pointed out. Indeed, this is very evident in the weak education indicators of the 2002 EIS (European Commission, 2002a, Annex Table B on p. 24) for: new science and engineering (S&E) graduates; population with tertiary education; and participation in life-long learning.<sup>252</sup>

The crumbling of these foundations of innovation drivers provides a huge challenge for Germany in the years to come (cf. Arundel & Hollanders, 2005, p. 28; Keck, 1993, p. 147).<sup>253</sup> Germany’s poor results in the OECD’s PISA study prominently brought this to public attention. The study identified the social exclusion of its migrant pupils as one of the crucial

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<sup>250</sup> The dual system of vocational training involves specialised ‘theoretical’ education at vocational schools (e.g. one week per month) that complements the practical training of apprentices in businesses and other organisations.

<sup>251</sup> The dual system was for instance identified as a best practice example by Ernst & Young (1998, p. 85).

<sup>252</sup> Germany’s low performance on these innovation drivers might, according to the EIS (European Commission, 2005f, p. 15), ‘thus hamper the effect of increased efforts in other key dimensions on the overall innovative performance of the country’.

<sup>253</sup> The Exploratory Innovation Scoreboard from the EXIS report (Arundel & Hollanders, 2005) that complements the EIS also shows a below EU average performance of Germany for many of the EXIS themes, with the exception of innovation diversity. In particular the shortcomings concerning skills and investment are outlined as possible future problems for Germany (ibid., p. 28).

aspects in Germany's failure to adapt its education and training system.<sup>254</sup> The education and research system is pivotal for Germany's ability to remain innovative and competitive as a high-wage country.

### ***Germany's research and higher education infrastructure***

Public research funding is split into institutional funding and project funding that is mainly provided by Federal government support (Stubbs, 2001, p. 151), while the State governments funding of the *Länder* goes to the *Fachhochschulen* (or Universities of Applied Science) (European Commission, 2003d, p. 11). Specific research projects funds are, for instance, provided by the German Research Foundation (*Deutsche Forschungsgemeinschaft, DFG* in short). Its 1989 budget of around 600 million Euro (1188 mio. DM) was financed 68% by Federal Government and 38% by the Federal States (Keck, 1993, p. 141). The interwoven, mostly supra-regional, key actors of the institutional research system are briefly introduced in the following.<sup>255</sup>

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<sup>254</sup> The results from the OECD's Programme for International Student Assessment, known as the PISA study, have found in recent years, for instance, that the impact of the parents' socio-economic background on the school performance of teenagers was the highest for Germany, the UK and the US. Since publication of the unsatisfactory result, educational policy has become the focus of public debate in Germany. Here, attention has been particularly placed on the integration failure of children from immigrant families within the current pre-school and school system. Germany's PISA results can be found via the German Education Server (*Deutscher Bildungsserver*) at <http://www.bildungsserver.de/>, or the institutes responsible for coordination of the German part of the PISA study, which were for the 2000 cycle: the Max-Planck-institute for education research (MPIB) in Berlin at <http://www.mpib-berlin.mpg.de/pisa>; and for the 2003 cycle: the Leibniz-institute for the pedagogic of natural sciences (IPN) in Kiel at <http://pisa.ipn.uni-kiel.de/>. The Home Page of the OECD's Programme for International Student Assessment (PISA) can be found at [http://www.pisa.oecd.org/pages/0,2987,en\\_32252351\\_32235731\\_1\\_1\\_1\\_1\\_1\\_1,00.html](http://www.pisa.oecd.org/pages/0,2987,en_32252351_32235731_1_1_1_1_1_1,00.html).

<sup>255</sup> An illustrated institutional profile of Germany's national innovation systems can also be found in various works (European Commission, 2003d, p. 3; Kuhlmann, 1997, p. 145; Organisation for Economic Co-operation and Development, 1999b, p. 106; Reger & Kuhlmann, 1995, p. 12).

### *Public scientific research facilities*

The research activities of the *Max-Planck-Society* (MPG) institutes focus upon basic research and are closely linked to the universities. They are jointly financed by the Federal Government and Federal States (European Commission, 2003d, p. 10; Keck, 1993, p. 141). In addition, joint funding is provided for other public sector research establishments such as the ‘Blue List’ Institutes under the umbrella of the Wilhelm-Gottfried-Leibnitz Association (WGL) and the Academies of Sciences (AoS). The Federal Government also provides institutional support for various ‘departmental research’ laboratories (Kuhlmann, 1997, p. 444) and large National Research Centres, including those of the Helmholtz Association of German Research Centres (HGF) that carry out long-term basic research and focus on certain technologies (European Commission, 2003d, p. 4). The Helmholtz Research Centres are funded by the Federal Government (90%) and the Federal States (10%) (European Commission, 2003d, p. 10). The *Länder* also support their own governmental laboratories (ibid.).

### *Intermediary and private research facilities*

The ‘corporatist’ institutions of the *Fraunhofer-Society* (FhG) have close links to universities and are partly financed by institutional support (European Commission, 2003d, p. 10) that comes from the Federal Government (90%) and the Federal States (10%), and they carry out applied research on contracts with clients in industry (40%) and government (European Commission, 2003d, p. 11; Keck, 1993, p. 144; Kuhlmann, 1997, p. 444).

Besides these intermediary Fraunhofer institutions, that cooperate closely with industry, applied research is also carried out by laboratories and Institutes of Co-operative Industrial Research (*Institutionen für Gemeinschaftsforschung, IfG* in short) that are united in the Association of Industrial Research Institutes (*Arbeitsgemeinschaft Industrieller Forschungsvereinigungen "Otto von Guericke" e.V., AIF* in short). For their joint R&D activities relevant to SMEs, they receive funding from about 50,000 member SMEs and programme funding from the Federal Ministry of Economics and Labour 'BMWA'<sup>256</sup> (European Commission, 2003d, pp. 3 and 11)

### ***Business and innovation support infrastructure***

It is a characteristic of the German Research and Higher Education System that its universities are generally more research-focussed and as a result often lag behind in terms of technology transfer and business outreach activities, even though nearly all universities have *technology transfer offices* or units (Keck, 1993, p. 141). It is often said that Germany is failing to exploit its cutting edge quality research due to its inability to transfer it into innovation output. The reason for this is in the fragmented science and research system that suffers from 'poor co-operation, insufficient synergies, and obstacles to competition' (Burfitt et al., 2002, p. 12).

Overall, business support in Germany is more the role of institutions such as technology and start-up centres, chambers of commerce and consultancies that are complementary but mostly external to the system of Higher Education Institutions (HEIs). Technology and start-up centres play a crucial role in the business and innovation support framework by assisting

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<sup>256</sup> Now the Federal Ministry of Economics and Technology (BMWi).

entrepreneurial activities and existing businesses through their facilities and support services in commercialising research knowledge.

There are more than 200 *business incubators* in Germany (Organisation for Economic Co-operation and Development, 1999a, p. 49) – usually labelled as a ‘technology centre’ (*Technologiezentrum*) – research parks offering work premises to companies and research institutions, and may also offer support services and opportunities for cooperation (cf. Hilpert & Ruffieux, 1991; Organisation for Economic Co-operation and Development, 1999a, p. 51; Sturm, 1989, p. 165; Tamásy, 2001).<sup>257</sup>

An important role in the business and innovation support system is played by the 83 chambers of commerce and industry (*Industrie- und Handelskammer, IHK* in short) and the 55 chambers of handicrafts (*Handwerkskammer, HWK* in short) in Germany (cf. Hoppe, 2000, pp. 63 and 66). Although they are fairly similar, the chamber of commerce and industry are distinct in that membership is obligatory for businesses. The IHK is a self-administrative public body under the control of the *Land* Ministries for Economic Affairs (Hoppe, 2000, pp. 63-64). Its main tasks – as outlined by Hoppe (2000, pp. 64-65) – comprise the following three areas: the execution of tasks delegated by the State; representing its business base vis-à-vis public administration actors; and the provision of a wide range of – mainly free – services to its members. These services include advice and support on start-up activities, further education and training, financing and so on (e.g. see Vereinigung der Industrie- und Handelskammern in Nordrhein-Westfalen, 2001).

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<sup>257</sup> Other labels for such incubation centres are innovation centre (*Innovationszentrum*) or start-up centre (*Gründungszentrum*).

In summary, these three types of business and innovation support organisations – university technology transfer offices, chambers of commerce, and business incubators –, together with the political-administrative bodies – the economic development units of local and regional authorities –, are regarded as the key intermediary actors within the business and innovation support system. Although there are other important actors, these four are regarded here as those who epitomise the homologous core set of organisations that are universally present in the individual sub-national and sub-regional settings of Germany.<sup>258</sup> Furthermore, as described in the previous chapter, they represent the triple helix of university-industry-government relations (Etzkowitz & Leydesdorff, 2000) within the innovation system.

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<sup>258</sup> For an extended list of important actors see Hoppe (2000, p. 82).

### ***Programmes and instruments of the national innovation policy***

Keck (1993, pp. 145-146) writes that the federal government was hesitant in assuming ‘a role as manager of a national innovation system’ responsible for science and technology and that each of key higher education and research organisations ‘primarily looked after itself’.<sup>259</sup> Reger & Kuhlmann (1995, p. 15) also point out that a strategically focussed industry-related technology policy (like in France) is unlikely in Germany because of the decentralised research system, as outlined above, that stems from its Federalist structure. Yet, recent efforts by the Federal Ministry of Education and Research (BMBF) and the Federal Ministry of Economics and Technology (BMWi) addressed some of these policy shortcomings and aimed to enhance the German innovation system (e.g. see Bundesministerium für Wirtschaft und Technologie, 1999; Bundesministerium für Wirtschaft und Technologie & Bundesministerium für Bildung und Forschung, 2002). Some of the key aspects of this are described in this section.<sup>260</sup>

Whilst the *innovation policy measures and programmes of the BMBF* focus upon the mobility of students and scientists, the financing of thematic R&D projects in both enterprises and public science bodies, and on activities and infrastructure of innovation and technology transfer and networking; *BMWi’s innovation policies* centre around improving the regulatory framework for competition and entrepreneurship, providing direct financial support to

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<sup>259</sup> The 2004 innobarometer (European Commission, 2004d) also provides an ambiguous message concerning the assessment of the success of public innovation support programmes to businesses in the EU. The broad message is that while the programmes across the EU have helped to support innovative firms to turn their innovations into commercial success, they have failed to raise the innovative capabilities of less innovative SMEs (cf. Office for Official Publications of the European Communities, 2005).

<sup>260</sup> Specific reference is made in this respect to the excellent, comprehensive and detailed overview of innovation policy in Germany that features in the ‘country report’ for Germany from the European Commission’s (2003d) ‘European Trend Chart on Innovation’ prepared by Christian Rammer from the Centre for European Economic Research (ZEW). This report also provides a more detailed overview list of measures of German innovation policy (pp. 46-47).

enterprises for innovation activities including for cooperative R&D and technology consulting (through grants, loans and venture capital from the federally owned bank *KfW Bankengruppe* – see below) and providing infrastructure support to the enterprise sector (European Commission, 2003d, p. 6 and see Figures 3 and 4 on p. 7 and Figure 5 on p. 9).

#### *Financial support instruments for business innovation activities*

There are three main types of innovation financing for SMEs from the Federal Government and the federally owned ‘SME bank’ (*KfW Mittelstandsbank*).<sup>261</sup> These include direct research grants within five thematic programmes, loans and venture capital (Bundesministerium für Bildung und Forschung & Bundesministerium für Wirtschaft und Technologie, 2001; European Commission, 2003d, pp. 35-36).

The five *thematic programmes that provide direct research grants* for R&D projects are the largest programmes in terms of funding and comprise the areas of: natural sciences, climate, environment, and energy; new technologies; information and communication technologies; biotechnology, health, and design of working conditions; and transportation, space, and construction (Bundesministerium für Bildung und Forschung & Bundesministerium für Wirtschaft und Technologie, 2001, pp. 5-31; European Commission, 2003d, p. 47). In addition, the Pro Inno programme (*PROgramm “INNOvationskompetenz mittelständischer Unternehmen”*) provides grants for SMEs to carry out cooperative R&D projects, either with

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<sup>261</sup> The former two federally owned banks, *Deutsche Ausgleichsbank* (DtA) and *Kreditanstalt für Wiederaufbau* (KfW), both merged in July 2003 to the *KfW Bankengruppe*, with their main SME support activities now being comprised under the branch name label of *Mittelstandsbank* (SME bank) (cf. European Commission, 2003d, p. 13).



other firms or with research organisations (Arbeitsgemeinschaft industrieller Forschungsvereinigungen, 2002; European Commission, 2003d, p. 41).

The *ERP innovation programme* (European Recovery Programme), which goes back to the Marshall plan, is the main loan guarantee scheme for innovation financing (Bundesministerium für Wirtschaft und Technologie, 2001; Deutsche Ausgleichsbank, 2002, pp. 20-21).

Finally, *venture capital* (including co-investors) is provided for innovation-related investments for technology-oriented start-ups and young firms through the BTU programme (*Beteiligungskapital für kleine Technologieunternehmen*), which since 2001 has been under the responsibility of the ERP (Bundesministerium für Wirtschaft und Technologie, 2001, p. 8). The BTU Early Stage programme (*BTU-Frühphase*) provides venture capital and mentoring for pre-seed and seed stages through the 'tbg' venture capital provider (*Technologie-Beteiligungs-Gesellschaft*) belonging to the KfW (Deutsche Ausgleichsbank, 2002, p. 10). In addition, there is the FUTOUR 2000 programme specifically for technology-orientated start-ups in Eastern Germany as well venture capital programmes of the ERP and the KfW (Bundesministerium für Bildung und Forschung & Bundesministerium für Wirtschaft und Technologie, 2001, pp. 43-44; Deutsche Ausgleichsbank, 2002, p. 9; European Commission, 2003d, pp. 35-36; Kreditanstalt für Wiederaufbau, 2000).

Whilst government support once also included tax incentives such as tax credits or allowances (Keck, 1993, p. 144), these measures were discontinued because they were believed to be ineffective as market pressure for innovation was seen to be sufficient (European

Commission, 2003d, p. 36).<sup>262</sup> Instead of unspecific tax allowances (with the exception of investment allowances for East German enterprises), Germany provides special depreciation rates on certain types of investment in R&D, and certain subsidies to SMEs, e.g. for using IPRs (ibid., p. 36). Furthermore, the recent major tax reform of 2001 included a reduction of corporate tax to a uniform 25% (ibid., p. 36).

### *Characteristics and trends of German innovation policy*

In their study on the ‘Infrastructure and Public Sector Support for the Medical Technology Industry in Baden-Württemberg’, Burfitt, Gibney & Schierenbeck (2002, p. 12) identify the recent trends in German Innovation and Technology Policy at the federal, regional and joint levels:

- A focus on high-tech industries and firms
- An emphasis on inter-firm and inter-institutional networking and collaboration
- The regionalisation of Federal schemes
- The use of competitive bidding to allocate public resources between regions<sup>263</sup>

Furthermore, they (ibid., p. 12) identify that the emerging *supporting forms of cooperation* emphasised by this new approach are:

- Open and flexible
- Topic-focussed instead of institution-focussed
- Time limited
- Inter-disciplinary

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<sup>262</sup> The strong performance in terms of business expenditure on R&D (BERD) as outlined before gives credence to this argument.

<sup>263</sup> The best ideas of submitted applications for competitions are granted (or winning) programme funding.

Similarly, Rammer identifies competition, bottom-up approaches and networking approaches as the new developments in German innovation policy in recent years (European Commission, 2003d, pp. 8-9). Furthermore, he (ibid., p. 19) identifies three ways in which regional aspects increasingly enter innovation policy.<sup>264</sup> Firstly, that regional differences in innovation policy stem from this being a major activity of *Länder* governments, which gear their approaches towards their regional framework conditions. A second route is the particular attention to the characteristics of East Germany within the specific programmes. Thirdly, the rise of the regional dimension is evident in a number of innovation policy programmes that follow a regional focusing approach (e.g. by restricting support to certain winning regions). The latter is described below.

#### *Towards a national approach for regional cluster policy*

According to the OECD (Organisation for Economic Co-operation and Development, 1999b, p. 88), Germany's cluster-based policy is applied at the micro and meso level and focussed upon the concept of 'similar firms and innovation styles'. It comprises the following components (ibid., p. 89): the provision of strategic information by technological foresight studies (FUTUR, former Delphi report); cluster development programmes (by regional development agencies); joint industry-research centres of excellence (competence centres); and platforms for constructive dialogue (German Council for Research, Technology and Innovation).

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<sup>264</sup> Indeed, the recent policy trend towards a regionalisation of economic and innovation strategies and policies has also been identified by others (see Dohse, 2001; Hassink, 1992, pp. 153 and 158; Heinze & Voelzkow, 1997; Klee & Kirchmann, 1998; Koschatzky, 2000, 2003; Lompe et al., 1996; Raines, 2002a, p. 33; Raines, 2002b, p. 159; Sturm, 1997; Waniek, 1993, p. 469) as stated earlier by this study.

In their international comparison, Boekholt & Thuriaux (2000, pp. 6-8, 34-36 and 42-46) characterise the German cluster policy approach – together with those of Austrian and the Netherlands – as belonging to the Industry-Research Link Model. This cluster policy model ‘focuses on “kick-starting” economic strength in *emerging technologies*’ by creating a critical mass of R&D capabilities and technology-based firms that is embodied in the ‘competence centre’ (*Kompetenzzentren*) approach (ibid., pp. 6-7). The collaborative partners for this type are ‘not defined as a product chain but rather as a knowledge chain, ranging from basic research to commercialisation’ (ibid., p. 34).

Within the German innovation policy activities, a focus has increasingly been placed upon the promotion of clustering and cooperation by on supporting the establishment of regional innovation networks. The following programmes are examples of the recent trend of the incorporation of regional and sectoral clustering aspects in innovation programmes (Burfitt et al., 2002, p. 12; European Commission, 2003d, p. 28), i.e. a regional clustering approach. The programmes include (see European Commission, 2003d, pp. 23 and 28-29) InnoRegio, Innovative Regional Growth Poles, and NEMO (*Netzwerkmanagement-Ost*), all for Eastern Germany; the support for the ‘EXIST – university-based start-ups’ programme (Federal Ministry of Education and Research, 2001)<sup>265</sup>; the programme Learning Regions; the successful biotechnology initiatives (such as BioRegio and BioProfile); the Networks of Competence and Competency Centre programmes.

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<sup>265</sup> Among the five regional networks that received funding was also one from North Rhine-Westphalia: the *bizeps* EXISTnetwork in the Bergisch-Märkische region ‘with the towns of Hagen, Remscheid, Solingen and Wuppertal as well as the Ennep-Ruhr district and the Märkisch district’ (Federal Ministry of Education and Research, 2001, p. 18) .

Common to all these programmes is the building of ‘regional and often sector-specific consortia (or at least a group of actors) that formulate a joint innovation strategy and provide funding for joint innovation efforts’ (European Commission, 2003d, p. 28).<sup>266</sup> Furthermore, the consortia usually integrate various competencies and organisations from the different dimensions such as public and private R&D facilities, supportive public administration, venture capital institutions, lead customers and so on (ibid., p. 29).

The *BioRegio initiative* was the first programme to focus on regional clustering even though its main objective was to develop a national biotechnology industry in Germany (European Commission, 2003d, p. 29). It was launched by the German government (cf. Organisation for Economic Co-operation and Development, 1999b, pp. 72-73) in 1995 as a competition amongst regions for funding of cluster initiatives to stimulate the formation of innovative collaborative university-industry networks in the biotechnology sector supported by public administration. It aimed to facilitate the transfer of scientific knowledge from university to industry and thus speed up the commercialisation of research into products and processes. It was presented by the OECD (Organisation for Economic Co-operation and Development, 1999b, p. 70) as good policy practice for promoting networking and clustering. In their UNIDO policy paper, Cooke & Memedovic (2003, p. 1) describe the initiative as ‘[o]ne of the clearest cases’ of a government approach of promoting regional innovation and cluster-building.<sup>267</sup> In his analysis of the BioRegio contest, Dohse (2000, p. 1111) concludes that it ‘goes in the right direction by taking regions seriously and giving prominence to the well-functioning interplay of the various elements of regional innovation systems’. However, he also states that this new policy instrument ‘cannot solve the fundamental information problem

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<sup>266</sup> Therefore, they show some influence or similarity to the Regional Innovation Strategy programme by the EU.

<sup>267</sup> Among the winning regions was Cologne-Düsseldorf in North Rhine-Westphalia.

associated with government intervention into the process of technological change'.<sup>268</sup> Yet, he (2000, p. 1119) sees the initiative's strategy theoretically justified as it 'promotes spatial clustering, rewards intraregional cooperation and stimulates interregional competition for technology'

Building upon the success of the BioRegio initiative, increasingly attention has been placed on the *centres of competence* programme (European Commission, 2003d, pp. 9 and 29).<sup>269</sup> The Competence Centre approach (Boekholt & Thuriaux, 2000, pp. 42-46; Burfitt et al., 2002, pp. 13-15) was further influenced by the recommendations of a number of research reports. These include the study on clusters (*Kompetenzzentren*) in German technology regions, compared to some US clusters, presented by the Roland Berger consultants (Roland Berger & Partner et al., 1998) for the German Federal Ministry of Education, Science, Research and Technology (BMBF) as well as 'an international comparative study on initiatives to build, develop and support "Kompetenzzentren" (clusters) by Technopolis (Boekholt et al., 1998) for BMBF.<sup>270</sup>

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<sup>268</sup> Dohse (2000, pp. 1118-1119) names three particular reasons why the consideration of the spatial dimension goes into the right direction, namely because technological change is path dependent; because of untraded interdependencies and due to the view of regions as the best suited governance level to internalise spillovers. However, Dohse (2000, p. 1119) also points out that '[a] major problem of sector specific policies is that intrasectoral spillovers seem to be of less importance than intersectoral spillovers (see Glaeser, Kallal, Scheinkman, & Shleifer, 1992 for empirical evidence), i.e. spillovers seem to be bund to a specific technology rather than to a specific sector of the economy.

<sup>269</sup> Compare also Sweden's NUTEK Competence Centre Programme that has been highlighted by the OECD (Organisation for Economic Co-operation and Development, 1999b, p. 70) as a good policy practice for promoting networking and clustering in order to facilitate university-industry interactions.

<sup>270</sup> This first report (Roland Berger & Partner et al., 1998) discusses as a kind of benchmark success stories, the computer and microelectronics industrial cluster in Silicon Valley (California, USA); its main competitor cluster along route 128 near Boston (Massachusetts, USA); the biotechnology cluster in the San Francisco Bay Area (North California, USA) and the biotechnology cluster in the State of New York. The Technopolis study (Boekholt et al., 1998) also covers the classical cases studies on as entrepreneurial clusters (*Kompetenzzentren*). It further discusses the science and technology-led clusters of information technology in Cambridge (UK) and of laser technology in California South Bay (USA), as well as the industry-led clusters in Eindhoven (Netherlands) and Gothenburg (Sweden), and the policy-led clusters of Silicon Glen in Scotland (UK), Kanagawa (Japan) and the Hsinchu Science Park (Taiwan).

The BMBF finances the building of these competence centres, which create a cluster infrastructure that bundles up horizontal (inter-disciplinary) competences and vertical competences (covering the whole value chain) by involving all the main actors in the innovation process. It thus embodies an especial emphasis on networking and inter-firm and inter-institutional co-operation. Their conceptualisation is described in more detail by Burfitt, Gibney & Schierenbeck (2002, pp. 13-15).<sup>271</sup> The key focus of these bodies is on seeking to establish collaborative centres in which all the necessary components and competencies of the innovation and product development process for a given discipline or product area are present within a region. In this sense they seek to network universities, external research institutes and firms with a clear focus on producing new product developments. They therefore take the notion of networking one step further than traditional approaches by tying it to the core concept of product development and also by ensuring that all the necessary actors needed to see the process through to completion are in place. In addition to their product development role these centres also provide more generic networking and support roles for their members.

Centres of Competence in various disciplines have been established throughout the German regions. These are run through a series of discipline-specific national competitions and funding is provided for a number of years to establish regional networks of excellence in particular areas such as nanotechnology. These bodies can potentially play a key role in regional cluster development not only by developing and networking existing strengths and capacities within regions, but also, through their focus on the entire innovation process, by ensuring that regions develop all the necessary capacities for innovation in particular disciplines. These innovation competencies may in turn have implications for innovation and

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<sup>271</sup> The following paragraphs until the end of this section have already featured with only some minor alterations in an publication by Burfitt, Gibney & Schierenbeck (2002, pp. 14-15).

product development in other disciplines and clusters within the region. The focus of these schemes is therefore on supporting networking and on building on existing regional strengths and expertise to secure benefits both for individual regions and also the nation as a whole.

The ‘competence centre’ programme covers a broad range of sectors, for which some interim evaluation reports are available.<sup>272</sup> The BMBF has run several competitions for Centres of Competence focussing on a number of cutting edge technologies. The current list of areas includes biomaterials, biotechnology, education & training, environmental technology, genomics, industrial manufacturing, laser technology, maritime technology, material science, medical engineering, medicine, microsystem engineering, nanotechnology, optical technology, power engineering, telecommunications, and traffic & transportation.

There are a number of these centres under each heading, each located in regions of excellence for their particular topic areas. Each centre adopts a specific ‘product focus’ within the context of these broad topic headings. In this sense competency centres and their supporting networks have very clear product development foci and consequently are tightly tailored to the capacities of regional firms and research institutions.

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<sup>272</sup> The interim evaluation reports include, for instance, the prognos (2001) report on the support measure for e-commerce and the interim evaluation of the nanotechnology competence centres in the early support phases (Bührer et al., 2002). There is also the final report by the Institute for socio-economic structural analysis ‘Söstra’ (Berteit, Boje, Kowalski, & Ransch, 1998) for the German Federal Ministry of for Economic Affairs (BMWi) on the contribution of the research and innovation support for the industries in the East Germany, the new *Länder*. Furthermore, Burfitt, Gibney & Schierenbeck (2002) have also analysed the programme ‘Centres of Competence for Medical Technology’ by the German Federal Ministry for Education and Research ‘BMBF’ (cf. Bundesministerium für Bildung und Forschung, 1999, 2000; Federal Ministry of Education and Research, 2003a). However, their report mainly focusses upon a single case study of a competence centre for minimally invasive medicine & technology in Tübingen-Tuttlingen (MITT), in Baden-Württemberg.



These various competency programmes are linked through a national network of competency centres and are marketed internationally through an online umbrella platform - kompetenznetze.de. The '*networks of competence*' initiative (Bundesministerium für Bildung und Forschung, 2002; Federal Ministry of Education and Research, 2003b) is complementary to the competence centre programme but is more virtually conceptualised.

More recently in 2007 – outside the core research period timeframe – the Federal Ministry of Education and Research (BMBF) <sup>273</sup> has held a '*top cutting-edge cluster competition*' ('Spitzencluster-Wettbewerb') awarding in September 2008 funding of up to 200 million Euro for the first five winners of the competition for cluster initiatives with critical mass and development potential. While it still remains to be seen though whether the selection process has been rigorous and non-political enough to avoid the 'picking the winner' mistakes of the past, this cluster competition has provided a substantial amount of funding for a limited number of projects. This limitation in terms of funded projects contrasts with the French 'pôles de compétitivité' (competitiveness clusters) initiative, which has been somewhat criticized for having failed to focus government funding only on its competitiveness clusters with global reach or globally-orientation, by instead funding a total of now 71 competitiveness clusters projects.<sup>274</sup>

Together with the federal government initiative for excellence in higher education (support for 'elite' universities) and the Competence Networks Germany campaign of the Federal

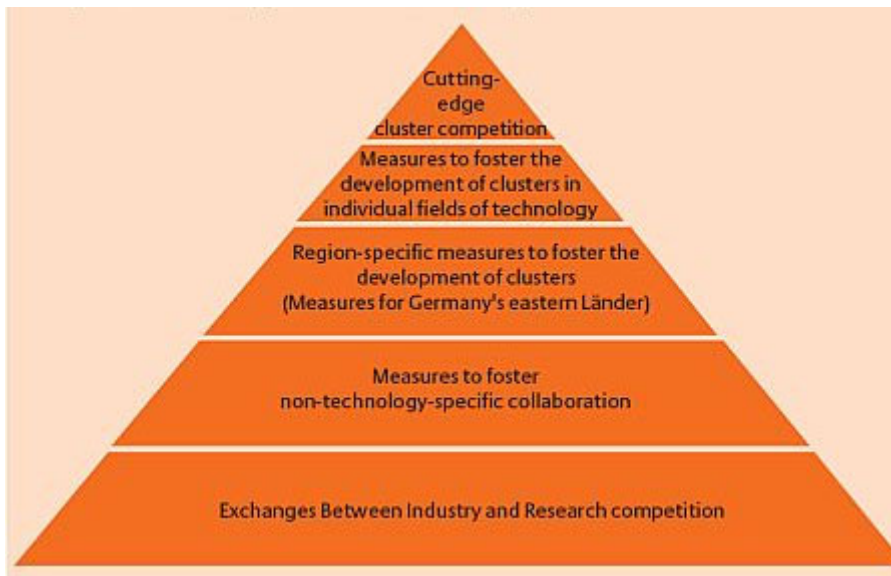
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<sup>273</sup> For information on the German 'top cutting-edge cluster competition' see <http://www.spitzencluster.de>

<sup>274</sup> The French State's total budget for the 'pôles de compétitivité' initiative was set at a minimum of 1.5 billion Euros over 3 years (2006-2008), predominantly earmarked for R&D projects and tax breaks. Initially 67, then after some additions and mergers, 71 cluster initiatives were supported. Out of these 71 successful applicants, 7 were identified as global competitiveness clusters and 10 as globally-orientated competitiveness clusters which receive higher funding. For information on the French 'pôles de compétitivité' initiative see <http://www.competitivite.gouv.fr/>

Ministry of Economics and Technology (BMWi), the emphasis clearly has been placed upon further supporting regional strengths as part of a comprehensive national Cluster Strategy (see Figure 16).

Figure 16 The German government's Cluster Strategy

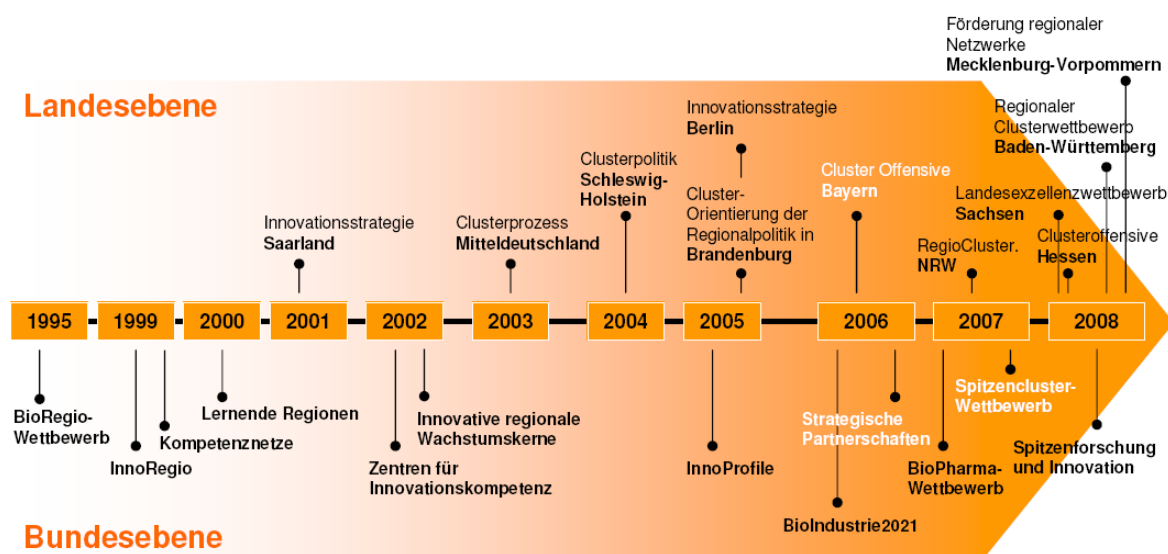


Source: Die Bundesregierung, <http://www.hightech-strategie.de/en/116.php>, accessed 22.02.2009

In addition, increasingly more and more *Länder* have also started their own cluster support programmes (see Figure 17), including the State of North Rhine-Westphalia, which in 2007 – outside the core research period timeframe – has also had its own first ‘RegioCluster.NRW’ cluster competition (Ministerium für Wirtschaft, 2007).<sup>275</sup>

<sup>275</sup> For more information about the RegioCluster.NRW competition see [http://www.ziel2-nrw.de/2\\_Wettbewerbe\\_und\\_weitere\\_Foerdermoeglichkeiten/2\\_Abgeschlossene\\_Wettbewerbe/RegioCluster\\_NRW/index.php](http://www.ziel2-nrw.de/2_Wettbewerbe_und_weitere_Foerdermoeglichkeiten/2_Abgeschlossene_Wettbewerbe/RegioCluster_NRW/index.php)

Figure 17 Overview of cluster and network support measures in Germany (1995-2008)



Source: Meyer-Krahmer, F. (2008) 'Innovationen durch modern Clusterpolitik', plenary presentation by the State Secretary Prof. Dr. Frieder Meyer-Krahmer of the Federal Ministry for Education and Research (BMBF) given on 20.10.2008 during the German Cluster Conference in Leipzig, available at: [http://www.clusterkonferenz.de/uploads/media/Praes\\_DCK\\_BMBF\\_Meyer-Krahmer.pdf](http://www.clusterkonferenz.de/uploads/media/Praes_DCK_BMBF_Meyer-Krahmer.pdf)

Note: The upper part of the figure depicts initiatives of individual States/regions (Land level) while the bottom part lists initiatives at the Federal national level. However, some support programmes such as 'Innovative regionale Wachstumskerne' are only for the East German 'New German Laender'.

### ***Strength and weaknesses of the German innovation system***<sup>276</sup>

While Germany's technological capabilities remain at the forefront with regards to advanced technologies where it has a long manufacturing tradition, it has fallen behind in many high-technology areas and those that have recently emerged (Burfitt et al., 2002, p. 12; Keck, 1993, p. 146; Stubbs, 2001, p. 151).<sup>277</sup> What Germany seems to lack is not the general capability to innovate but an innovativeness especially in the cutting edge lead markets that are the potential future growth markets (Abelshausen, 2004, pp. 449-450; Stubbs, 2001, p. 151).

<sup>276</sup> A range of further studies concerning the German Innovation System can be found at the website of the Expert Commission Research and Innovation (EFI) at <http://www.e-fi.de/indikatorenstudien.html?&L=0>

<sup>277</sup> For key indicators according to technological sectors, see for example the OECD's Economic Surveys for Germany (e.g. Organisation for Economic Co-operation and Development, 2003a).

This is also supported by the findings of the 2002 European Innovation Scoreboard (European Commission, 2002, Table 3 on p. 12 and cf. Annex Table B on p. 24), which shows, that in comparison to the other EU-15 Member States, Germany has a *major relative strength* in current patenting, business R&D (as a share of GDP), and employment in medium- and hi-tech manufacturing, while displaying a *major relative weakness* in current innovation finance, manufacturing hi-tech value added, the trend of home internet access, and education.<sup>278</sup>

To some surprise, the 2005 Innobarometer (European Commission, 2005b, pp. 2-4) shows an *unfavourable innovation demand* in Germany. According to these results, citizens in Germany together with those in Poland, Latvia and Finland are least ready to embrace innovation. As the EIS indicates (cf. European Commission, 2005a, pp. 15 and 27-28), this relative reluctance to innovation ‘could be an explaining factor for the differences in the transformation of innovation inputs into innovation outputs’ (ibid., p. 28). However, Germany’s high innovation output ‘may indicate that the drivers for innovation do not lie in the public demand but rather come from the side of the firm’ (ibid., p. 28).

There is also a lack of specialised skilled personnel (Janz et al., 2001, p. 9), which is exacerbated by an apparent so-called brain drain of the highly-skilled ‘creative elite’ mainly to the US (Florida & Tinagli, 2004) and a perceived weakness of education and training of entrepreneurial skills (Sternberg et al., 2000, pp. 6 and 27). In addition, businesses also perceive the wider political and regulatory framework conditions very negatively (Sternberg et al., 2000, pp. 6 and 26), which irrespective of it actually being unfavourable, certainly acts

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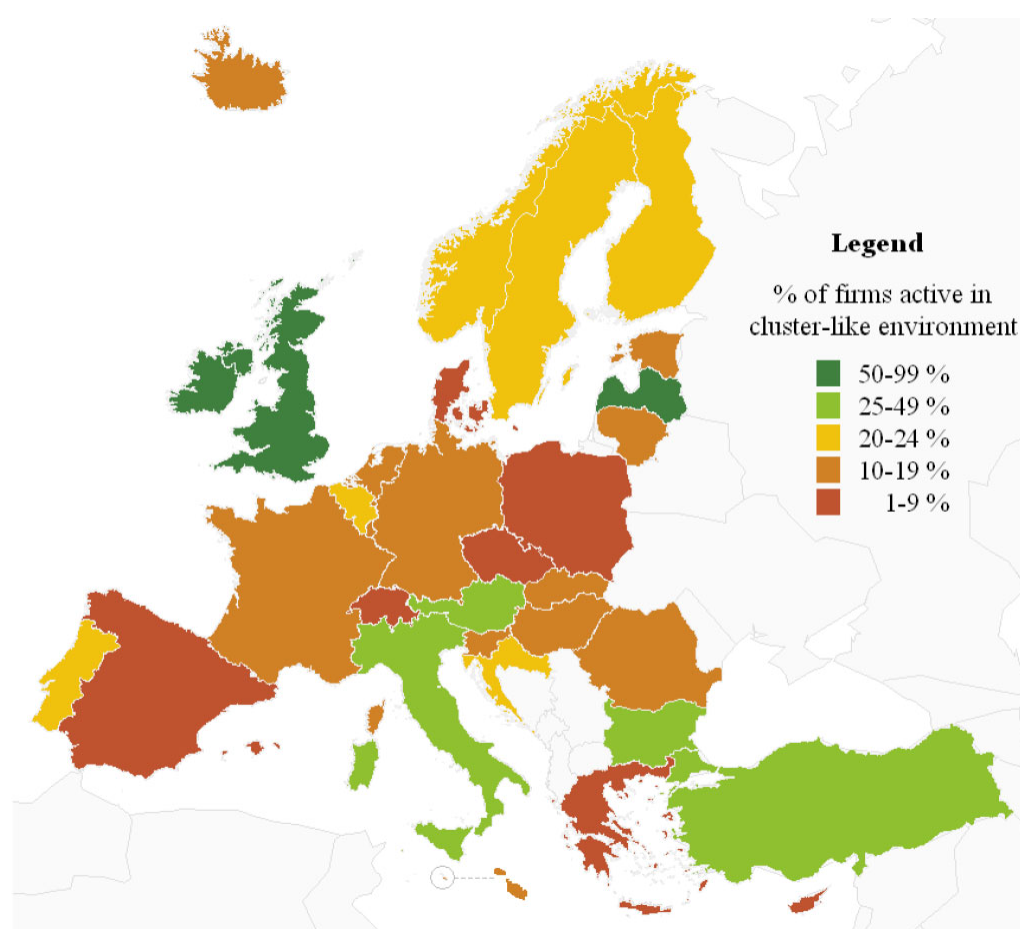
<sup>278</sup> However, the country report for Germany from the 2000 Global Entrepreneurship Monitor (GEM) highlights that businesses perceive positively the government’s emphasis and provision of programmes in support of start-ups (Sternberg, Otten, & Tamásy, 2000, pp. 6 and 24-25). Anyway, venture capital appears not be an important barrier to industrial innovation as, for instance, Keck (1993, p. 144) infers from the small demand for it.

as a barrier to entrepreneurial activity. Indeed, bureaucracy is widely seen as a hampering factor to new start-ups (Skambracks, 1999, pp. 13-19) and particularly SMEs are seen to suffer in Germany from bureaucratic regulatory duties (Hacke, 2005).

Overall, Germany's decentralised political-administrative system is usually critically characterised as being 'fragmented', 'consensus orientated' and 'corporatist' (Abelshauser, 2004, p. 449; Hoppe, 2000, p. 264; Humphreys, 1989, pp. 130-131). While the German corporatist market economy described as *Rhine capitalism* (Albert, 1993) is occasionally hailed for its economic and social superiority over the American pure market economy system (cf. Abelshauser, 2004, p. 449), it has increasingly being recognised to be suffering from its high consensus threshold due to its different level of governments. Scharpf's (1976) classical description – of what he calls the 'joint decision trap' (*Politikverflechtungsfalle*) – has shown that policy deadlock and political immobilism arises in the absence of 'cooperative federalism' and an almost universal consensus (cf. also Hoppe, 2000, pp. 263-264; Humphreys, 1989, pp. 130-131).

In this given context, the increasing use of competitive bidding and the national approach of regional cluster policy (see also Figure 17) appear to be appropriate instruments for innovation policy in Germany. Yet, Germany appears to be somewhat lacking behind in terms of proactive application of the cluster approach given the comparative low percentage of firms that state to be active in a cluster-like environment (see Figure 18) according to the 2006 Innobarometer (European Commission, 2006, p. 4).

Figure 18 Percentage of firms active in cluster-like environments



Source: Innobarometer on cluster's role in facilitating innovation in Europe (European Commission, 2006, p. 4)

Yet, around a fifth of the roughly 2000 clusters in Europe identified in 2007 by the European Cluster Observatory on the basis of employment data are to be found in Germany (see Table 21). Out of the total of 35 identified German strong '3-star-clusters', traditional sectors such as production technologies (10), automotive (7) and metal (5) clearly dominate.<sup>279</sup>

<sup>279</sup> The European Cluster Observatory's simple three-star methodology is based on the measurement of the revealed effects in terms of employment that linkages and spill-overs have on the location decisions of companies, not on a direct measurement of such dynamic interactions between the driving forces of a cluster. The up to three stars – indicating whether the cluster has reached a certain critical mass – are allocated to cluster categories in regions according to their cluster employment *size*, the degree to which it is *specialised* and the extent to which the locality (the region) is geared towards and *focused* upon production in the relevant industries comprising the cluster. The total number of 2017 clusters have been identified from 9804 potential areas of

This applies even more so to North Rhine-Westphalia (NRW), where the total of seven strong ‘3-star-clusters’ are to be found in production technologies (3), metal (3) and building fixtures (1).

*Table 21 Cluster presence in Europe, Germany and NRW – Results from the European Cluster Observatory*

	3 star clusters <sup>279</sup>	2 star clusters	1 star clusters	Total number of clusters (1-3 stars)
EU-27 plus EFTA-4 and Turkey	155	524	1338	2017
Germany (DE)	35	116	246	397
North Rhine-Westphalia (NRW)	7	24	35	66
- Arnsberg	2	4	5	11
- Cologne ( <i>Köln</i> )	0	7	7	14
- Detmold	3	3	7	13
- Düsseldorf	1	7	10	18
- Münster	1	3	6	10

Source: Own counting of clusters identified by the European Cluster Observatory. ISC/CSC cluster codes 1.0, dataset 20070613 according to size, specialisation and focus of employment data (Germany 2006 data).<sup>279</sup>

Note: The sub-categories for North Rhine-Westphalia are its five regional administrative districts (NUTS 2).

This suggests that there is still a foundation of cluster strength in Germany based on traditional competencies and trajectories, while the perceived lack of cluster initiatives by businesses – that may have the potential to yield future cluster strength – could be seen as a crucial weakness of the German innovation system given the importance of cluster and cluster policy for innovation and competitiveness (European Commission, 2008a, 2008b).

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cluster development that is calculated by multiplying the 258 regions analysed at NUTS 2 level (within the EU-27 countries, Iceland, Israel, Norway, Switzerland and Turkey) by the number of 38 cluster categories applied. These cluster categories excludes sectors such as local retail and other local services that mainly serve local markets because they are neither viewed as being exposed to direct competition across regions nor as tending to “cluster together”. For more information on the methodology and the different cluster concepts see European Commission (2008a) and the European Cluster Observatory’s website at <http://www.clusterobservatory.eu/>

Germany's decentralised political-administrative system also means that the strength of its regional innovation systems and regional policies at *Länder* level become much more important than perhaps in other less decentralised countries such as France.

### ***Complementary EU support for facilitating the emergence of more world-class clusters***

At the highest level at the Brussels European Council in March 2008, heads of State and governments urged to better coordinate efforts in support of clusters and to facilitate the participation of innovative SMEs in clusters.<sup>280</sup> In May 2008, the Council of the European Union also recognised 'the importance of cluster policy in terms of fostering innovation and excellence and addressing the specific needs of SMEs, including innovative enterprises with a high growth potential' and invited Member States, the European Commission and regions 'to coordinate their efforts to improve framework conditions for innovation, such as science-industry linkages and support services for innovation, including encouraging the growth of world class innovation clusters, and innovation clusters of regional importance and to ensure better governance of relevant policies throughout the European Union'.<sup>281</sup> This emphasis on clusters follows the Conclusions of the December 2006 Competitiveness Council which included cluster development among the 9 strategic priorities for the EU's broad-based innovation strategy.<sup>282</sup>

In October 2008, the European Commission (2008b) responded by adopting for the first time a Communication on clusters entitled 'Towards world-class clusters in the European Union:

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<sup>280</sup> Presidency Conclusions of the Brussels European Council (13/14 March 2008) available at [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/ec/99410.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/99410.pdf)

<sup>281</sup> The 2871st meeting of the Competitiveness Council of 29-30 May 2008 adopted the Council Conclusions 10174/08 on the competitiveness and innovation of the European industry that are available at <http://register.consilium.europa.eu/pdf/en/08/st10/st10174.en08.pdf>

<sup>282</sup> The Council Press Release 15717/06 (Presse 337) on the conclusions of the 2769th Council meeting can be found at [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/intm/92107.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/intm/92107.pdf)



Implementing the broad-based innovation strategy'. This brief policy document outlines the Commission's strategy aiming to contribute to creating a more efficient policy framework for cluster support in the EU in order to facilitate the development of more world-class clusters in the EU. It outlines and addresses in particular the challenges of:

- *improving cluster policies* based on evidence-based policy-making (e.g. by considering the cluster mapping of the European Cluster Observatory<sup>283</sup>);
- *fostering trans-national cluster cooperation* both at policy level (e.g. through the European Cluster Alliance) and at operational level between cluster organisations to ultimately support international cooperation of clustered businesses;
- *promoting the excellence of cluster organisations* (through a pilot initiative with the aim of developing a European quality label for the excellence of cluster organizations that could also lead to the creation of a self-sustainable non-profit European Cluster Manager Association); and finally of
- *improving the integration of innovative SMEs into clusters* (especially through cluster organisations).

The Communication is annexed by a longer Commission Staff Working Document (2008a) on the concept of clusters and cluster policies, which concludes that there is overall strong evidence suggesting a high importance of clusters, cluster policy and trans-national cluster cooperation for innovation and competitiveness.<sup>284</sup> It further provides a more detailed description of the challenges addressed by the Commission Communication.

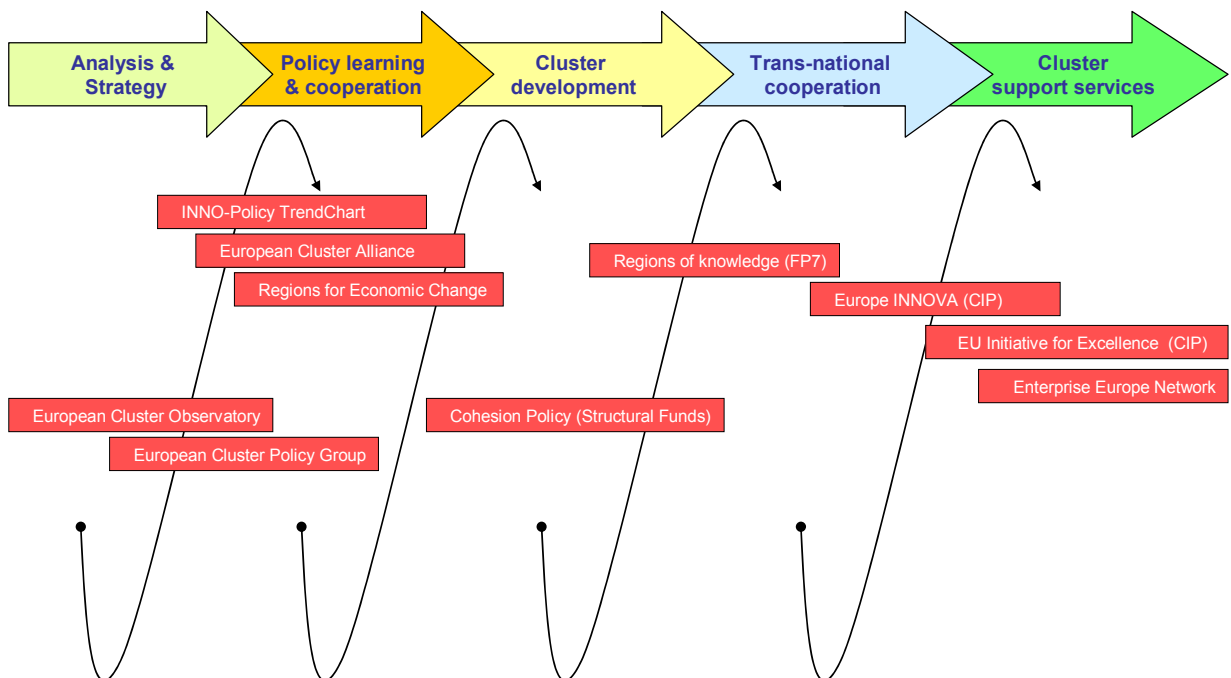
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<sup>283</sup> The cluster mapping of the European Cluster Observatory is available at [www.clusterobservatory.eu](http://www.clusterobservatory.eu)

<sup>284</sup> The Communication (2008b) 'Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy' and the annexed Commission Staff Working Document (2008a) on 'The concept of clusters and cluster policies and their role for competitiveness and innovation: Main statistical results and lessons learned' are both available at <http://ec.europa.eu/enterprise/policies/innovation/policy/clusters>

The main EU cluster support initiatives are depicted in the following Figure 19 along the different development stages of cluster policy development (see Appendix III for a chronological overview of selected Community initiatives related to clusters). These initiatives are mainly supported by the Competitiveness and Innovation Programme (CIP) such as under the Europe INNOVA and PRO INNO Europe® initiatives, Cohesion Policy, and the Regions of Knowledge initiative for research-driven clusters implemented under the 7<sup>th</sup> Research Framework Programme (FP7).<sup>285</sup>

*Figure 19 Overview of current and planned EU initiatives in support of clusters*



Source: European Commission (2008a, p. 62) Staff Working Document that accompanied the Commission Communication (2008b) on clusters.

<sup>285</sup> These initiatives are described in detail in the aforementioned Commission Staff Working Document (2008a).

The recent focus on excellence and transnational cluster cooperation is another cornerstone of the EU's 'broad-based innovation strategy' (European Commission, 2006) as part of the so-called 'Lisbon agenda' in view of becoming 'the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion' (Council of the European Union, 2000, paragraph 5). This approach follows in the footsteps of the influential Green Paper on Innovation (Europäische Kommission, 1995; European Commission, 1995) and the previous emphasis on Regional Innovation Strategies (RIS), and Regional Technology Transfer Strategies and Infrastructures (RITTS), and Innovative Actions in the 1990s as part of regional and structural policy (Europäische Kommission, 1995a; European Commission, 1999a, 2002k; Landabaso, 2002, Annex III on pp. 36-37; Landabaso & Reid, 1999; Morgan, 2001, pp. 25-26; Morgan & Nauwelaers, 1999b; Oughton et al., 2002, pp.104-108). The regional innovation strategies supported by the EU were aimed at encouraging greater cooperation and developing 'social capital' in the regions in order to stimulate the development of 'clusters' of competitive activities (European Commission, 1992, p. 79; Landabaso & Reid, 1999, p. 21).

Having presented the wider German innovation system context and briefly indicated to some of the complementary policy fields pursued at supranational level, the following section sketches out the distinct characteristics of the regional innovation system of the Federal State of North Rhine-Westphalia.

### **North Rhine-Westphalia's regional innovation system**

The regional innovation system of the Federal State of North Rhine-Westphalia has to be understood in the context of the wider German Innovation System, presented above. For instance, North Rhine-Westphalia is said to have a competitive disadvantage with regards to the national regulatory framework for *taxation*. Even though this is a problem at the national level, North Rhine-Westphalia is said to suffer particularly from tax holdings being situated in neighbouring countries such as the Netherlands.<sup>286</sup>

North Rhine-Westphalia often receives some special attention, as it is perceived as a miniature version of Germany because of its diverse economic profile that mirrors to some extent the countries economic diversity. This point is elaborated in the following section that provides a general introduction of the economic profile of the region, including a discussion of the public administrative structure, the higher education system, a presentation of key programmes and policies as well as key institutional actors.

### ***General and economic profile of North Rhine Westphalia***<sup>287</sup>

A Financial Times Survey on North Rhine-Westphalia rightly describes the *Land* as ‘a bellwether for the nation’ (Barber, 2002). For instance, when it comes to local or regional elections, analysts look at North Rhine-Westphalia in the hope of spotting overall political trends.<sup>288</sup> Its representative nature stems not only from it being Germany's most populous

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<sup>286</sup> Interviews No. 33, transcript pages 8-9, No. 29, transcript page 2, and No. 37, transcript page 3

<sup>287</sup> Parts of the following profile have already featured already in alteration in a report on the Media Cluster in Cologne by Collinge & Schierenbeck (2004, pp. 7-8).

<sup>288</sup> Local, Regional and General (Federal) Elections are mostly carried out at different times. In North-Rhine-Westphalia, for example, Local Elections were last held in September 2004, while Regional Elections were held in May 2005. Federal Elections were last held in September 2005.

Federal State (*Land*) with a population of just over 18 million inhabitants (in an area of 34,0872 km<sup>2</sup>)<sup>289</sup>, but also because of its diverse, contrasting and hence somewhat characteristic composition of the *Land*. Thus, it can be argued that North Rhine-Westphalia does represent a very heterogeneous innovation system – even the *Land* level represents one political and policy-related homogenous setting. Heinze (1997, p. 13, own translation and emphasis added), for example, concludes that ‘this *Land* is all *but* a homogeneous spatial construct with a uniform development trend’.

First, it consists of wide rural areas (e.g. East Westphalia) as well as of many large cities along the Rhine and the industrial densely-populated polycentric metropolitan Ruhr area (*Ruhrgebiet*) with a population of around 5.4 million (Kommunalverband Ruhrgebiet, 2001, p. 3). Correspondingly, the *Land* in generalisation comprises both the more conservative rural population as well as the urban population with a tendency to electorally favour left-wing parties.<sup>290</sup> According to NRW’s former Minister President Karl Arnold ‘North Rhine-Westphalia is the social conscience of the Federal Republic’ (Hüwel, 2005b) with the Ruhr area also seen as the heartland of the Social Democratic Party.

Secondly and closely linked, the *Land* is also composed of both wealthy parts and areas with high unemployment rates that are normally rather attributed to East Germany. This concerns in particular the former industrial powerhouse of the Ruhr area, which now hosts the city with

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<sup>289</sup> Data are from 2002 (Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen, 2004, p. 58).

<sup>290</sup> Following a right-wing swing at the regional election (*Landtagswahlen*) in May 2005, the Social Democrats (SPD) lost however several urban constituencies to the conservative Christian Democrats (CDU) such as Düsseldorf, Wuppertal and so on. With the exception of constituencies in Cologne (I, III, VI and VII), Minden (Minden-Lübbecke II) and Bielefeld (I), only the Ruhr Area remained a red Social Democratic stronghold in North Rhine-Westphalia (confer an election map, e.g. by Grobusch, 2005). The winning party for the cities at the centre of this study in these elections are as follows: Aachen city I+II and county I+II (CDU); Dortmund I-IV (SPD); Duisburg I-IV (SPD); and Düsseldorf I-IV (CDU).

the highest unemployment in West Germany: Gelsenkirchen with an unemployment rate of 17.1 % in September 2002.<sup>291</sup>

Finally, it hosts agriculture and in particular a legacy of traditional industries such as coal mining, steel, chemicals and textiles but at the same time is breeding high-tech businesses and industries.<sup>292</sup> Obviously then, huge differences exist between the various counties, which to some extent mirrors the North-South and East-West divide in Germany. This makes it so interesting to investigate this Land.

*Figure 20 North Rhine-Westphalia in Europe*



Source: <http://www.cordis.lu/nordrhein-westfalen/intro.htm>

After decades of arguably slow structural change following the general trend from an industrial towards a service and knowledge society, North-Rhine Westphalia's economy is

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<sup>291</sup> The unemployment rate is given for 30.09.2002 as per centage of the total number of dependent civil employed persons comprising those obligatory to pay social insurance, officials and the unemployed (but excluding the self-employed and supporting family members). The statistics are taken from the annual sub-regional compilation *Kreisstandardzahlen* (Landesamt für Datenverarbeitung und Statistik Nordrhein-Westfalen, 2002), available via <http://www.it.nrw.de/statistik/querschnittsveroeffentlichungen/index.html> . Gelsenkirchen's unemployment figure at the end of September 2007 was 16.3%.

<sup>292</sup> This legacy is likely also the reason why 22 headquarters of Germany's 50 largest companies are located in North Rhine-Westphalia according to a presentation by GfW Nordrhein-Westfalen entitled "NRW – The economic powerhouse of Europe" of 07.10.2002, page 7.

now mainly driven by services, which nowadays contribute over 70% of the gross value added.<sup>293</sup> Yet, the region's *traditional industrial legacy* in particular of the Ruhr area with mining, steel-working, and textiles is still reflected today in the region's strength in classical industrial sectors such as the automotive, energy, chemical and mechanical engineering industry as well as metalworking and its production. This is also reflected in the cluster mapping from the European Cluster Observatory (see Table 21 on page 249), which identifies seven strong ('3-star') clusters for North Rhine-Westphalia, all of which in traditional sectors (production technologies, metal and building fixtures). However, there is a number of relatively *new key sectors* that have emerged within the last two decades such as media and telecommunications, especially in the Rhine axis of Düsseldorf, Cologne and Bonn (Collinge & Schierenbeck, 2004, p. 16), information and communication technologies (ICT); logistics; and biotechnology.<sup>294</sup>

Rehfeld (1995, p. 93) also identifies new production clusters for the Ruhr area, which include automotive components production, the emergence of environmental technologies and waste management, and transportation services that are linked to the classical clusters of mining, steel industry, chemicals and electricity.<sup>295</sup> Similarly, Roland Berger Strategy Consultants (1998, p. 5) identify the following six clusters or competency fields (*Kompetenzfelder*):

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<sup>293</sup> Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen (accessed 27.05.2004) at <http://www.mwa.nrw.de/wirtschaft/standort/daten/daten.htm>

<sup>294</sup> For a more detailed socio-economic analysis of North Rhine-Westphalia see, for example, Bross & Walter (2000); the SWOT analysis featuring in North Rhine-Westphalia's Objective 2 Single Programming Document (Landesregierung Nordrhein-Westfalen, 1999, pp. XII-XIII and 189-216); the indicators by the EU's third report on economic and social cohesion (European Commission, 2004b); Koschatzky's study (2004) on innovation and future potential; and the report by Roland Berger Strategy Consultants (2001) identifying North Rhine-Westphalia's core competency fields. Furthermore, confer Interview No. 29, transcript pages 1-2 and 4-5

<sup>295</sup> Nearly a decade later, Rehfeld et al. (Institut für Arbeit und Technik, 2004) identify the following six strategic activity fields: materials and their applications, logistic system, medical and biotechnological applications, IT-based system integration, knowledge-based services and sustainable resource management.

energy, transportation/logistics, information and communication, new materials, Microsystems technology, and medical technology.<sup>296</sup>

### ***North Rhine-Westphalia's public administrative structures***

The 'hyphen State' (Hüwel, 2005b) of North Rhine-Westphalia was created on 23<sup>rd</sup> of August 1946 by the British Military government out of the northern part of the Prussian Rhine Province and the Province Westphalia, while the Land Lippe-Detmold joined a year later (Die Präsidentin des Landtags NRW, 1993, p. 4).

The federal public administrative structure for Germany (see Knemeyer, 2001, p. 172) with shared sovereignty has already been outlined above (cf. Table 20). It is characterised by subsidiarity and decentralisation to the effect that important functions such as education and regional policy and planning are allocated to the *Länder* and local authorities are being given the right for autonomous self-administration.

Nowadays, there are in total 396 municipalities in North Rhine Westphalia, of which 23 are larger cities with the status of non-county (metropolitan) municipality (*Kreisfreie Stadt*), i.e. equal to and not subordinate to a county (see Die Präsidentin des Landtags NRW, 1993, p. 5; Kost, 2003, p. 198). The remaining 373 municipalities are subordinate to 31 counties (*Kreis*).

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<sup>296</sup> The study is available at [http://www.mwmev.nrw.de/cgi-bin/mwmev/lib/pub/object/downloadfile.cgi/Gesamttext\\_neu.pdf?lang=1&ticket=guest&oid=6726](http://www.mwmev.nrw.de/cgi-bin/mwmev/lib/pub/object/downloadfile.cgi/Gesamttext_neu.pdf?lang=1&ticket=guest&oid=6726)



Table 22 North Rhine-Westphalia's public administrative structure

Five governmental administrative districts ( <i>Regierungsbezirk</i> )	Düsseldorf	Cologne ( <i>Köln</i> )	Münster	Detmold	Arnsberg	Total number (for five districts)
Metropolitan cities, non-county municipalities ( <i>Kreisfreie Stadt</i> )	10	4	3	1	5	23
Counties ( <i>Kreis</i> ), <i>which include:</i>	5	8	5	6	7	31
Cities ( <i>Stadt</i> )	38	56	43	49	57	243
Municipalities ( <i>Gemeinde</i> )	18	39	32	20	21	130
Total number of municipalities (excluding counties)	66	99	78	70	83	396

Source: Own creation based on the official administrative identification codes of the municipalities of North Rhine-Westphalia provided by the Landesamt für Datenverarbeitung und Statistik Nordrhein-Westfalen (2002).

According to Kost (2003, pp. 198-199), there were a total of 207 municipalities in North Rhine Westphalia in 1998 that can be labelled as cities (with a population above 20,000), of which 30 are larger metropolitan cities (with a population above 100,000). Cologne is the biggest of the metropolitan cities (with a population of 965,000), while the capital of North Rhine-Westphalia, Düsseldorf, is the 4<sup>th</sup> biggest city (with a population of around 570,000). The population for the other relevant cities at the centre of this study are as follows: Dortmund (3<sup>rd</sup> biggest with a population of 594,000 just behind Essen with 606,000), Duisburg (5<sup>th</sup> biggest with 526,000), and Aachen (13<sup>th</sup> with 245,000).<sup>297</sup>

<sup>297</sup> See also Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen (accessed 27.05.2004) at <http://www.mwa.nrw.de/wirtschaft/standort/daten/daten.htm>

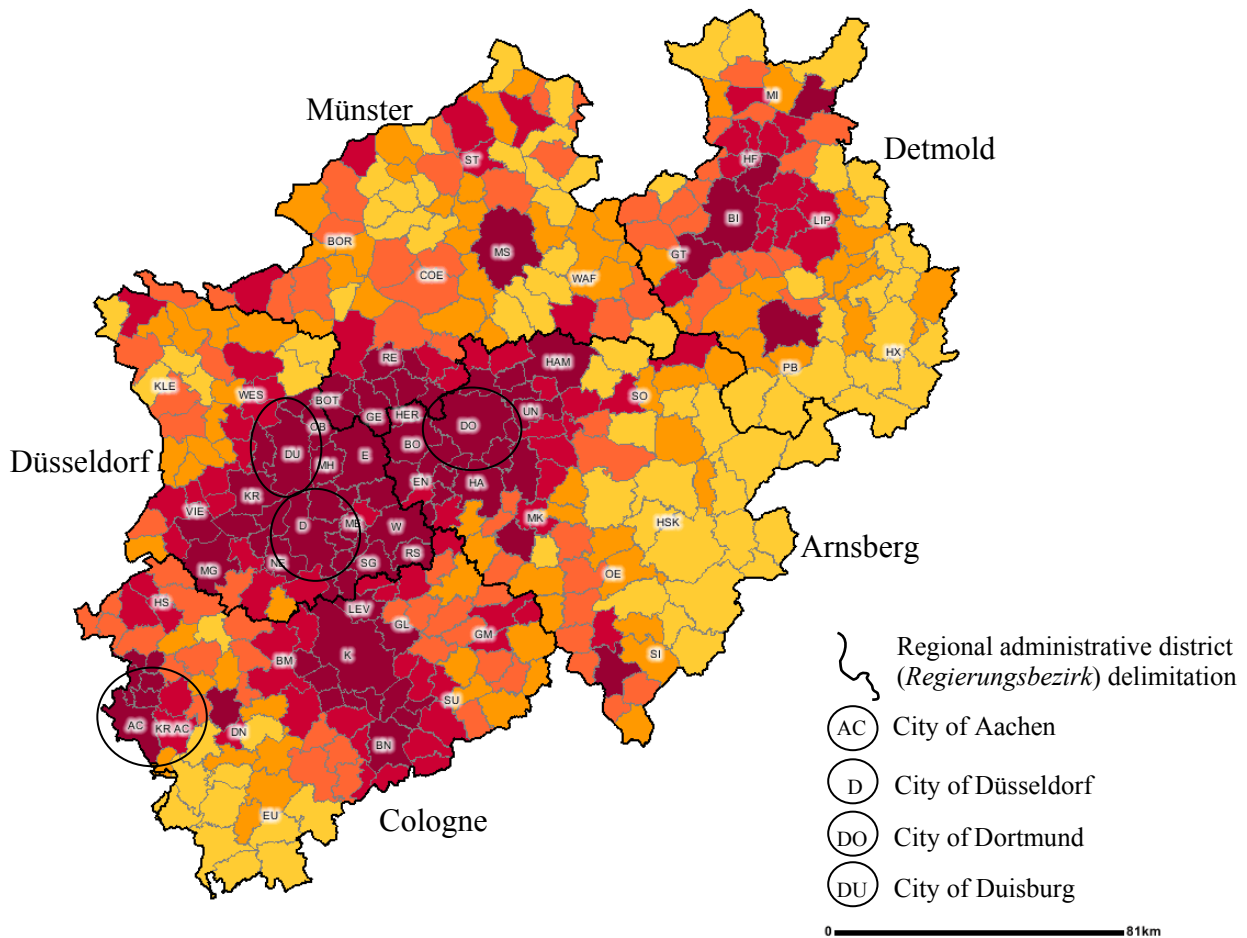
North Rhine-Westphalia's council legislation for local authority self-administration is classified as belonging to the North German type of council legislation – together with Lower Saxony. It is a British-based monistic system (Knemeyer, 2001, p. 175) that is characterised by a strong council and (lord) mayor, and a comparative weak head of administration (Wehling & Kost, 2003, pp. 10-11).

Specific to North Rhine-Westphalia is that it is amongst the larger *Länder*, who have also an additional tier of regional associations of local authorities or intermediate administrative districts under a district commissioner that execute certain control functions for the *Länder*. There are five intermediary governmental administrative districts (*Regierungsbezirke*) in North Rhine-Westphalia, namely Arnsberg, Detmold, Düsseldorf, Köln and Münster (see Figure 21) – besides the two additional landscape associations of the Rhine land and of Westphalia-Lippe (cf. Kost, 2003, pp. 200 and 218).<sup>298</sup> Although their existence is contested, they are said to relieve Ministries from some day-to-day duties (Wehling & Kost, 2003, p. 16). There have also been some proposals (cf. Blotevogel, 2001; Hüwel, 2005a; Kost, 2003, p. 218) to restructure the intermediary level by creating only three intermediary regional associations, e.g. Rhine land (seat proposed to be located in Cologne), Ruhr area (Essen) and Westphalia (Münster).

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<sup>298</sup> A further intermediary governmental administrative district (*Regierungsbezirk*) of Aachen existed until 01.08.1972, when it was resolved and integrated into the governmental administrative district of Cologne (Landesamt für Datenverarbeitung und Statistik Nordrhein-Westfalen, 2008, p. 30).

Figure 21 North Rhine-Westphalia's five administrative districts and the four case city-regions



Source: Own creation based on map provided by the 'Nordrheinwestfalen Regionalstatistischer Online-Atlas NRW' of the Landesamt für Datenverarbeitung und Statistik, available at <http://www.statlas.nrw.de>  
 Note: Colouring indicates population density of 2006.

### ***North Rhine Westphalia's economic and innovation performance***

North Rhine/Westphalia is the most populated of the 16 German *Länder* with a population of roughly 17 million. Representing 21.9% of the total German population and 20.9 % of the German workforce, North Rhine-Westphalia produces around a fifth (22%) of Germany's gross value added (Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen,

2004, p. 58).<sup>299</sup> It also has a similar representative share of Germany's gross domestic product (GDP), which was 22% in 2002, and 21.9% in 2003, representing a total of 466.878 billion EUR at current prices. North Rhine-Westphalia exported goods and service in the value of 113.7 billion EUR in 2002, 17.5 % of Germany's total exports.<sup>300</sup>

*Table 23 Regional gross domestic product (GDP) per capita in Germany (1991 until 2007)*

Gross Domestic Product (GDP) per capita (inhabitants) – in current prices (EUR) – Germany 1991-2007 according to Federal States																	
Year	BW	BY	BE	BB	HB	HH	HE	MV	NI	NW	RP	SL	SN	ST	SH	TH	D
1991	23.430	22.724	18.427	7.660	26.838	33.845	24.419	7.470	18.890	<b>21.184</b>	19.301	19.231	7.597	7.139	19.304	6.625	<b>19.186</b>
1992	24.274	23.946	20.185	9.638	27.772	35.015	25.566	9.497	19.803	<b>22.069</b>	19.801	19.921	9.618	9.146	20.188	9.083	<b>20.431</b>
1993	23.729	24.012	21.545	11.758	27.900	35.848	25.663	11.550	19.981	<b>22.035</b>	19.588	19.561	11.784	11.319	20.463	11.215	<b>20.872</b>
1994	24.564	24.896	22.246	13.719	29.100	37.022	26.422	13.617	20.716	<b>22.688</b>	20.262	20.557	13.875	13.144	21.089	13.208	<b>21.871</b>
1995	25.358	25.523	23.024	15.036	29.805	37.977	27.146	14.965	20.858	<b>23.443</b>	20.940	21.527	15.287	14.038	21.800	13.933	<b>22.636</b>
1996	25.749	25.907	22.707	15.656	29.980	38.761	27.728	15.586	20.883	<b>23.441</b>	20.918	21.011	15.934	14.680	22.058	14.532	<b>22.909</b>
1997	26.180	26.472	22.560	16.017	31.081	40.010	28.117	15.940	21.186	<b>23.929</b>	21.277	21.484	16.087	15.261	22.359	15.167	<b>23.346</b>
1998	26.948	27.563	22.721	16.257	31.702	41.106	28.580	16.078	21.884	<b>24.545</b>	21.576	22.015	16.371	15.642	22.579	15.587	<b>23.960</b>
1999	27.700	28.405	22.970	16.822	32.083	41.493	29.720	16.605	22.197	<b>24.802</b>	22.108	22.383	16.871	16.041	22.859	16.232	<b>24.511</b>
2000	28.343	29.487	23.161	17.298	33.426	42.423	30.223	16.859	22.767	<b>25.236</b>	22.587	23.125	17.031	16.437	23.309	16.638	<b>25.095</b>
2001	29.309	30.090	23.244	17.695	34.419	44.403	31.204	17.342	22.904	<b>25.622</b>	22.531	23.566	17.731	16.937	23.775	17.212	<b>25.664</b>
2002	29.350	30.671	23.210	18.015	35.277	44.907	31.407	17.624	22.795	<b>25.944</b>	23.042	23.691	18.632	17.848	23.331	17.666	<b>25.984</b>
2003	29.521	30.797	23.035	18.213	35.892	44.980	32.145	17.906	22.961	<b>26.073</b>	23.165	23.938	19.188	18.166	23.544	18.221	<b>26.221</b>
2004	29.843	31.611	22.899	18.791	36.685	45.677	32.662	18.452	23.399	<b>26.734</b>	23.857	25.170	19.864	18.749	23.916	18.876	<b>26.802</b>
2005	30.102	32.155	23.295	19.122	37.191	46.869	33.261	18.609	24.091	<b>27.074</b>	23.896	26.416	20.001	19.084	23.995	19.118	<b>27.219</b>
2006	31.441	33.240	23.699	19.668	38.198	48.647	34.414	19.206	24.908	<b>28.040</b>	24.639	27.329	20.759	19.833	24.701	19.887	<b>28.194</b>
2007	32.840	34.716	24.536	20.678	40.014	50.557	35.701	20.352	25.864	<b>29.396</b>	25.791	28.782	21.828	20.988	25.489	20.926	<b>29.465</b>

Source: Working group "National income accounts for the regions" (*Arbeitskreis "Volkswirtschaftliche Gesamtrechnung der Länder - VGR d L"*) of the National and Regional Statistical Offices (*Statistische Ämter des Bundes und der Länder*), made available at [http://www.vgrdl.de/Arbeitskreis\\_VGR/tbIs/tab01.asp](http://www.vgrdl.de/Arbeitskreis_VGR/tbIs/tab01.asp)

Note: Results according to ESVG 1995. Inhabitants as of 30.06.2007. Results for the Federal State of North Rhine-Westphalia (NW) and for Germany (D) are highlighted in bold. The other Federal States are Baden-Württemberg (BW), Bavaria (BY), Berlin (BE), Brandenburg (BB), Bremen (HB), Hamburg (HH), Hesse (HE), Mecklenburg-West Pomerania (MV), Lower Saxony (NI), Rhineland-Palatinate (RP), Saarland (SL), Saxony (SN), Saxony-Anhalt (ST), Schleswig-Holstein (SH), Thuringia (TH).

<sup>299</sup> North Rhine-Westphalia's workforce was 7,620,000 in 2002 (Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen, 2004, p. 58).

<sup>300</sup> Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen (accessed 27.05.2004) at <http://www.mwa.nrw.de/wirtschaft/standort/daten/daten.htm>

In terms of GDP per capita (see Table 23), North Rhine-Westphalia ranks 6<sup>th</sup> most prosperous region amongst the 16 Federal States, behind the City-states of Hamburg and Bremen, the State of Hesse, and the southern States of Bavaria and Baden-Württemberg. However, since 2001, North Rhine-Westphalia not only performs below the the average for Western Germany – excluding the new *Länder* – but also below Germany’s overall national average.

Remarkable is North-Rhine-Westphalia’s share of the Foreign Direct Investment (FDI) into Germany. Its central location and good infrastructure are amongst the reasons why NRW attracted around 35% of all FDI that came to Germany in the last years.<sup>301</sup> There is a strong concentration of Japanese FDI in the *Land* and in Düsseldorf in particular (see Gesellschaft für Wirtschaftsförderung Nordrhein-Westfalen mbH, 2000; Legewie, 1995).<sup>302</sup>

North Rhine-Westphalia’s overall economic performance and unemployment can be regarded as about average among the 16 individual Federal States (*Länder*) within Germany (see Statistisches Bundesamt et al., 2004, p. 114). Mirroring Germany’s recent general economic recession and persisting structural weakness in the labour market, North Rhine-Westphalia has to cope with a relatively high unemployment rate of 10.1 % in 2002 (Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen, 2004, p. 58).<sup>303</sup> While this rate was below the national average of 10.8%, it was well above the 8.5% average of the “old” *Länder* from the former West Germany (Statistisches Bundesamt et al., 2004, p. 114).<sup>304</sup>

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<sup>301</sup> Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen (accessed 27.05.2004) at <http://www.mwa.nrw.de/wirtschaft/standort/daten/daten.htm>

<sup>302</sup> Confer also Interview No. 29, transcript pages 12

<sup>303</sup> Unemployment rate measured in relation to the dependent civil employed persons as opposed to the ILO measure.

<sup>304</sup> In comparison, the southern States of Baden-Württemberg and Bavaria had Germany’s lowest unemployment rates of 6.1% and 6.9% respectively.

According to the institute for economic research 'RWI', R&D expenditure in NRW only amounts to 1.77 % of GDP in 2001 in contrast to 3.9 % in Baden-Württemberg, for example, and compared to the national average of 2.52% as outlined by the 2002 EIS (European Commission, 2002a, p. 24). The main reason put forward for this difference is that the core of NRW's economy lies not in growing and R&D intense sectors (Schrörs, 2005).

The German Patent and Trademark Office (*Deutsches Patent- und Markenamt*) identified a ratio of 43 patents per 100,000 inhabitants for North Rhine-Westphalia in 2004 (see Fischer, 2005). Despite its 6th rank out of the 16 German *Länder*, North Rhine-Westphalia's patent output was well below the national average of 59 patents per 100,000 inhabitants, mainly due to the high averages of Germany's two technological leading regions of Baden-Württemberg (ratio of 121) and Bavaria (109).<sup>305</sup>

The 2002 European Innovation Scoreboard (European Commission, 2002a) as stated earlier displays only a below average score of selected regional innovation indicators for North Rhine-Westphalia when indexed to Germany's mean (European Commission, 2002b, pp. 10 and 16).<sup>306</sup> The 2006 Regional Innovation Scoreboard (European Commission, 2006) also highlights the *intra-regional differences* as it ranked 208 European regions according to their newly calculated Revealed Regional Summary Innovation Index (RRSII). Out of North Rhine-Westphalia's five regional administrative districts, only Cologne (19<sup>th</sup> rank with an RRSII score of 0.69) and Düsseldorf (74<sup>th</sup> rank / 0.49) showed an above average innovation

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<sup>305</sup> Greif (1998, pp. 18, 125 and 148) identifies an average of 37.7 patent applications per 100,000 inhabitants for NRW for the period 1992-1994, representing the fifth rank amongst the 16 *Länder* and 22.3% of the total German patent applications. The gap to the leading regions and hence to the national average (38.1 for 1992-1994) therefore seems to have widened in recent years.

<sup>306</sup> The RRSII is calculated as the unweighted average of the regional national summary innovatin index (RNSII) and the regional European summary innovation index (REUSII), which are the average indicator values indexed to the country mean or EU mean respectively.

performance, while Arnsberg (103<sup>rd</sup> / 0.43), Detmold (105<sup>th</sup> / 0.43) and Münster (117<sup>th</sup> / 0.41) only manage average scores.<sup>307</sup>

The midterm report of the ESPON programme (European Spatial Planning Observation Network, 2005) gives a useful indication of the *Land's* economic and innovation performance in comparison to the EU-27 plus Norway and Switzerland. It comprises the following selected research results for North Rhine-Westphalia's territorial development:

- an 'average', and 'moderately below average', degree of *economic success* (in terms of GDP per capita in PPS in 2002, and GDP per capita growth between 1995 and 2002)<sup>308</sup>; (ibid., p. 27 and cf. p. 19)
- an 'average', and 'moderately below average', degree of *regionalised Lisbon performance* (as an aggregate of five indicators<sup>309</sup>); (ibid., p. 23)
- an 'average' degree of *efficiency of labour market* (i.e. seven indicators with regards to unemployment rates and employment distribution); (ibid., p. 29)
- an 'above average' (i.e. strongest) degree of *potential accessibility* (i.e. five indicators concerning road, rail and air transport); (ibid., p. 33)
- an 'average', and 'moderately above average', degree of *spatial concentration* (i.e. four indicators of settlement structures, e.g. population in agglomerated, densely populated or rural regions)<sup>310</sup>; (ibid., p. 43)

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<sup>307</sup> In comparison, the top innovating region of Stockholm and the 3rd placed Upper Bavaria (Oberbayern) reached RRSII scores of 0.90 and 0.79 respectively.

<sup>308</sup> The southwest of North Rhine-Westphalia displays an 'average' degree, while the northeast shows a 'moderately below average' degree of economic success.

<sup>309</sup> The *five indicators* for the degree of 'regionalised Lisbon performance' – referring obviously to the EU's Lisbon Strategy – used by ESPON (European Spatial Planning Observation Network, 2005, p. 22) are: productivity (GDP per capita employed in 2002); employment rate (employed persons per total population aged 15-64 in 2003); expenditure on R&D (total of expenditure on R&D per total GDP in 2001); R&D Business Enterprise Sector (R&D BES personnel per total employment in 2001); and education level (highly educated population per total educated population in 2002). For more detail see also the ESPON programme website at <http://www.espon.lu>

<sup>310</sup> The southwest of North Rhine-Westphalia displays a 'moderately above average' degree of spatial concentration, while the more rural northeast shows an 'average', and in parts even a 'moderately below average', degree of spatial concentration.

While North Rhine-Westphalia's overall economic and innovation performance can consequently be described as average, the ESPON (2005) midterm report nevertheless considers the functional urban areas of Düsseldorf and Cologne (*Köln*) as strong Metropolitan European Growth Areas (MEGA).<sup>311</sup> The report classifies the two areas as being part of the second strongest MEGA category of 17 cities labelled as European engines that 'are relatively large, competitive and often have a strong knowledge base, but tend to be weaker, either in terms of the number of inhabitants or accessibility' (ibid., 2005, p. 20) than the first category of the two Global Cities of London and Paris as the strongest MEGAs.

ESPO's (ibid., pp. 55-58) thematic review on innovation and research development also highlights the *stark divergence* between the northeast and the southwest of North Rhine-Westphalia in terms of innovation capacity and human capital.<sup>312</sup> While the southwest – consisting of the administrative regions (*Regierungsbezirke*) of Düsseldorf and Cologne including the so-called 'ABCD' triangle of cities (of Aachen and the Rhine axis of Bonn-Cologne-Düsseldorf) – exhibits a 'high' degree of importance of R&D, the northeast –

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<sup>311</sup> The ESPON programme (ibid., p. 18) investigated 1595 Functional Urban Areas (FUAs) – i.e. nationally defined Ravel to Work Areas (TTWAs) within 29 countries of the European urban system, of which the most powerful ones (measured by demographic mass, competitiveness, connectivity and knowledge base) are considered as Metropolitan European Growth Areas (MEGA). A total of 76 MEGAs are then further distinguished into the five categories according to their performance. Besides the two Global Cities of London and Paris as the strongest MEGAs, 17 cities were identified as European engines. 7 out of these 17 are based in Germany, namely Munich, Hamburg, Berlin, Stuttgart, Frankfurt, Cologne and Düsseldorf (ibid., p. 57). Together with Milan, Madrid, Barcelona, Rome, Geneva, Brussels, Amsterdam, Vienna, Copenhagen, and Stockholm, they form the core of the economically and functionally dominant so-called 'Pentagon' area (European Spatial Planning Observation Network, 2005, pp. 17 and 10) akin to the traditionally as 'blue banana' defined European agglomeration core (see Nerb, Reuter, & Russ, 1992, pp. 13-15; Rodriguez-Pose, 2001, p. 33).

<sup>312</sup> Although this divergence appears to be only displayed for the administrative regions, it is surmised that if the performance or importance of R & D would be displayed for Ruhr area (*Ruhrgebiet*) on its own, that it most likely would indicate a below average importance. The populous Ruhr area is not an own administrative region but split up into three parts that belong to the administrative regions of Düsseldorf, Münster and Arnsberg.



consisting of the administrative districts of Arnsberg, Münster and Detmold – instead displays only a ‘moderately below average’ importance of R&D (ibid., p. 57).<sup>313</sup>

This economic divergence (within the region) is also captured by the following statement by an official of the State chancellery of North Rhine-Westphalia:

‘North Rhine-Westphalia can be considered a ‘more prosperous’ region with an area still in need for funds to aid economic restructuring.’<sup>314</sup>

Although this can be seen as a political statement (in the quest for more European funding), it gives out two clear messages with regards to how North Rhine-Westphalia perceives themselves: as a prosperous region in the process of economic restructuring. Indeed, North Rhine-Westphalia has a whole history in attempting to pursue the economic restructuring of its region with varying success. Some of the endeavours are described next.

### ***Research and education infrastructure (HEI)***

Investments in the research and education infrastructure are mainly the responsibility of the individual *Länder* (see Table 20 above) and it is an area which North Rhine-Westphalia seemed to have viewed as an investment in the future. North Rhine-Westphalia is host to a specialised and very dense landscape of *further and higher education institutions* that comprises around 50 higher education institutions of universities, polytechnics and colleges

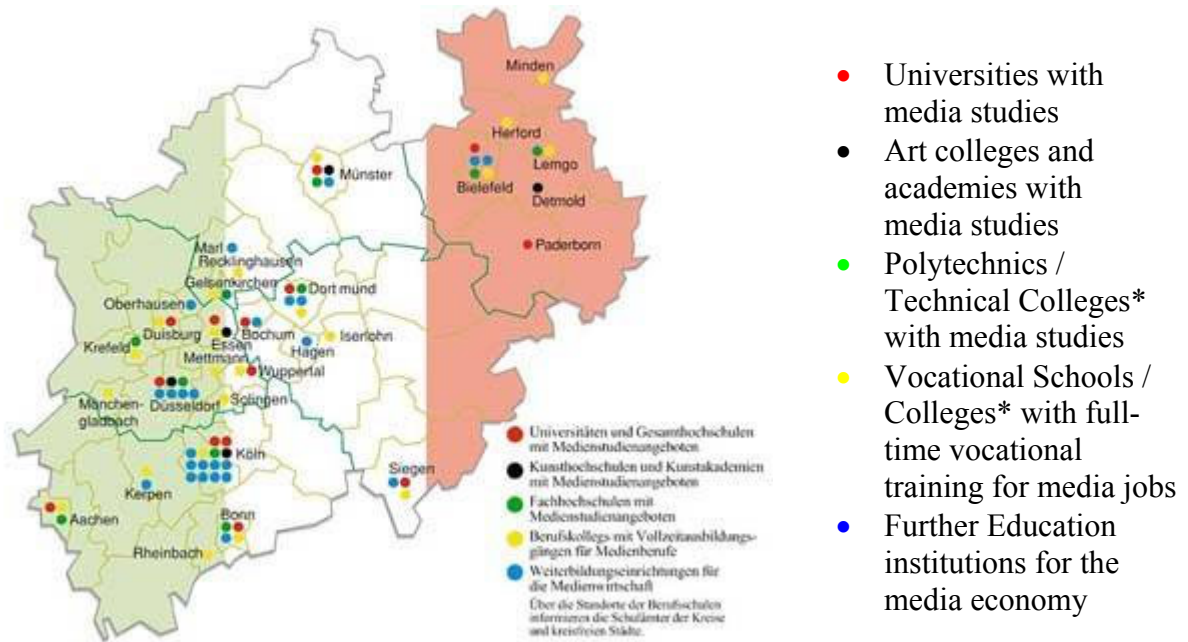
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<sup>313</sup> The degree of importance of research and development is measured as an aggregate of two standardised R&D indicators: expenditure of R&D, and personnel in BES as percentage of total personnel.

<sup>314</sup> Introduction quote of a seminar presentation paper by Johannes Grotz of the State chancellery, Representation of the State of North Rhine-Westphalia to the EU (*Staatskanzlei des Landes Nordrhein-Westfalen, Vertretung des Landes Nordrhein-Westfalen bei der Europäischen Union*) entitled “North Rhine-Westphalia’s Preliminary Position on the Third Cohesion Report” distributed following the seminar on “The implications of the Third Report on Economic and Social Cohesion and regional policy reform for the ‘more prosperous’ regions: networking for growth” on the 9th of March 2004 in Brussels (at the South East England House).

(Ministerium für Wirtschaft, Mittelstand und Technologie des Landes Nordrhein-Westfalen, 1995). While only 5 universities existed in North Rhine-Westphalia in the 1950s (Körfer & Latniak, 1994, footnote 7), the number has risen to 15 by the 1990s (Ministerium für Wirtschaft, Mittelstand und Technologie des Landes Nordrhein-Westfalen, 1995, pp. 421-423). This can be an important asset of the region influencing the creation of knowledge and innovation as, for example highlighted by Collinge & Schierenbeck (2004, pp. 23-32) in the case of the media cluster in Cologne. The following figure illustrates this at the example of the depth of media-related course offered at the *Land* level.

Figure 22 North Rhine-Westphalia's higher and further education landscape for media



\* Note: The German *Fachhochschulen* can best be compared to the former British Polytechnics. They are specialised higher education institutions, which generally offer relatively focused and practical courses of study, in particular for areas of technology, social and natural sciences, and art. The German *Berufskollegs* or *Berufsschulen* are Vocational Schools or Colleges, who provide vocational training courses are part of what is known as the 'dual education system'. Trainees follow a two or three year apprenticeship with practical on the job training, while they in parallel also attend study courses two days a week, or alternatively weekly blocks of seminars, at a Vocational College. At the end of the training period, trainees are awarded a Professional Qualifications following a final examination at the Chamber of Commerce (*IHK*) or Handicrafts (*HWK*).

Source: Own translation and following explanations (as featured in Collinge & Schierenbeck, 2004, p. 26) to the legend of the diagram by the Ministerium of Labour, Social Affairs, Qualifications and Technology of the *Land* North Rhine-Westphalia (Ministerium für Arbeit und Soziales, 2000, p. 19); while the image itself was taken from <http://www.aim-mia.de/images/topics/aim/nrw-map.jpg> at <http://www.aim-mia.de/article.php?sid=916&mode=nocomments&catid=36&topic=1&auswahl=1>

Building up a knowledge infrastructure with the foundation of several new universities in the 1960s and 1970s was part of North Rhine-Westphalia's strategy in tackling structural economic change (Körper & Latniak, 1994). However, while the *Land* is producing an over-proportional share of nearly a third of all German graduates (Ministerium für Wirtschaft, Mittelstand und Technologie des Landes Nordrhein-Westfalen, 1995, see table 3.9 b on p.

414), critics point out though that it does so very much for other *Länder* too (Unknown, 2001).<sup>315</sup> The pattern of universal coverage of disciplines by many institutions of the higher education landscape and thus limited focus upon core competencies (and consequent shortness of universities with an elite status) has also been criticised. Yet, the *Land's* share of students in Engineering sciences, for instance, was 33.15% (Ministerium für Wirtschaft, Mittelstand und Technologie des Landes Nordrhein-Westfalen, 1995, see table 3.9 b on p. 414).

In addition, North-Rhine Westphalia hosts several further *research institutions*. In the 1990s, there were three large research laboratories<sup>316</sup>, 11 Max-Planck-Institutes, 6 Fraunhofer Institutes, 41 university research institutes, 30 research and development centres that were complemented by an abundance of technology transfer institutions at universities, the chambers and individual technology and start-up centres (Ministerium für Wirtschaft, Mittelstand und Technologie des Landes Nordrhein-Westfalen, 1995, see pp. 424-427, 431-437 and cover). By 2002, the number of Fraunhofer Institutes for applied research had risen to 13. The following Figure 23 shows the density of NRW's scientific and research infrastructure.

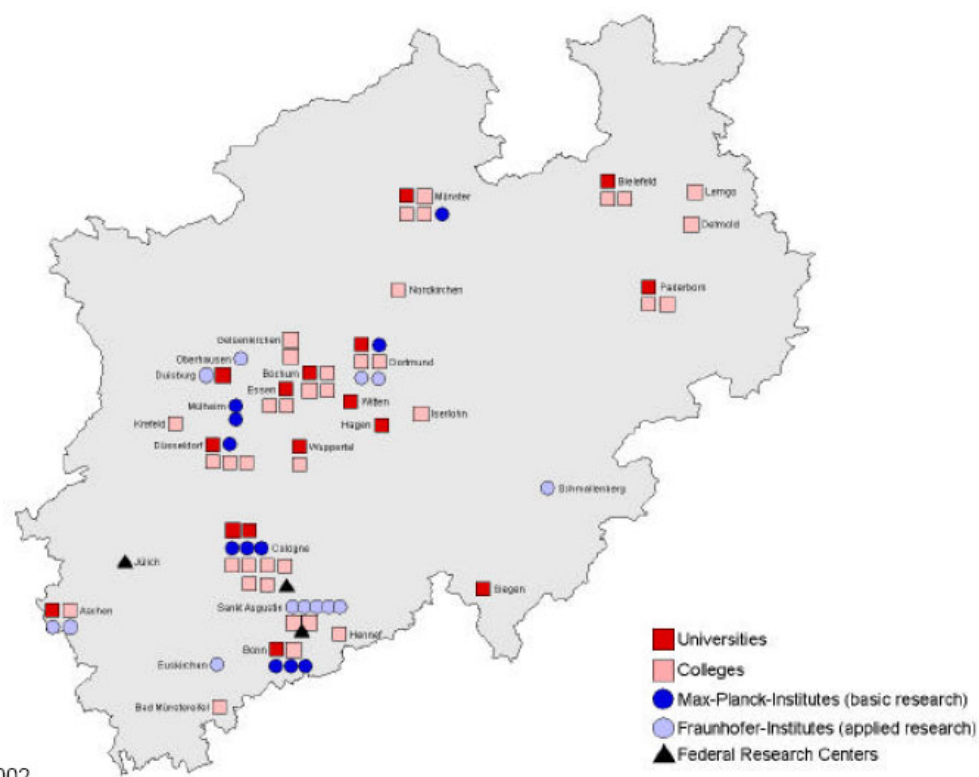
Despite the density and scope of North Rhine-Westphalia's research infrastructure, excellence appears to be lacking given the rather average transformation into regionalised innovation performance as measured by the 2006 Regional Innovation Scoreboard (European Commission, 2006) described above.

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<sup>315</sup> The share of North Rhine-Westphalia's students in 1990/91 was, for instance, 30.31% of all German students (Ministerium für Wirtschaft, Mittelstand und Technologie des Landes Nordrhein-Westfalen, 1995, see table 3.9 b on p. 414).

<sup>316</sup> This includes the Jülich Research Center, the German Center for Aeronautics and Space (DLR) and the GMD Institute – Germany's national research center for mathematics and information technology.

Figure 23 North-Rhine Westphalia's scientific and research infrastructure



data: as of March 2002

Source: GfW Nordrhein-Westfalen, presentation entitled “NRW – The economic powerhouse of Europe” of 07.10.2002, page 35

### *North Rhine Westphalia's innovation policy*

This section covers two main aspects of North Rhine-Westphalia's innovation policy approach. First it presents a brief historic overview of economic development policies over the last 40 years that aimed to support the economic structural reform of the region. It thus presents strategies, programmes and instruments applied to support businesses activities and innovativeness. The second part highlights some of the key actors within the broad governance infrastructure that are involved in economic development and innovation policy formulation and implementation.

*North Rhine Westphalia history of technology policy in attempting structural change*

North Rhine-Westphalia is often portrayed as ‘the classical *Land*’<sup>317</sup> of the *Rhine capitalism* (Albert, 1993) or Rhine model of economy culture, i.e. the corporatist system of cooperation and consensus orientation (Abelshauser, 2004, p. 449; Hoppe, 2000, p. 264; Humphreys, 1989, pp. 130-131). For instance, the evaluation (Brandherm, Hausmann, Müller, Notz, & Scholten, 1994, p. 75) of the operational programme for the Objective-2-areas in North Rhine-Westphalia (for the first phase of ERDF<sup>318</sup> 1989-1992) also states that the cooperation between the Land and relevant regional actors is a ‘constitutive element’ of the structural and labour market policies in North Rhine-Westphalia.

This consensus orientation was epitomised by the self-proclaimed underlying leitmotiv of NRW’s former Minister President Johannes Rau during his twenty years of term in office (cf. Appendix VII), which was ‘to reconcile not divide’ (“*Versöhnen statt spalten*”). This comprised the attempt to avoid a polarisation between the different heterogeneous territories and interests including, for instance, the iron rule that the four regions of the party districts are proportionally represented in the leading figures of the parliamentary part of the SPD (Seim, 2005). This long-lasting overall consensus-orientated policy approach can be described to have at least partly been drifted into an inherent political institutional sclerosis. The parliamentary opposition (CDU) denounced this approach ‘consensus towards nonsense’ (“*Konsens bis zum Nonsens*”).<sup>319</sup> Other critics, have also rephrased Rau’s leitmotiv in a

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<sup>317</sup> Interview No. 29, transcript page 2 and cf. Interview No. 33, transcript page 4 and

<sup>318</sup> ERDF is the European Regional Development Fund; the EU fund for support to EU regions.

<sup>319</sup> Interview No. 33, transcript page 4

derogatory way into ‘to spoil not divide’ (“*Verwöhnen statt spalten*”) <sup>320</sup>, which depicts the long-lasting tradition of providing a broad spread of support and funding equally to everybody just like pouring water out of one’s ‘*watering can*’. <sup>321</sup> However, over the last decade there appears to have been a turning away from this principle, which the following section illustrates.

North Rhine-Westphalia has a long tradition of innovation and technology policy measure as it has undergone a slow economic, social and ecological restructuring process as former heavily industrialised region. Following the arrival of economic problems in mining with the shut down of coal mines in 1957, the *Land* government established the first program of structural economic development policy for the Ruhr area ‘EPR’ (*Entwicklungsprogramm Ruhr*) in 1968 (Heinze et al., 1996, pp. 7-8 and 14-17).

A number of programmes followed (see Heinze et al., 1996, p. 41; Körfer & Latniak, 1994) such as the North Rhine-Westphalia program (*Nordrhein-Westfalen-Programm*) in 1970, the ‘technology program mining’ for the advancement of mining technology (*Technologieprogramm Bergbau, TPB* in short) and the ‘technology program energy’ for the advancement of power generation (*Technologieprogramm Energie, TPE* in short) both in 1974, and the ‘technology program steel’ (*Technologieprogramm Stahl, TPS* in short). Körfer & Latniak (1994, section 2, paragraph 7) summarise the focus of the policies until the mid 1970s as being aimed at ‘supporting modernization processes by supporting infrastructure development [e.g. the founding of universities], by avoiding lowering social consequences of the decline processes [i.e. subsidies (see Heinze et al., 1996, p. 19)] and – as new step in the

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<sup>320</sup> Interview No. 33, transcript page 2.

<sup>321</sup> Interview No. 44, transcript pages 7-8 and Interview No. 22, transcript page 5

1970s- by supporting technological change within the core areas of industry (coal, steel and power generation).

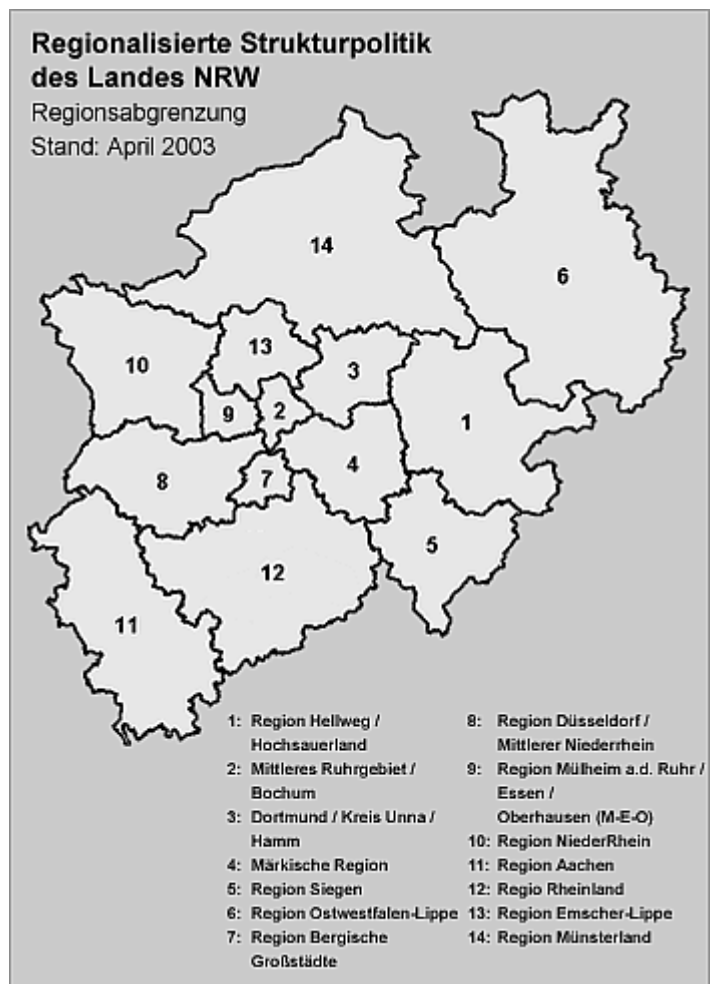
The ‘technology programme economy’ (*Technologieprogramm Wirtschaft, TPW* in short) was created in 1978, which supports individual or joint R&D project with a focus towards the market implementation phase (Bundesministerium für Bildung, 1996, pp. 201-206; Kreditanstalt für Wiederaufbau, 2000, p. 11 of supplemented annex). The ‘action program Ruhr’ (*Aktionsprogramm Ruhr*) followed in 1980 and the technology program for the advancement of ‘technologies of the future’ (*Technologieprogram Zukunftstechnologien, TPZ in short*) in 1984. This second wave of programmes widened its support to other sectors and SMEs as well as gave rise to founding of technology centres in the region with the Technologiezentrum Aachen being the first established in 1984 (Körfer & Latniak, 1994).

A third wave of programmes, namely the ‘initiative for the future of the coal and steel regions’ (*Zukunftsinitiative Montanregionen, ZIM* in short) in 1987 and the initiative for the future of NRW’s regions (*Zukunftsinitiative für die Regionen Nordrhein-Westfalens, ZIN* in short) in 1989, introduced a new practice of a decentralised policy approach (Asheim & Cooke, 1999, pp. 163-164; Kruse, 1990, pp. 132-134). This so-called ‘regionalised structural policy’ approach involved the setting up of corporatist intermediary ‘regional development conferences’ (*Regionalkonferenzen*) consisting of a broad range of stakeholders. These were asked to develop and propose by consensus ‘regional development concepts’ (*Regionale Entwicklungskonzepte, REK* in short) for the localities at sub-*Land* administrative level (see Figure 24). There have been an active debate and diverging evaluations and assessments concerning the effectiveness of this approach (Heinze & Voelzkow, 1997; Kremer & Pfeife,



1993; Ministerium für Wirtschaft, Mittelstand und Technologie des Landes Nordrhein-Westfalen, 1992a, 1992b; Ministerium für Wirtschaft, Mittelstand, Technologie und Verkehr des Landes Nordrhein-Westfalen, 1996; Ministerium für Wirtschaft und Mittelstand, Technologie und Verkehr des Landes Nordrhein-Westfalen, 1999; Ministerium für Wirtschaft und Mittelstand, Technologie und Verkehr Nordrhein-Westfalen, 1999; D. Rehfeld, Baumer, & Wompel, 2000; Voelzkow, 1993).

Figure 24 Spatial delimitations of the Regionalised Structural Policy in NRW



Source: Ministry for Economic Affairs and Employment of the Land North Rhine-Westphalia at <http://www.mwa.nrw.de/images/wirtschaft/regionalkarte.gif>, taken from <http://www.mwa.nrw.de/wirtschaft/strukturpolitik/regionen/regionen.htm>

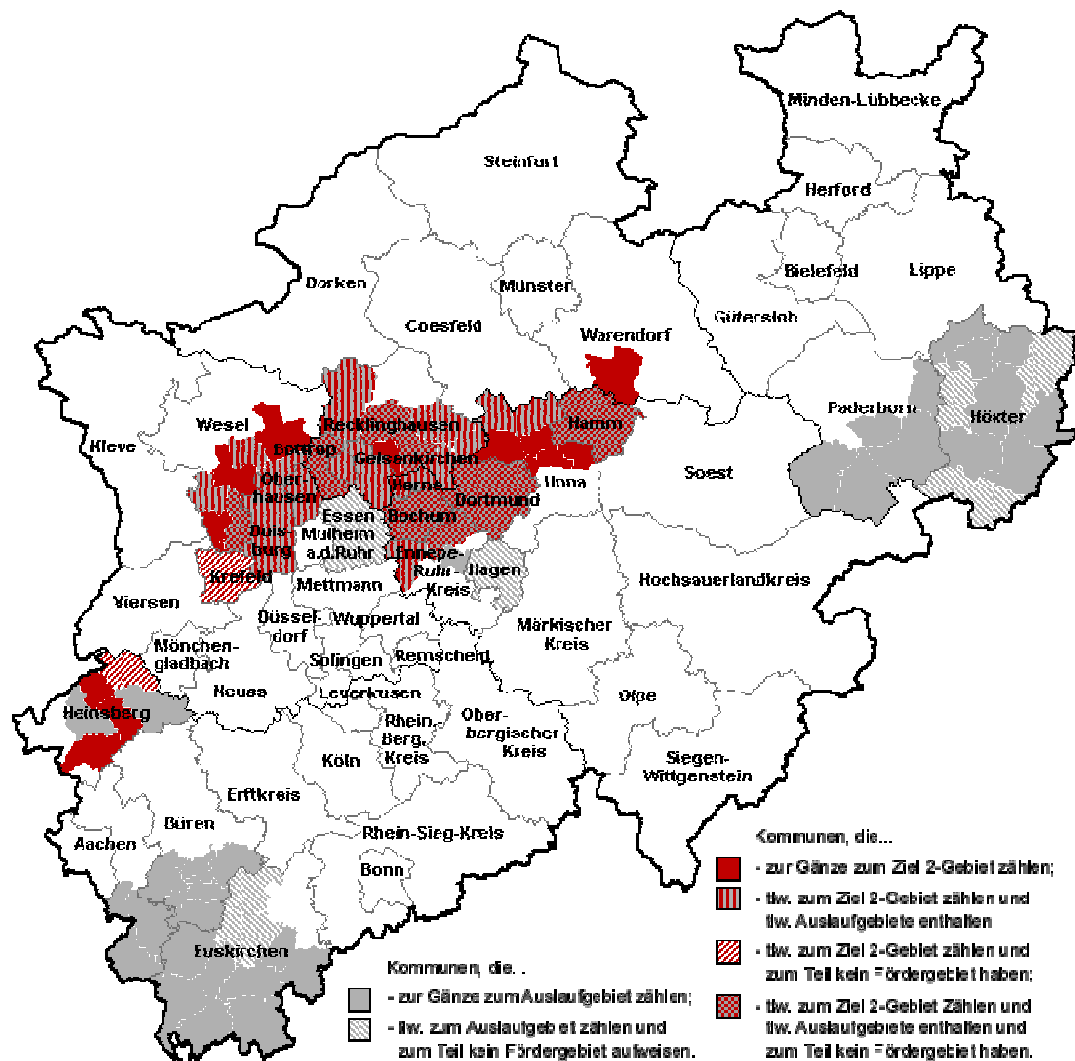
The main argument in favour of a *differentiated* regional structural policy is that the increasing complexity of determinants of economic development gave rise to divergent regional development dynamics, which require diverse policy approaches that consider the individual endogenous strength and weaknesses of localities (cf. Heinze et al., 1997, p. 13). While Waniek (1993) rejects the regionalised structural policy because it undermines the right for self-administration of municipalities and thus does not strengthen a decentralisation of structural policy; a different study by Efas is said to demand the institutional strengthening of regional conferences (cf. Heinze et al., 1997, p. 22).

The *Land* government (Ministerium für Wirtschaft und Mittelstand, Technologie und Verkehr Nordrhein-Westfalen, 1999, pp. 11-13) also provided a comprehensive review of 10 years of regionalised structural policy. (cf. also Landesregierung Nordrhein-Westfalen, 1999, pp. 265-268). While the review concludes that the approach was able to mobilise various interests and develop a culture of dialogue as well as ameliorate the flexibility and implementation of policy measures, it also points out that there is the need for some changes. The critical aspects of the review highlight the need for more concentration on regional strength, for new sub-level bodies as sources of new ideas, for more targeted policy measures, and for an integration of sustainable development aspects.

Heinze (1997, p. 21) also rightly points out that a decentralised policy approach implicitly assumes that the actors at the lower levels of governance have the institutional capacity to act and to decide. Indeed, this study argues that there is a critical institutional mass in order to constitute a governance system capable of a cooperative and coordinated (i.e. systemic) provision of a holistic and strategic approach for business and innovation support.

The various regional action programmes noted above were followed over the last 15 years by a series of Objective 2 programmes, which mean that together with other EU funding (notably from the community initiatives Rechar and Resider) a total of 6 billion Euro has been spent in North Rhine Westphalia since 1989 on economic development policy (Jakoby, 2006, p. 282).<sup>322</sup>

Figure 25 North Rhine-Westphalia's Objective 2 area (for the period 2000-2006)



Source: <http://www.ziel2-nrw.de/start.php>, under 'Programm-Info > Fördergrundlagen > Fördergebiete'

<sup>322</sup> Rechar and Resider were both Community Initiatives that supplemented the EU's Structural Fund during 1988-1999. While Rechar supported the adaptation to industrial change in coal-dependent regions, Resider supported the adaptation to industrial change in steel-dependent regions.

Following the above-mentioned reviews, structural policy in NRW has evolved into a fourth phase over the first decade of the new millennium that saw a shift away from the consensus-orientated policy approach to a more strategic cluster policy approach implemented through competitive bidding for funding, which the following section describes in more detail. The following table summarises the key strategic orientations for the different programme across four phases of structural policy in NRW over the past forty years:

Table 24 Overview of programmes and strategic focus of forty years of structural policy

1968-1977	1978-1986	1987-1999	2000-2013
Structural economic development policy for the Ruhr area (EPR) 1968-1973; North Rhine-Westphalia program since 1970; Technology programs for <b>mining, energy and steel</b> (TPB/TPE/TPS) since 1974.	Technology programme economy (TPW) since 1978; Action program Ruhr ( <i>Aktionsprogramm Ruhr</i> ) 1980-84; Technology program for the advancement of <b>technologies of the future</b> (TPZ) since 1984.	Initiatives for the future of the coal and steel regions (ZIM) since 1987 and for <b>NRW's regions</b> (ZIN) since 1989 <b>EU Structural Funds</b> Objective 2 and Community Initiatives Rechar and Resider 1989-1999; Sectoral and technological <i>Land</i> initiatives; Start up and growth initiatives NRW 'GO!', PFAU and 'MOVE'	<b>EU Structural Funds</b> Objective 2 2000-2006 and 2007-2013; <b>Regional competitions;</b> <b>Cluster initiatives</b>
Support for <b>modernisation</b> processes in coal, steel and power generation; Founding of new <b>universities</b> , <b>Subsidies</b> to avoid stark social consequences.	Initiating <b>active structural change</b> ; Support to SMEs for <b>individual or joint R&amp;D projects</b> with a focus on implementation/ Innovation; Founding of <b>technology centres</b> since 1984 and setting up of the centre for innovation and technology <b>ZENIT GmbH</b> .	Decentralised consensus-based <b>regionalised structural policy</b> (directed corporatism); Setting up of Inter-municipal regional development conferences for the development of <b>regional development concepts</b> (REK); Emscher Park International Building Exhibition ( <b>IBA</b> ) 1989-1999; <b>Sectoral initiatives</b> , support for <b>start-ups</b> and to <b>SMEs</b> ;	Sectoral and <b>cluster-based policy</b> as part of NRW's innovation strategy based on competences (strengthening regional strength); <b>Competitive bidding</b> (directed competition) for projects in developing clusters or competency fields ( <i>Kompetenzfelder</i> ); Top-down setting of <b>Projekt Ruhr GmbH</b> and later replacement by the the <b>regional development agency Ruhr metropole 'wmr'</b> under the Regional Ruhr Association (RVR)

Source: Own creation but partly based upon a similar figure for programmes for the Ruhr area only by Kommunalverband Ruhrgebiet & ISA Consult GmbH (2000, figure 1 on p. 4).

### *North Rhine Westphalia's strategic orientation for innovation and business support*

The over 500 pages long comprehensive Single Programming Document for the Objective 2-Area of North Rhine-Westphalia for the phase 2000-2006 (Landesregierung Nordrhein-Westfalen, 1999) provides a good source of information for the more recent strategic approach taken by the *Land* to achieve the programme's main aim of 'creating new and securing existing jobs, especially in SMEs, by the improvement of the region's competitiveness' (ibid., p. XV).<sup>323</sup> The main beneficiary of the Objective 2-Area is the Ruhr area as Figure 25 shows.

A strategic orientation on regional competences as part of a 'growth pact' agreed with the lord majors of the cities of the Ruhr area was the core behind the aim of reducing the area's high unemployment. It seems a particular incentive for a more focussed approach stemmed from the realisation by policy-makers that the 2000-2006 phase would be "last big chance" to make a difference following the then expected phasing out of Objective 2 funding in 2006 (Ministerium für Wirtschaft und Mittelstand, 2002).<sup>324</sup> In order to do so, it focuses the Structural Fund support of 881 million Euro for the 2000-2006 phase (ibid., p. XXVIII) upon the following four core priorities (ibid., p. XVIII, own translation):

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<sup>323</sup> The Objective 2 of the EU's Structural Fund concentrates upon '[s]upporting economic and social conversion in industrial, rural, urban or fisheries-dependent areas facing structural difficulties' by providing territorial funding from the European Regional Development Fund (ERDF) and the European Social Fund (ESF) (cf. European Commission, 2004I, p. 10).

<sup>324</sup> This expectation was also stated in the interviews and documents (e.g. Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, preface). However, North Rhine-Westphalia eventually received another contribution of 1.28 billion Euro from the Objective 2 Structural Fund programme for the period 2007-2013. See the European Commission's press release IP/07/799 of 12 June 2007, available at the Rapid database at <http://europa.eu/rapid> For more information about the EU's Regional/Cohesion Policy see [http://ec.europa.eu/regional\\_policy/index\\_en.htm](http://ec.europa.eu/regional_policy/index_en.htm)

1. Business and start-up finance
2. Innovation and competence development
3. Innovation orientated infrastructure development
4. Target group orientated support

The programme further outlines 12 *strategic orientations* for the implementation of programme measures, which include the following key concepts (ibid., pp. XIX and 258-276, own translation):

1. Developing visions and formulate leitmotifs
2. Initiative change of perception and mentality
3. Concentrate upon SMEs
4. Develop clusters/competency fields and sharpen regional profiles
5. Bundle themes and integrate policy portfolios
6. Achieve a comprehensive understanding of partnership
7. Include private businesses
8. Enable quality improvements through competition
9. Maintain flexibility during programme implementation
10. Embed sustainable development and equality as horizontal cross-cutting tasks
11. Improve evaluation and monitoring<sup>325</sup>
12. Contribute to the European Employment Strategy

A few of these strategic orientations have to be viewed as being very novel for policy-making in North Rhine-Westphalia. For instance, the introduction of competitive bidding for projects in developing clusters or competency fields (*Kompetenzfelder*) organised through the agency Projekt Ruhr GmbH created in 2000 by the *Land* government (ibid., pp. 417-418, to be discussed more later on) is to be seen as a clear turning away from the traditional consensus-

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<sup>325</sup> See also Jakoby (2006) for more information on North Rhine-Westphalia's history of evaluating policy.

based corporatist approach that was accompanied by a fairly equal provision of funding as with a ‘watering can’.

This new approach of focussing upon endogenous strength and instead of following blindly the imperative of coherence is to be seen as courageous. Its introduction was thus unsurprisingly faced with some resistance by sub-regional actors fearing for their ‘fair’ share of funding. In a way, this appears to undermine the structures of ‘regionalised structural policy’, i.e. the intermediary and advisory ‘regional development conferences’ (*Regionalkonferenzen*) that were created to develop consensus-based regional development concepts (*Regionale Entwicklungskonzepte*, *REK* in short) for the sub-Land administrative areas (cf. Landesregierung Nordrhein-Westfalen, 1999, pp. 265-268). The clear cut distinction between the North Rhine-Westphalian model of ‘directed corporatism’ (Hoppe, 2000, p. 81 and cf. pp. 78-80) and the British ‘directed competition’ (Hoppe, 2000, p. 200) seems to no longer exist. Instead, it is argued here that North-Rhine Westphalia seems to be slowly departing from its traditional legacy to moving towards applying more a model of ‘directed competition’.

It seems that this trend has been maintained more lately since a large proportion of the expected 1.28 billion Euro from the Objective 2 Structural Fund programme for the succeeding period 2007-2013 was again foreseen to be allocated through competitions and for supporting NRW’s cluster strategy (Ministerium für Wirtschaft, 2007, pp. 120-124 and 194) as part of the *Land*’s innovation strategy.<sup>326</sup>

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<sup>326</sup> See <http://www.exzellenz.nrw.de/nocl/noth/clusterpolitik/bundes-und-eu-ebene/> and the European Commission’s press release IP/07/799 of 12 June 2007, available at the Rapid database at <http://europa.eu/rapid> The text of the operational programme for 2007-2013 for NRW is available at [http://www.ziel2.nrw.de/1\\_Ziel2-Programm/3\\_1\\_Programmtexte/index.php](http://www.ziel2.nrw.de/1_Ziel2-Programm/3_1_Programmtexte/index.php) . The text of the *Land* government’s innovation strategy of 29.08.2006



The selection of competency fields or sectoral cluster, for which regional actors in the Ruhr area were asked to submit proposals for innovative projects (in the 2000-2006 phase), was build upon the recommendations and identification of six such clusters by the above-mentioned study of Roland Berger Strategy Consultants (1998, p. 5), which was commissioned by the *Land* Ministry for Economic Affairs, SMEs, Energy and Transport (MWMEV). The Projekt Ruhr GmbH has consequently developed the following 11 Municipal Priority Development Areas in collaboration with the MWMEV (Aufsichtsrat und Innovationsbeirat der Projekt Ruhr GmbH, 2002).<sup>327</sup>

1. Area of expertise: Chemical industry
2. Area of expertise: Power technology
3. Area of expertise: Industrial technologies and resources
4. Area of expertise: Information technologies and resources
5. Area of expertise: Logistics
6. Area of expertise: Medical technology and healthcare
7. Area of expertise: Urban development and quality
8. Area of expertise: Ecological and urban renewal project “Emscher Landscape Park”
9. Area of expertise: Tourism, Leisure and Culture
10. Priority focus: Design
11. Area of expertise: Land development for commerce, industry and the service sector

Arguably, this set of priority development areas of expertise or competency fields seem to have been somewhat widened or watered down in comparison to the six fields or clusters

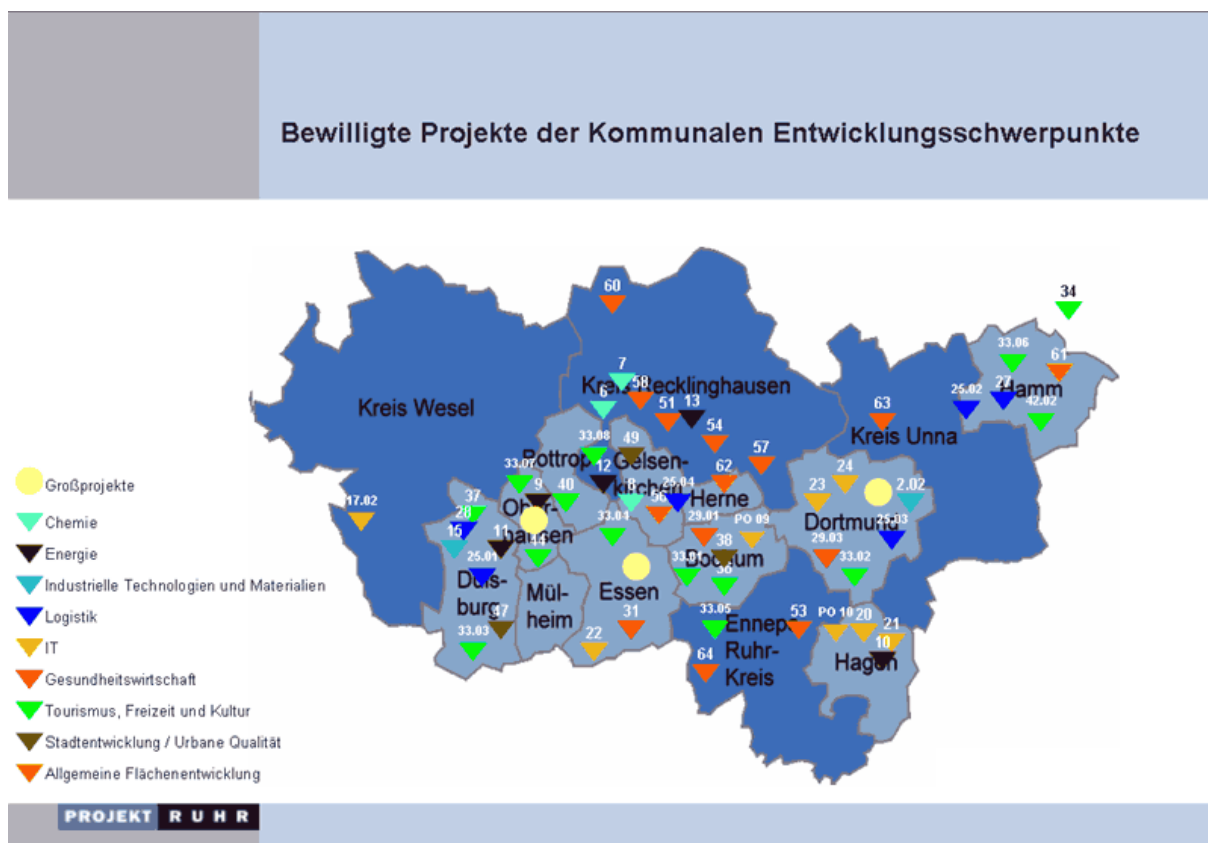
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is available at [http://www.innovation.nrw.de/objekt-pool/download\\_dateien/innovationsland\\_nrw/Innovationsstrategie.pdf](http://www.innovation.nrw.de/objekt-pool/download_dateien/innovationsland_nrw/Innovationsstrategie.pdf)

<sup>327</sup> The translation was taken from the CORDIS Regional Service: Nordrhein-Westfalen: Spotlights: „Municipal Priority Development Areas in the Ruhr District“ at <http://www.cordis.lu/nordrhein-westfalen/spot.htm>, last accessed 06.05.2003

identified in the study by Roland Berger Strategy Consultants (see above on page 257).<sup>328</sup> The following figure shows the allocation of projects according to the different Municipal Priority Development Areas.

Figure 26 Allocation of projects for the Municipal Priority Development Areas



Source: Projekt Ruhr GmbH, formerly at [www.projektruhr.de](http://www.projektruhr.de)

<sup>328</sup> However, the widening of areas for cluster initiatives is more evident in the later 2007-2013 period, where 16 competence fields (*Stärkefelder*) and *Landes-Cluster* have been identified in the following areas: Chemical industry, machinery/production technology, automotive, plastics, biotechnology, energy economy as well as energy research, health economy, medical research, food, logistics, media, culture economy, ICT, environmental technologies, nano-/microtechnology, new materials. See <http://www.exzellenz.nrw.de/noel/noth/clusterpolitik/nrw-clusterstrategie/>

*North Rhine Westphalia's system of innovation and business support: programmes and initiatives*

The Objective 2 programme for the period 2000-2006 outlines 24 measures (ibid., pp. XIX-XXVIII, 250 and 340-387) that are subordinate to these four main priorities for the Objective 2 area – which comprises the Ruhr area as well as some parts in East Westphalia and two areas near Aachen. These complement and strengthen several national and regional structural policy programmes already existent.

With regards to *national* structural policy instruments, reference is made to the significant ‘regional economic development programme’ (*Regionales Wirtschaftsförderungsprogramm*) of investment support through the national community initiative (*Gemeinschaftsaufgabe*). Its territorial support areas are nearly identical with those of the Objective 2 area (ibid., pp. XIX and 478-479).

In addition, the Single Programming Document also points to the coherence of its measures to other existing *regional* structural policy programmes, which are available across the whole *Land*. First, the intention is explicitly named (ibid., pp. 479-485) to build upon the 120 projects of economic, social and ecological restructuring with an investment of 5 billion Euro (ibid., pp. 480-481) of the Emscher Park International Building Exhibition (*Internationale Bauausstellung Emscher Park*, IBA in short), that ran in the Emscher subdistrict of the Ruhr area between 1989 and 1999 (see Kilper & Wood, 1995). The IBA Emscher Project can be described as a kind of ‘catalyst project’ as proposed by Amin (1999, pp. 373-374) in order to reconstruct local social capital and civic identities that were damaged by ‘economic hardship,

state-dependency, elite domination and so on' as a result of a lock-in situation.<sup>329</sup> While Kilper & Wood (1995, p. 230) describe the IBA project as a 'remarkable experiment in creative restructuring processes', they also point to some shortcomings such as the lack of a regional economic strategy as a basis for action and the paradox associated with 'activities "from below" are to be stimulated "from above"'. Because of its 'corporatist form of intervention' and backing of strong players, they identified a bias 'towards professionally organized planning' as opposed to 'projects being devised by citizen's pressure groups'. This is important because the IBA project involved the attempt of changing mindset towards ecology and culture in the Ruhr Area (Bömer, 2000, p. 107). IBA saw itself as the "workshop for the future of industrial regions" (Müller, 2005). The 'hard' results of the various projects were an exhibition location in Oberhausen (Gasometer), a service centre in Dortmund-Eving on a former site of a coal mine (Zeche Minister Stein), the cultural centre Zeche Zollverein, and the nature park in Duisburg-Meiderich as well as 17 technology centres (Müller, 2005).

Secondly, reference is made (see Landesregierung Nordrhein-Westfalen, 1999, pp. 481-483) to several technological and sectoral '*Land* initiatives' such as for media (*Landesinitiative mediaNRW*), for future energies (*Landesinitiative Zukunftsenergien*), for the automotive industry (*Verbundinitiative Automobil NRW, VIA NRW* in short), for chemical industry (*Initiative ChemSite*), for textiles (*Zukunftsinitiative Textil NRW*), for food processing (*Food-Processing Initiative NRW*), for construction (*Zukunftsinitiative Bau*) and for biotechnology (*BioGenTec-Initiative*). Some of these programmes have received particular recognition. One is the cluster-orientated industrial policy programme for the automotive production supply chain

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<sup>329</sup> Amin (1999, p. 373) defines such *catalyst projects* as those that 'might focus on popular projects which restore a pride of place and belonging (e.g. festivals, the recovery of local public spaces, cheap and efficient public transport), community development programmes, schemes involving public participation, investment in the social infrastructure, civic educational programmes, and initiatives in marginalized communities designed to rebuild confidence and capability.

(VIA NRW initiative), which has been identified as a best practice example for the setting up, development and moderation of a technology network (Ernst & Young, 1998, p. 79; European Commission, 1999b, p. 62). In addition, the initiatives for the media industry and for biotechnology (BioGenTec) have also been identified as best practice examples of sectoral and innovation support (Ernst & Young, 1998, pp. 78 and 80). Finally, the ChemSite initiative has also been highlighted as innovative approach of turning a competitive disadvantage into an advantage with a sectoral infrastructure initiative that included the building of a propylene pipeline to address bottlenecks (see Landesregierung Nordrhein-Westfalen, 1999, pp. 482-483).<sup>330</sup>

Thirdly, the *Land* provides advisory and information support for entrepreneurial activities with the start up initiative NRW ‘GO!’ (*Gründungsoffensive NRW*) (see Hoppe, 2000, pp. 94-109) as well as similarly for the growth of SMES with the initiative ‘MOVE’ (*Mittelstands-Offensive NRW*) (see Landesregierung Nordrhein-Westfalen, 1999, pp. 483-484).

Finally, the Objective 2 measures also build upon the consensus on vocational education (*Ausbildungskonsens NRW*), the 1997 master plan for tourism in the Ruhr area (*Masterplan für Reisen ins Revier*), and the action program women and profession (*Aktionsprogramm Frau und Beruf*) (see Landesregierung Nordrhein-Westfalen, 1999, pp. 484-485).

It is important to make a clear distinction here though between the various ‘supra-regional’ *Land* initiatives (that usually apply to entire *Land* level) and the ‘regionalised’ structural policy (at the sub-*Land* level). Here, in this specific terminology, the term ‘regional’

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<sup>330</sup> See also interview No. 33, transcript page 5

obviously does not refer to the *Land* level (as otherwise referred to by this thesis) but to sub-*Land* intermediary administrative regions that consist of a group of municipalities.<sup>331</sup>

Overall, the country report on Germany of the European Trend Chart on Innovation (European Commission, 2003d, pp. 19-22) also provides a broad list of selected innovation policy measures in North Rhine-Westphalia that complement the programmes outlined earlier at the national level.<sup>332</sup> They broadly comprises measures, programmes and initiatives in support of the following: innovation orientated personnel mobility, technological consulting for enterprises, consulting in textiles industry (*Textilberatung*), the promotion of clustering and innovation cooperation with the technology programme mining (*Technologieprogramm Bergbau*, *TPB* in short) and for technology infrastructure, consulting for inventors (*Erfinderberatung*) for the protection of IPR, innovation finance by *Land* guaranties for investment capital offered through WIN (*Wagniskapital für Innovationen NRW GmbH*)<sup>333</sup>, strategic R&D for the rational use of energy (*Rationelle Energienutzung*) and future energies (*Landesinitiative Zukunftsenergien*, *LZE* in short), the promotion of R&D projects by companies, and finally measure for intensified cooperation between research, universities and companies by supporting technology transfer, e.g. within EU-measures and with the free technological advice by the technology-transfer-ring handicraft (*Technologie-Transfer-Ring Handwerk NRW*).

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<sup>331</sup> Interview No. 29, transcript page 13.

<sup>332</sup> These policy measures are also described in more detail in the useful (national) guide on innovation support (Bundesministerium für Bildung und Forschung & Bundesministerium für Wirtschaft und Technologie, 2001, pp. 67-68).

<sup>333</sup> See also Sunley, Klage, Berndt (2005, pp. 262 and 268) for NRW's venture capital programmes as part of ist regional policy.

Moreover, the *Land* Ministry for Education also established a programme awarding innovative ideas from graduates and providing financial support of university spin-outs, i.e. start-ups (*Programm zur finanziellen Absicherung von Unternehmensgründungen aus Hochschulen, PFAU* in short).<sup>334</sup>

Finally, it should be pointed out that subsidies are still provided heavily to coal mining with an amount of roughly 2.5 billion Euro per annum, i.e. every job in mining being supported with 60.000 Euro (Mock & Steiger, 2005). Obviously, these funds that have been transferred to non-competitive industries over the last decades represent a source of opportunity costs as they could have been and could be spent instead on support for emerging and growing industries in gaining a competitive advantage. This can only be explained by what a policy-makers has described as coal being a topic that is ‘emotionally charged’ and a social and regional policy problem, that otherwise is ‘not rationally explainable’.<sup>335</sup>

### ***Main actors in the Governance of the business and innovation support system in North***

#### ***Rhine Westphalia***

In line with the broad definition of innovation, the governance infrastructure comprises the whole range of key organisations that conceptualise, influence and implement innovation policy. This involves policy-makers as well as practitioners, who provide business and innovation advice and support in a general, and thus includes not merely technology or innovation orientated services.

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<sup>334</sup> nrw media (accessed 27.05.2004) *Initiativen in NRW: 3. Finanzierung*, at [http://www.media.nrw.de/initiativen/initiativen\\_druckansicht.php?rubrik=12](http://www.media.nrw.de/initiativen/initiativen_druckansicht.php?rubrik=12)

<sup>335</sup> Interview No 29, transcript pages 4 and 8.

In general, the main first points of contact for businesses with regards to advice concerning the above mentioned innovation support and funding programmes are the chambers of commerce and industry (IHK) and the ‘centre for innovation and technology in NRW’ (ZENIT). Besides these actors that play a crucial role in the implementation of policy measures (as practitioners), there are furthermore the core policy-makers at the Ministries at *Land* level and project coordinators closely associated with it, such as the ‘economic development corporation for North Rhine-Westphalia Ltd.’(GfW), the investment bank branch of the NRW.bank, and Projekt Ruhr GmbH. These are briefly introduced in the following.<sup>336</sup>

#### *ZENIT – Centre for innovation and technology in NRW*

The centre for innovation and technology in NRW Ltd. (*Zentrum für Innovation und Technik in NRW, ZENIT GmbH* in short) has also been identified as a best practice example of an institutional actor (Ernst & Young, 1998, p. 81). The ZENIT GmbH is the *Land*’s main regional agency, that has been described as ‘a good example of a “one-stop-shop” approach combining support for innovation and more general business support services’ (ibid., pp., p. 81). It was founded in 1984 as a public private partnership (PPP), by the *Land*, by an association of SMEs (*Trägerverein ZENIT e.V.*), and by WestLB (now NRW.bank) to a third each, in order to provide sound advice and innovation support to SMEs (Kerlen, [1987(?)], p. 16). The organisation has around 45 members of staff that besides technology consulting and also provides advice regarding strategic and operative management tasks including marketing,

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<sup>336</sup> This selection is not conclusive, but fitting for the focus of this study. There are also other important actors in the general governance system such as the regional (property) development agency ‘LEG’ (*Landesentwicklungsgesellschaft mbH*), the limited corporation for innovative employment G.I.B. (*Gesellschaft für innovative Beschäftigungsförderung mbH*) and many others (Kommunalverband Ruhrgebiet, 2001, p. 25).



joint representation and mentoring at international fairs and exhibitions, advisory functions as a (former) Euro Info Centre (EIC) and Innovation Relay Centre (IRC)<sup>337</sup>, as well as advice concerning funding opportunities (cf. also Hassink, 1992, pp. 94-96).<sup>338</sup> With the recent creation of the full subsidiary ProVendis, a new task concerning the exploitation of patents from higher education institutions has been added to this list. ZENIT sees this first of all as a technology adviser, but also as an information broker and mediator as well as an information and feedback provider to the *Land* for its adjustment and conceptualisation of policy-making.<sup>339</sup> It thus occupies a double function, being programme coordinator and in a way assessor, while at the same time also being an advice and consulting institution for business.

#### *Chambers of commerce and industry*

The chambers of commerce and industry (IHK) also have this double function, which derives from its obligatory membership. This gives them a unique representative nature, which is at least potentially a valuable source of information for the policy development process. In addition, this probably also means that the organisation and its non-market support and advice services are much more well known than those of other actors. The key role and tasks of the chambers of commerce and industries (as well as the chambers of handicrafts) have already been outlined before in the discussions of the national governance level. They are fairly homogenous across the different settings across Germany and they are organised according to areas corresponding to sub-*Land* administrative region. Yet, they also have additional branches in other localities within these areas. However, a specific institution to North Rhine

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<sup>337</sup> The tasks of the former EICs and IRCs are now performed by the Enterprise Europe Network partners, which in NRW are currently ZENIT and the NRW.bank. See <http://www.enterprise-europe-network.ec.europa.eu>

<sup>338</sup> See section 'Wir über uns' at <http://www.zenit.de>

<sup>339</sup> Interviewee from ZENIT GmbH.

Westphalia is the ‘technology consultancy office Ruhr’ (*Technologieberatungsstelle Ruhr, tbr* in short), which by means of cooperation between six chambers of commerce (Bochum, Dortmund, Duisburg, Essen, Hagen and Münster), aims to enhance its technological knowledge and consequently provide specific technological advice to SMEs in the Ruhr area and acts as a mediator by referring them on to relevant research centres, if necessary (Hassink, 1992, p. 94).

### *Business incubators*

Technology and start-up centres are an important element of the public infrastructure for the support of entrepreneurial activities, as they not only provide an infrastructure but also access to a cooperation network (Neusser, Kutz, & Schröder, 2003, pp. 38-39). This can, for example, help to mobilise entrepreneurial activities from Higher Education and Research Institutions.

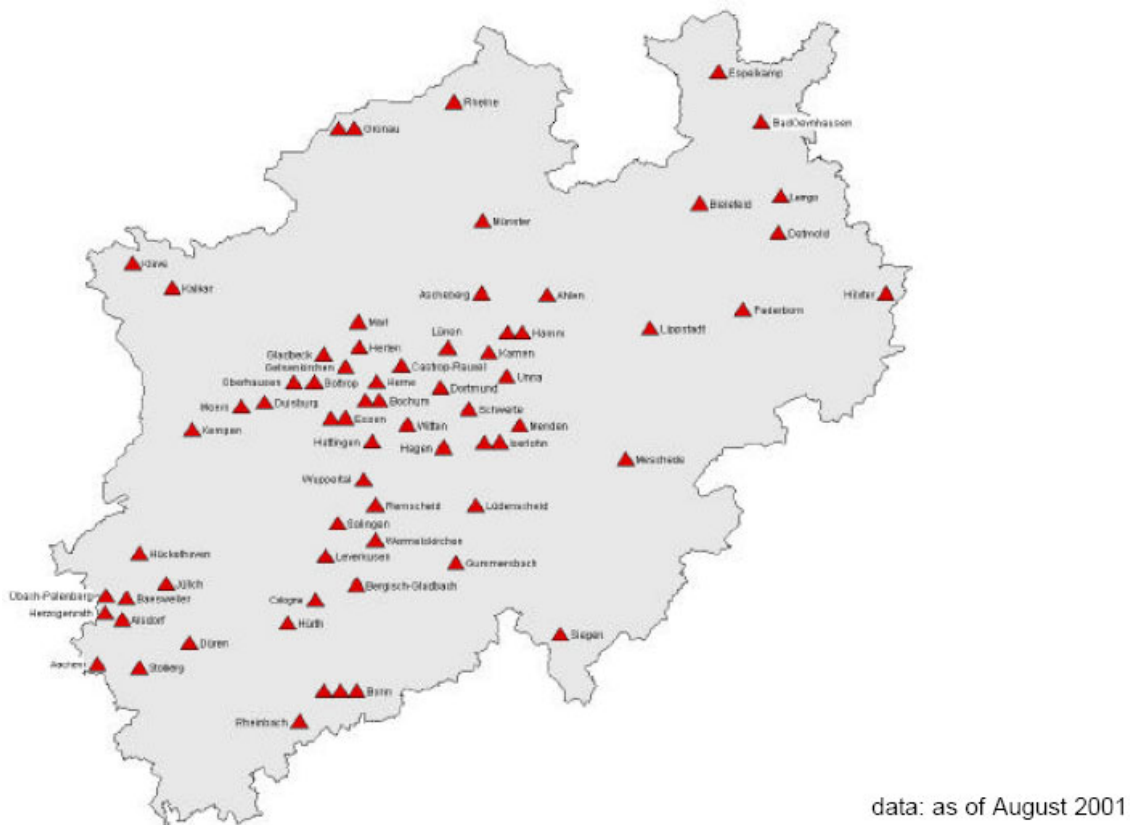
Out of the previously named figure of roughly two hundred business incubators or technology centres in Germany, nearly one third are said to be situated in North Rhine-Westphalia (Organisation for Economic Co-operation and Development, 1999a, pp. 49 and 52) indicating a potential oversupply. Indeed, in addition to its dense Higher Education and Research landscape, North-Rhine Westphalia hosts also an abundance of technology and start-up centres with a total figure of 63 in 1997 as identified by Elle et al. (1997, p. II) that is exceptional even in international comparison.<sup>340</sup> By 2001, this figure rose to 69. The

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<sup>340</sup> According to Tecworld (Neusser et al., 2003, pp. 38-39) the figure rose apparently to 91 in 2001.

following figure shows depicts the oversupply and dense network of technology centres or incubators in NRW.

Figure 27 Overview of technology centers in NRW



Source: GfW Nordrhein-Westfalen, presentation entitled “NRW – The economic powerhouse of Europe” of 07.10.2002, page 33

The technology centres of Aachen (operated by *Aachen Corporation for Innovation and Technology Transfer*, AGIT in short), Duisburg (Micro-Electronics Centre linked to the Fraunhofer Institute for Micro Electronic Switches and Systems ‘IMS’), and Dortmund (Technology Centre) have also been identified as a best practice example of innovation support (Ernst & Young, 1998, p. 82).

Despite the density of technology centres and obvious success of some, not all are said to deserve the notion innovation or technology centre. Some have reportedly provided little more than a business park that due to lack of demand from technology or innovation-orientated businesses had to be filled at the end with any business – preventing the opportunity to create an environment conducive to innovation cooperation. This may be explained partly by the over-supply, but also as a consequence of the former hype around technology centres, where possibly such centres were set up irrespective of actual demand. The following comment by one actor illustrates this:

‘There is clearly an over supply of technology centres, but you should not forget the history. The run or boom on technology centres was in the early 90s, end of the 80s, when numerous technology centres were set up. At that time, every mayor wanted to have a technology centre for entrepreneurs on a Greenfield site. The problem was, that one could not say no. At the end of it was then an oversupply of technology centres, which eventually did not attract those business tenants initially wanted, but some bakery or whatever. After 10 years there are now only a few ones, which from my opinion, do work very well. For instance, Essen and Dortmund; Remscheid as well, and Aachen anyway. But then there are other technology centres, which host sunbed studios. [...] Nowadays, the talk is about internet portals, virtual networks, competency centres/clusters, competency fields, that are terms that circulate now. Again, every *Land* and every mayor want to now do a competence field in whatever.’<sup>341</sup>

The latter comment can also be seen as an indication that the *Land*'s new strategic orientation (towards creating a leitmotif and focussing the policy approach on endogenous strength and competencies) may have been successfully communicated top-down.

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<sup>341</sup> Interview No. 35, transcript page 15

Furthermore, the *Land*'s advantage of this density of technology centres has also created a disadvantage in that the institutional actors become predominantly inward orientated and less open to cooperation with external actors that can serve as an important source of new ideas to a system. This intra-regional perspective and lack of inter-regional exchange is illustrated by the fact that the *Land*'s technology centres are generally not organised member in the international network of Business and Innovation Centres (BIC), because they are said to believe to be well-networked and able to exchange ideas amongst themselves.<sup>342</sup>

#### *Policy-makers at the Land government*

The core institutional actors of the innovation system come from the various Ministries of the *Land* government, which host the main policy-makers that conceptualise and provide impetus for new initiatives and strategies. The concentration of North Rhine-Westphalia's policy development and conceptualisation at the Ministries at the *Land* level is illustrated by the following quote of one interviewee. At the same time, it also shows that other stakeholders at least also play a part in this process by providing feedback and partial attempts to influence the outcome.

*Interviewer: Were initiatives developed in-house, or were they developed elsewhere and you only provide the technological advice?*

*Interviewee: Yes. They were developed elsewhere.*<sup>343</sup>

*Interviewer: Have all initiatives been developed elsewhere?*

*Interviewee: Yes.*

*Interviewer: Were you integrated in this process?*

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<sup>342</sup> Interview No. 29, transcript page 10

<sup>343</sup> Interview No. 35, transcript page 2

Interviewee: Not directly, rather indirectly via feedback to [...] the Ministry for Economic Affairs [of NRW] in Düsseldorf by telling them clearly what technological development or what technological level exist in this and that sector as well as what economic and social milieu there is; by means of formal quarterly reports, in general assemblies and supervisory board meetings – in whatever form. One meets up and talks, and from these talks and feedback to the Ministry of Economic Affairs, they actually develop the initiatives, which we sometimes also cannot understand. You can leave the tape on and I am saying this quite plainly. Either one does not understand us, or one interprets us wrongly. But we are not the only ones, who provide a feedback. There are enough lobbyists – while I am not describing us as lobbyists – and advisors [...], who may whisper something into the ears of the some Ministries.<sup>344</sup>

A different stakeholder also mentioned the following:

‘Economic development policy in a narrow sense is not done by us, that is the tasks of policy. There is the State Chancellery in North Rhine-Westphalia or the Ministry for Economic Affairs.’<sup>345</sup>

This concentration of policy development and conceptualisation at the Ministries at the *Land* level also may partly explain the overall findings of this thesis that an awareness of academic theory and theory-derived models is widely lacking among practitioners implementing programmes, whereas it is evident at policy-maker level.

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<sup>344</sup> Interview No. 35, transcript pages 2-3

<sup>345</sup> Interview No. 43, transcript page 3

*GfW – the economic development corporation for North Rhine-Westphalia.*

The ‘economic development corporation for North Rhine-Westphalia Ltd.’ (*Gesellschaft für Wirtschaftsförderung Nordrhein-Westfalen mbH*, *GfW* in short) can be seen as an externalised body of the Land government. It was founded in 1960 as a 100% subsidiary of the *Land* to look after potential investors from abroad interested to establish a presence in the region, i.e. attracting incoming foreign direct investment (FDI). This central activity (*Gesellschaft für Wirtschaftsförderung Nordrhein-Westfalen mbH*, 2000, pp 8-11) has over the last years been complemented by supporting the economic activities of its own businesses abroad, i.e. foreign trade activities (with support and advice regarding fairs, exhibitions, delegations and projects) and by supporting endogenous entrepreneurial activities and those of existing SMEs (e.g. with the programmes GO! and MOVE, see above).<sup>346</sup> It is now closely linked to the *Land*’s own NRW.BANK (Macias, 2005). It has around 50 staff to undertake this holistic four-pronged approach to economic development support, which very much mirrors the three-pronged approach (without the trade dimension) that is followed by economic development units and agencies at the sub-regional and local level (e.g. clearly in Dortmund). Apart from its clear trade and investment related bridge function that in 2000 comprised two subsidiaries in Japan and Singapore and six representative offices in the US, Israel, South Korea, China (2) and Vietnam, there nevertheless seems to be at least some potential functional overlap concerning the supporting role for endogenous business potential between the GfW, ZENIT as well as Projekt Ruhr GmbH.

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<sup>346</sup> Interviewee from GfW, transcript page 1

*NRW.bank – North Rhine Westphalia’s regional bank*

Following of the toughening of the guidelines for credit allocation due under – what is known as Basel II – a shortage of capital resources, in particular for SMEs persists. The region’s support bank NRW.BANK (formerly *Westdeutsche Landesbank, WestLB* in short) has gained a crucial role in this respect since it bundled up all support funding allocation activities, that have previously been spread out. It is hoped that by concentrating the management of support and financial instruments in one hand that the support programmes become less complicated and clearer.<sup>347</sup>

*Projekt Ruhr GmbH*

Another 100% subsidiary of the *Land* government was the Projekt Ruhr GmbH (i.e. Project Ruhr Ltd.), which was set up as additional governance actor at the meso level in April 2000 (see Hans H. Blotevogel, 2001, p. 20; Landesregierung Nordrhein-Westfalen, 1999, pp. 417-418). It had around 25-30 employees after its official project start in 2001<sup>348</sup> and an initial budget of around 15 mio Euro (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 37).

The main aim of Projekt Ruhr GmbH was to work towards structural change in the Ruhr area and thus to contribute to job creation. It focused its efforts to achieve this aim on supporting networking and especially on amplifying the endogenous strength of the Ruhr area. This follows the strategic orientations outlined by North Rhine-Westphalia’s Objective 2 Single

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<sup>347</sup> Interviewee from WestLB and Interview No 43

<sup>348</sup> Interviewee from Projekt Ruhr GmbH, transcript page 1



Programming Document (Landesregierung Nordrhein-Westfalen, 1999, pp. 417-418). As discussed earlier, the Projekt Ruhr GmbH developed the 11 Municipal Priority Development Areas (*Kompetenzfelder*, i.e. clusters or competency fields) in collaboration with the *Land* Ministry MWMEV (see Aufsichtsrat und Innovationsbeirat der Projekt Ruhr GmbH, 2002) and it was labelled as the ‘driving’ body in charge of overseeing and organising the competitive bidding process for the allocation of the Objective 2 funding for the Ruhr area.

Thereby, it was hoped to ‘overcome the unilateral local and sectoral thinking’, which has been described by stakeholders as ‘church-clock-tower-thinking’ (*Kirchturmdenken*) and ‘local egoism’.<sup>349</sup> To limit the anticipated political and media opposition to this departure from the traditional consensus-based approach, emphasis was placed upon transparency, which means that unsuccessful applicators were allowed to look at the successful bids in order to acknowledge what were better applications and take their defeat in making an application more easily. Arguably a too cautious approach was followed with regards to public relations, which may have caused suspicion. Importantly, the organisational life span for this organisation was set out from the start to be only limited – with the plan to dissolve the ‘project’ at the end of 2008.

The organisational structural set-up of Projekt Ruhr GmbH was quite meaningful (see Figure 28). The cabinet of the *Land* government was represented in the supervisory board (*Aufsichtsrat*) providing the broad direction and, at the same time, political backing from the

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<sup>349</sup> See information sheet ‘Kriterien zur Auswahl von Projekten der Projekt Ruhr GmbH’ of the Projekt Ruhr GmbH information pack (2001), Interviewee 3, transcript page 3, and Interviewee 33, transcript page 3. The information sheet ‘Aufgaben und Arbeitsweise der Projekt Ruhr GmbH’ also outlines the following criteria for the selection of projects of Projekt Ruhr GmbH: horizontal character and employment effect; regional importance and metropolitan character; rentability; quality and innovative character; sustainable development; communication results.

high-profile political elite – referred to by some stakeholder as ‘the enforcement argument’ –, which is seen as a major driver to reducing stakeholder’s inclination to oppose. This further implies that at least some indirect responsibility was taken. It thereby addresses the lack of political accountability and democratic deficit that accompanied the externalisation of certain functions to the quango-like Projekt Ruhr GmbH. The configuration of the supervisory board changed in 2001 in that it became more inclusive by an enlargement that included the CEO from the regional (property) development agency ‘LEG’ (*Landesentwicklungsgesellschaft mbH*), a CEO from the Dortmund software business MATERNA GmbH, the chairmen of the regional district representation of the Federation of German Trade Unions ‘DGB’ (*Deutscher Gewerkschaftsbund-Landesbezirk Nordrhein-Westfalen*) and high-level academic representatives from two universities.<sup>350</sup>

In addition, 15 lord mayors and heads of county administrations representing the cities and local municipalities of the Ruhr area had an advisory function in the Innovation Advisory Body (*Innovationsbeirat*).<sup>351</sup> It can clearly be assumed that this body served a participatory and integrative function giving the Projekt Ruhr GmbH *quango* a more democratic touch. For instance, the ‘growth and employment pact Ruhr’ was signed by this Innovation Advisory Body in 2001.<sup>352</sup>

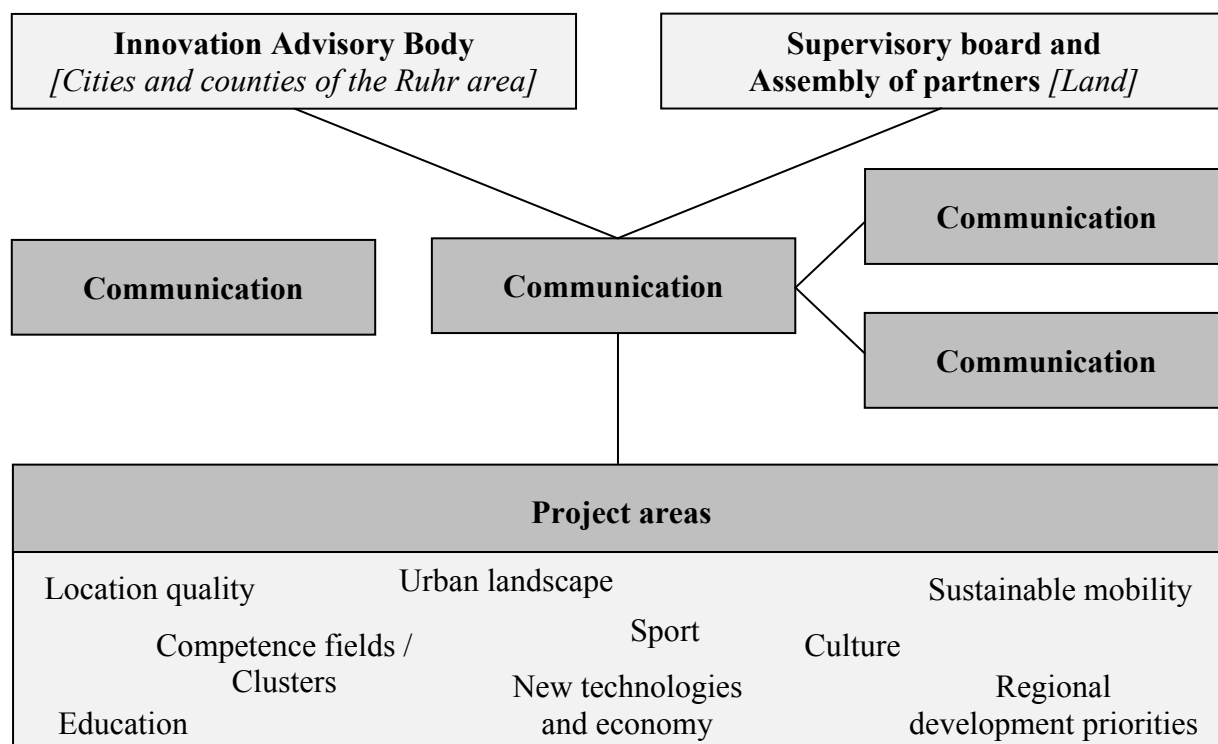
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<sup>350</sup> See ‘Results of the second supervisory board meeting of the Projekt Ruhr GmbH’ in 2001, transcript provided by Interviewee.

<sup>351</sup> See information sheet of the Projekt Ruhr GmbH information pack (2001) and Interviewee from Projekt Ruhr GmbH, transcript page 2.

<sup>352</sup> The growth and employment pact expressed the objective of actors from industry, handicrafts, services, unions, and local and regional politicians to create 200,000 jobs by 2005 in 12 identified competence fields for the Ruhr area. It was also signed by the director of the Local Association for the Ruhr Area ‘KVR’. See KVR’s *Regionalinformation Ruhrgebiet*, August 2002 edition.

Figure 28 Organisational structure of Project Ruhr GmbH



Source: Own translation of Chart 10 of Project Ruhr GmbH of 07.05.2001 provided by Interviewee

The organisational construct as depicted by above's figure can be seen to illustrate the sensitivity of the 'new' top-down approach that bypassed the right of local authorities for self-administration and brought in an element of insecurity about funding allocation. This is described in the explanation of one policy-maker with the following quote, which builds upon the experience of the (previous) association of the local authorities in the Ruhr area (*Kommunalverband Ruhrgebiet*), which it was said

‘was always weak and never played a significant role because the egoism of local authorities prevailed and there was never the willingness to cooperate and to work together’. [...] We have tried it for a long time, but we leave it now. The local municipalities are not able and not willing to do that. Now there is an institution of the Land, which we name the Projekt Ruhr GmbH. In a way, **we move from a bottom-up approach to a top-down approach** and conduct and control more. [...] This means that the reactively supporting Land, which waited for somebody to show initiative somewhere, now became an actor commissioning projects, for which funding one has to apply. [...] Together with the study [(Roland Berger & Partner et al., 1998)], we aim to kindle a discussion in the regions or mainly the Ruhr area region. Well, we have recognised that due to this situation in North Rhine Westphalia, we would not easily manage such a paradigm change.’<sup>353</sup>

Another regional stakeholder also provides the following initial assessment:

Interviewee: [...] In the area of technology transfer from universities to SMEs, one can identify in which region there are active partners and which there is a dark spot.

*Interviewer: Which region would you describe as a dark spot?*

Interviewee: The Ruhr area. Just with a few exceptions, namely the university cities, but only Bochum and Dortmund. [On the other hand,] Essen and Duisburg are a very dark spots, while they cooperate at the moment regarding their universities. In my opinion, there is a total dark spot with regard to economic development support, innovation support, initiatives or activities. For some reason, they appear to also not increase their activities. That’s why Clement [(former) Prime Minister of the Federal State of North Rhine-Westphalia] set up last year the institution Projekt Ruhr GmbH in Essen. [...] They are active and we have also contact with them. They have, so I believe, also a lot of funding to spur the region on, but that does not work. It must not be their fault, not at all, they have tried, yet for some reason it does not work there.<sup>354</sup>

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<sup>353</sup> Interviewee 33, transcript pages 3-4

<sup>354</sup> Interview No. 35, transcript pages 10-11

Indeed, it seems that the Projekt Ruhr GmbH was only able to provide a small output.<sup>355</sup> Yet, in terms of strategic orientation and approach it followed the new cluster-theory-influenced approach. On a critical note, however, there may have been a watering down of the focus of strategic orientation. The inclusions of horizontal action areas (i.e. ‘Urban development and quality’, ‘Ecological and urban renewal project “Emscher Landscape Park”’, and ‘Land development for commerce, industry and the service sector’) into the areas of expertise and the increase of areas of expertise from 6 competency fields to 11 Municipal Priority Development Areas (see Aufsichtsrat und Innovationsbeirat der Projekt Ruhr GmbH, 2002; Projekt Ruhr GmbH, 2002) at least hints such a likely development. Purely speculative, this could have been, if true, the result of Projekt Ruhr GmbH having to give in to political pressure.

In any case, the implementation of the strategic tasks through a top-down approach did seem not to be easily manageable nor without opposition. Project Ruhr GmbH’s key organisational role for the Ruhr area virtually ended already prematurely in May 2005 when the State elections in North Rhine-Westphalia brought a change in government. The coalition agreement (CDU & FDP - Die Liberalen, 2005, p. 11)<sup>356</sup> between the two parties forming the new regional government (i.e. the conservative Christian Democratic Union and the Free Democratic Party – Liberals) stated that the Regional Ruhr Association ‘RVR’ (*Regionalverband Ruhr*)<sup>357</sup> would be entrusted with the regional planning function for the Ruhr area while, at the same time, the Projekt Ruhr GmbH was to be dissolved.

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<sup>355</sup> For instance Interviewee 3, transcript page 3

<sup>356</sup> The coalition agreement is available at [http://www.wirtschaft.nrw.de/500/5\\_Koalitionsvereinbarung.pdf](http://www.wirtschaft.nrw.de/500/5_Koalitionsvereinbarung.pdf)

<sup>357</sup> The Regional Ruhr Association ‘RVR’ (*Regionalverband Ruhr*) geographically comprises the non-county (metropolitan) cities of Duisburg, Essen, Mülheim an der Ruhr, Oberhausen, Bottrop, Gelsenkirchen, Bochum, Dortmund, Hamm und Herne as well as the counties of Wesel, Recklinghausen und Unna, while its 15 member bodies also include the non-county city of Hagen and the Ennepe-Ruhr-Kreis (county). More information on the RVR is available at <http://www.rvr-online.de>

Consequently, the tasks of the Projekt Ruhr GmbH were then gradually transferred to RVR, which until 01.10.2004 was known as the Local Association for the Ruhr Area ‘KVR’ (*Kommunalverband Ruhrgebiet*).<sup>358</sup>

Later in January 2007, the RVR established the regional development agency Ruhr metropole ‘wmr’ (*Wirtschaftsförderung metropoleruhr GmbH*) as a subsidiary with a Limited company legal status and allocated in agreement with all the municipalities the following tasks.<sup>359</sup>

- National and international marketing of the Ruhr metropole location;
- Initiation and accompanying of regional networks and competence centres;
- Acquisition and advise for businesses concerning their location searches;
- Provision of economic information about the region;
- Mediation of networks and first local contact points; and
- Coordination and specialist support for local authorities concerning funding applications.

While wmr’s tasks appear to be similar to those by its predecessor, the previous potential overlap between tasks of Projekt Ruhr GmbH and those of KVR/RVR are eliminated by its organisational integration into RVR.

While wmr’s supervisory board (*Aufsichtsrat*) consist of the regional director and ten elected representatives of the economic committee of its parent organisation RVR, its advisory body (*Beirat*) comprises a total of 28 members consisting of representatives from the local development agencies of all of the 15 non-county (metropolitan) cities and counties of the Ruhr area, from chambers of commerce and industry (4) and handicrafts (2), as well as from

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<sup>358</sup> The KVR itself had been since 01.10.1979 the successor of the Settlement association of the Ruhr coal district ‘SVR’ (*Siedlungsverband Ruhrkohlenbezirk*), which itself already existed since 05.05.1920 (*Kommunalverband Ruhrgebiet*, 2001, pp. 74-75).

<sup>359</sup> Own translation of task description at <http://business.metropoleruhr.de/wir-ueber-uns.html>, accessed 03.03.09

the business associations *Initiativkreis Ruhr*, *Pro Ruhrgebiet e.V.* and *Unternehmensverbandsgruppe Ruhr Niederrhein e.V.*<sup>360</sup>

The organisational set-up of the regional development agency Ruhr metropole 'wmr' differs from that of its predecessor Projekt Ruhr GmbH in two important ways. First, the composition of the advisory body with mainly local development agencies instead of municipalities has now more of a practitioners' orientation than a policy dimension. Secondly, the top-down supervision of the Land's government was replaced by a kind of self-administration by elected representatives, bottom-up from local authorities. The role of the cities and counties of the Ruhr area were strengthened. Whereas they were previously 'only' part of the all-embracing advisory body of the Project Ruhr GmbH, they are now represented in the voting Assembly nicknamed 'Ruhr parliament of wmr's parent organisation, the Regional Ruhr Association 'RVR'.<sup>361</sup> This more democratically constituted assembly consists of 71 Assembly Members and has a deciding function – arguably mirroring English Regional Assemblies.<sup>362</sup>

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<sup>360</sup> See links to *Beirat* and *Aufsichtsrat* at <http://business.metropoleruhr.de/wir-ueber-uns.html>, accessed 03.03.09

<sup>361</sup> See the RVR website at <http://www.rvr-online.de/rvr/politik/politik.php>, accessed 26/01/2009.

<sup>362</sup> For more information see <http://www.rvr-online.de/rvr/politik/vv.php>

*The overall systemic-ness of institutional actors at the Land level*

In his book 'The rise of the Rustbelt', Cooke (1995, p. 236) highly praises North Rhine-Westphalia for embarking on a 'high-road-strategy' of industrial policy, and attempting to transform itself into a 'learning region'. In this respect he states the following:

'The region of regions that, on the face of it, has it all in terms of growing, successfully functioning networked innovation services, is North-Rhine-Westphalia.'  
(Cooke, 1995, p. 236)

The development report of the *Land* government in North Rhine Westphalia for the twelve's legislature period also concludes that

'a working and applied technology structure has been set up in North Rhine-Westphalia over the last years, which is unequalled in Europe. The grown connections, e.g. between enterprises, universities, ZENIT, technology centres, associations, chambers and unions, shall also be supported in the future and the technological development shall continue to be accompanied by a regional and social consensus.'  
(Der Ministerpräsident des Landes Nordrhein-Westfalen, 1996, p. 28, own translation)

Yet, despite the innovation support infrastructure and network, the Land has not been able to achieve an impressive overall innovation performance (as shown before). This has to be explained at least partly by the composition of North Rhine-Westphalia' production structure with a comparative share of larger enterprises of traditional industries that are in generalisation less innovative than other sectors.



However, the consensus-based regionalised structural policy can be said to have failed as an instrument to deliver really innovative policy projects. Even though it has managed to institutionalise cooperation in some regions and most regions have continued the work on regional development concepts (REK), it appeared overall to have had only limited cumbersome success with some regions even having stopped the regionalisation processes completely (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. XXXIV-XL of annex). The concepts were reported to have been rather similar and not enough geared towards regional strengths.<sup>363</sup>

Furthermore, several regional stakeholders have reported a certain overlap between the various regional actors of the innovation and business support system and reported missing a more top-down *Land* policy implementation approach (e.g. by referring to a missing policy ‘monopoly’ or at least ‘policy influence’).<sup>364</sup> Explicit reference was made by actors to the British regional development agencies (e.g. Scottish Enterprise), which were perceived as a best practice model due to their reported ability for central control of local economic development activities (due to their shares in these institutions).<sup>365</sup> Yet, because of the right of local municipalities for self-administration, it is acknowledged that such an approach is not possible in Germany. However, this thinking can be regarded, nevertheless, as a potential driving force for the introduction of competitive bidding for project funding allocation (under the Objective 2 programme) and the allocation of the organisation of this process to the Projekt Ruhr GmbH. They are seen here as a means by the *Land* to partly bypass local authorities due to the perception of their inability to focus their policy endeavours upon endogenous strength. This allows posing the question: Projekt Ruhr – a regional development

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<sup>363</sup> Interview No. 33, transcript page 1.

<sup>364</sup> For instance, Interview No. 43, transcript pages 6 and 7

<sup>365</sup> Interview No. 29, transcript page 7 and Interview No. 43, transcript page 7

agency in disguise? This process appears to have been partly turned back following the May 2005 State elections and the consequent demise of the organisation. However, the Project Ruhr GmbH should be regarded as an important step towards the creation of the undisguised regional development agency for the metropole ruhr 'wmr'.

Bachtler (2005, pp. 7-8) also provides an international comparison for the *management of Objective 2 funding*. He distinguishes between a differentiated approach, a subsumed approach and composite systems, representing a mix of the two approaches. The first approach to resource allocation with separate administrative structures has been established in the Netherlands, Sweden and the UK to deliver the Structural Funds. In contrast, in Austria, Spain and in parts of Germany and most new Member States, allocation of resources is channelled through national or regional ministries and agencies with a subsumed approach.<sup>366</sup>

One approach that is common to the different management systems is to outsource parts of programme administration to a separate secretariat as tradition in Belgium, the Netherlands and the UK. Recently, North Rhine-Westphalia also outsourced their programme management to a consultancy company. A new 'Objective 2 Secretariat' (Ziel 2 Sekretariat) ought to provide technical and administrative support, manage communication and, especially, improve coordination between the programme committees, different ministries and administrating agencies.

In the succeeding funding period 2007-2013, the ERDF also provides the co-financing for North Rhine-Westphalia's cluster management via an overall Cluster secretariat

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<sup>366</sup> A mixed approach can be found in Finland, France and Italy according to Bachtler (2005, pp. 7-8).

(Clustersekretariat) and the specific regional cluster initiatives under the umbrella brand of 'Exzellenz NRW – Cluster Nordrhein-Westfalen' (Kompetenznetze Deutschland, 2008, p. 52). This bundling of different initiatives is seen here as a positive development given previous criticism concerning the confusing conceptional profile of support programmes (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 49). Following the *Land's* government change in 2005, a much more focussed emphasis on innovation and cross-departmental cluster policy has emerged lately. This is not only visible in the title of the *Land's* economics ministry being renamed Ministry for Innovation, Science, Research and Technology (MIWFT) but also in the *Land's* innovation strategy agreed in August 2006 (Ministerium für Innovation, 2006).<sup>367</sup>

The following figure depicts the main actors in the governance of the business and innovation support system of North Rhine-Westphalia, while Table 25 further below indicates more potential overlap between different organisations. This concerns in particular the three main actors in the governance of the business and innovation support system at the *Land* level, ZENIT and GfW as well as Projekt Ruhr GmbH for the Ruhr area, vis-à-vis the local business and innovation support actors at the sub-regional level of the city-regions.

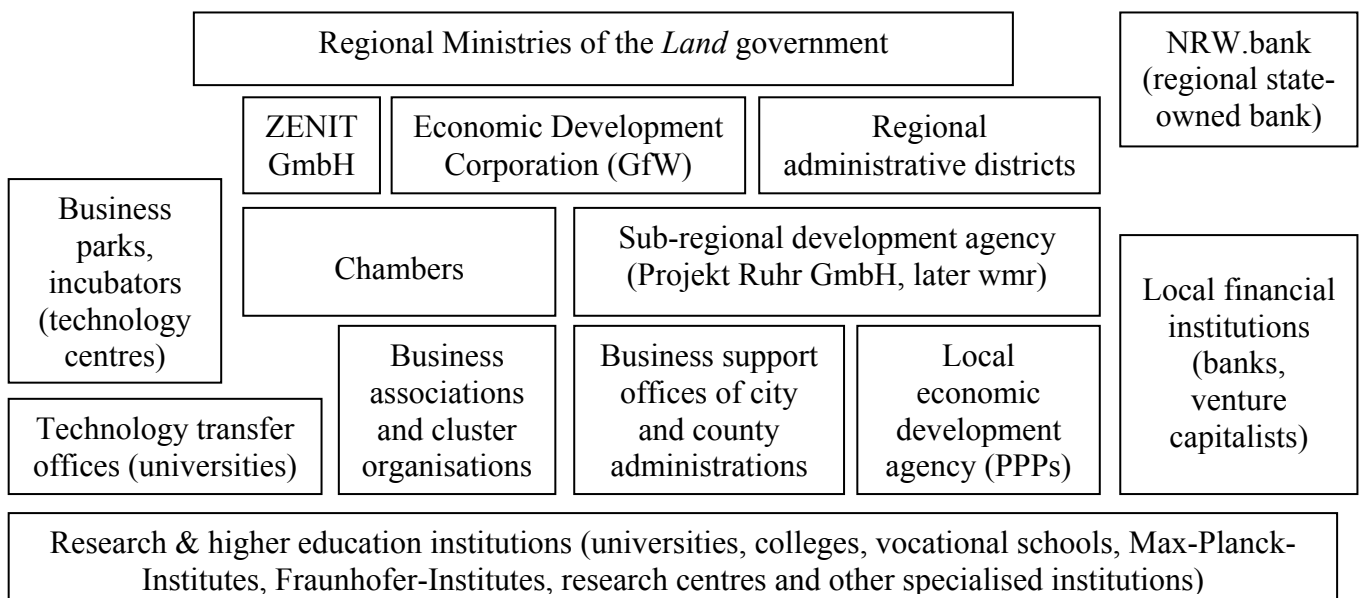
While organisational relationships with ZENIT were mentioned most frequently and mainly regarded as cooperative by the interviewed local actors, a potential overlap with the tasks of the chambers of commerce and industry may yet exist. The relationships to both Projekt Ruhr GmbH and GfW were however viewed slightly more as a mix between cooperation and competition. For example, two local interviewees distinguished their assessments of the

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<sup>367</sup> The innovation strategy agreed by the *Land* government cabinet on 29. August 2006 is available at [http://www.innovation.nrw.de/object\\_pool/download\\_dateien/innovationsland\\_nrw/innovationsstrategie.pdf](http://www.innovation.nrw.de/object_pool/download_dateien/innovationsland_nrw/innovationsstrategie.pdf) and information on the cluster strategy at <http://www.exzellenz.nrw.de/nochl/noth/clusterpolitik/nrw-clusterstrategie/>

relationship according to the tasks that GfW carried out. One viewed its international trade-related role as cooperative while viewing other general support tasks more as a co-competition mix.<sup>368</sup> Still, relationships between regional and sub-regional actors overall appear to be in majority cooperative. This is also reflected in the mostly cooperative assessment of the relationships to local actors by the main regional actors.

Figure 29 Main institutional actors of NRW's business and innovation support system



Source: Own creation

It can be crucially argued that the first point of contact and most frequent interaction that enterprises make with institutions from the innovation and business support system is mostly likely to be at the local level. Here, it is believed that local institutions in close convenient proximity are more likely to be known, and approached, by businesses or entrepreneurs seeking advice and/or support. Hence, following this argument, local innovation and business institutions are perceived here as the first and most important point of contacts for businesses

<sup>368</sup> Interview No. 1 and 16.

– irrespective of the actual governance level that provided funding for activities and projects. These core actors are also seen to represent the intermediary institutions depicted by the triple helix of university-industry-government relations (Etzkowitz & Leydesdorff, 2000) as they comprise such organisations as branches of the chamber of commerce and industry, existing technology centres, local economic development agencies and the units of local authorities responsible for economic development and business support. Following this argument, the actors and their coordination and cooperation of the sub-regional (and local) level becomes much more important. Consequently, the governance dynamics, and thus the systemic-ness, of these innovation and business support systems at the sub-regional level are analysed in the next section.

As a conclusion to the above and as a introduction to subsequent discussions, Table 25 (influenced by Hassink, 1992, Table 5.1 on p. 85) provides an overview of the governance level(s) involved and targeted level(s) of activity for the different policy initiatives and actors.<sup>369</sup>

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<sup>369</sup> The KVR (2000, p. 27) also provides a good depiction of a geographical and functional delimitation for institutions of the Ruhr area.

Table 25 Spatial level of activity for a selection of policy programmes, instruments and actors

	Main targeted level(s) of activity				
	Local	Sub-regional	Regional (Land)	National	EU / Internat.
<p><b>Financial incentives for innovation</b></p> <ul style="list-style-type: none"> <li>• EU technology policy</li> <li>• National sectoral/technology policy</li> <li>• Thematic sectoral/technology Land initiatives</li> <li>• National Competency Centres competitions</li> <li>• Regional Policy provided by multiple levels (incl. Objective 2 funding)</li> <li>• Regional (Land) Competency Field competitions</li> </ul>			(X) X X	X	X
	X	X	X	(X) virtual	
	X	(in NRW) X	X		
<p><b>Economic Development Policy Actors</b></p> <ul style="list-style-type: none"> <li>• European Commission</li> <li>• Federal Ministries</li> <li>• Land Ministries</li> <li>• Regional economic development corporation GfW (externalised Land body with export &amp; FDI orientation)</li> <li>• Projekt Ruhr GmbH (externalised Land body)</li> <li>• Regional conferences (regionalised structural policy)</li> <li>• Economic development unit of local municipalities</li> <li>• Local Economic development agencies (externalised, private, PPP)</li> </ul>		X	X X X	X	X X
	X	X			
	X	X			
	X				
<p><b>Technology transfer (TT) and business support institutions</b></p> <ul style="list-style-type: none"> <li>• TT by chambers of commerce</li> <li>• ZENIT</li> <li>• University TT Offices</li> <li>• TT by local authorities</li> </ul>	X (X) X (X)	X	(X) X		(X)
<p><b>Technology centres / business incubators</b></p>	X				

Source: Own creation inspired and influenced by Hassink's (1992, Table 5.1 on p. 85) analysis.

### **The sub-regional level: case study findings from four city-regions and one pilot case**

This section looks at the governance dynamics, and thus the systemic-ness, of innovation and the business support systems at the sub-regional level. This thesis suggests that sub-regional governance dynamics are not sufficiently accounted for in innovation systems theory. After a brief overview of the economic and innovation performance of the four city-regions and an outline of general approaches with regards to local economic development policies, this section looks at economic development policy and dynamics at sub-regional level of four case studies, namely city-regions of Aachen, Dortmund, Duisburg and Düsseldorf and of the pilot case study of Ratingen. The results and the underlying causes of differences are discussed here on a case-by-case basis, while a comparative analysis of all four case studies of city-regions follows in the subsequent chapter.

For each case study, a short economic history and structure of the city-region is presented first. Secondly, specific characteristics of core governance actors are presented. This includes a discussion of the building of new core business and innovation support organisations and selected cluster organisations and networks. The overall structure and any explicitly identified coordination between actors, as well as decision-making processes and critical incidents that have changed behavioural routines or the interacting environment, are identified. Thirdly, formalised and non-formalised policies and strategic approaches are outlined. Finally, the nature of relationships and extent of cooperation between actors is described. A rudimentary social network analysis is presented to support the author's analysis of each case study. This analysis is not representative as it is based on a low number of interviews of local stakeholders and the supporting interview matrix tool (see appendix VI) that they were asked to complete. Nevertheless, it provides an indication of the nature of relationships and helped

to avoid a reporting bias in cases where the depth and length of interview discussions varied. Due to the sensitivity of interinstitutional and interpersonal relationships reported in the case studies, the promised anonymity of interviewees and organisations mentioned has been preserved.

Out of the four case studies, two cases have been given slightly more attention in the reporting. This was due to the additional strong university dimension in the case of Aachen and the particular nature of policy measures in the case of Dortmund, which both were thought to deserve a more detailed explanation.

### ***Local economic and innovation performance of the four city-regions***

A detailed economic and innovation profile for North Rhine-Westphalia is provided earlier. The following Table 26 provides an overview of key economic structural data for the four case study city-regions. It shows that in 2002, Düsseldorf was the only city with better than the *Land*-average key economic indicators, in terms of a slightly lower unemployment rate and a significantly higher GDP per employed person (78,979 € versus the NRW average of 54,552 €) as an indicator of labour productivity. However, it should be noted that more recently in 2007, Düsseldorf's unemployment rate exceeded that of the *Land*. In terms of patent density as a proxy for innovation performance, in 2008 the wider Düsseldorf area ranked a high 25<sup>th</sup> amongst the 97 larger German planning regions.<sup>370</sup> Düsseldorf and its

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<sup>370</sup> It should be stressed that reliable and comparable secondary innovation performance data at a more granular level below or at NUTS2 level are difficult to find, including from the Community Innovation Survey (CIS). The European Commission's regional innovation scoreboard is amongst those efforts trying to capture the regional innovation performance. Measuring local innovation performance would require collecting primary data, which is out of the scope of this research, where it is not the aim to establish a direct causal relationship between innovation performance and governance dynamics, which would be very difficult, if not impossible, to establish.



hinterland reached a density of 165 patents per 100,000 employees versus the German average of 136.

Given that the formerly heavily industrialised Ruhr area usually displays a below-average economic performance, it is unsurprising that both of the case-study cities from the Ruhr area – Duisburg and Dortmund – had unemployment rates above the Land's average of 10% with 13.6% and 14.7%, respectively. In 2001, only Duisburg displayed a slightly above *Land*-average GDP per employed person (55,781 €). However, it should be noted that over half a decade, Dortmund surpassed both the Land's average (59,857€) and Duisburg's level (61,672 €) following a remarkable increase from 53,930 € in 2001 to 63,833 € in 2006. Both cities had a below-average patent density in 1998 with Duisburg ranking 53<sup>rd</sup> (97 patents) amongst the 97 larger German planning regions and Dortmund ranking 64<sup>th</sup> (80 patents). Overall, their economic performance today has to be seen in light of their trajectories from former heavy industrialised economies, typical to the Ruhr area.<sup>371</sup>

As a city-region with a similar history of industrial brown coal field (*Aachener Revier*), Aachen has generally been the city with the highest unemployment rate in the *Land* outside the Ruhr Area (Gersdorff, 2005; Unknown, 2005; Wels, 2005). In 2001, the city of Aachen had an unemployment rate of 11.2%, while its surrounding county stayed below the Land average with a rate of 9.7%. While the city of Aachen and its surrounding county performed below the *Land* average in terms of labour productivity in 2001 with a GDP per employee of around 50,000 € – it also stayed below-average later in 2006 –, the city-region and its

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<sup>371</sup> After the first mentioning of coal mining in the 14<sup>th</sup> century in a Dortmund document, the Ruhr area vastly developed during the 'black gold' rush of the industrial revolution with the population of the Ruhr area increasing from 400,000 in 1850 to 3.8 million in 1925 (Kommunalverband Ruhrgebiet, 2001, pp. 11-13). However, the mining crisis, which started in 1958, and the closure of steelworks following the world economic crisis of the mid-seventies heavily affected the Ruhr economy.

hinterland ranked a high 18<sup>th</sup> place out of 97 planning regions in Germany for patents density with 189 patents. This is clearly due to the competences associated with the location of the excellent technical RWTH university of Aachen.

Table 26 Key economic structural data for the case city-regions

Administrative area	Population 2002 <sup>372</sup>	Population 2007 <sup>372</sup>	Unemployment rate 2002 <sup>373</sup>	Unemployment rate 2007 <sup>373</sup>	GDP per employed 2001 (€ at market prices) <sup>374</sup>	GDP per employed 2006 (€ at market prices) <sup>375</sup>	Patent applications average 1992-1994, per 100,000 inhabitants <sup>376</sup>	Patents 1998 per 100,000 employees (planning regions) <sup>377</sup>
Germany	82,536,700	82,314,900 (2006)	10.5%	9.5%	.	.	38.1	136
<b>North Rhine-Westphalia</b>	18,076,355	17,996,621	10.0%	10.0%	54,552	59,857	37.7	.
Ruhr area	4,782,865	4,701,379	.	.	52,692	59,340	.	.
Arnsberg, governmental administrative districts	3,800,729	3,723,712	10.7%	10.3%	51,710	58,540	.	.
<b>Dortmund</b> , non-county metropolitan city	590,831	586,909	14.7%	15.5%	53,930	63,833	20.6	80 (64 <sup>th</sup> rank)* incl. hinterland
Düsseldorf, governmental administrative districts	5,249,280	5,208,288	10.0%	11.0%	59,457	64,349	.	.
<b>Düsseldorf</b> , non-county metropolitan city	571,886	581,122	9.7%	11.4%	78,979	81,324	44.5	165 (25 <sup>th</sup> rank)* incl. hinterland
Ratingen, city (belonging to the county of Mettmann)	91,967 (508,703)	92,255 (502,045)	.	6.8%* (July)				.
			(7.2%)	(7.6%)	(53,468)	(59,113)	(80.3)	
<b>Duisburg</b> , non-county metropolitan city	508,664	496,665	13.6%	14.9%	55,781	61,672	17.5	97 (53 <sup>rd</sup> rank)* (Duisburg/Essen incl. hinterland)
Köln, governmental	4,331,419	4,391,062	9.4%	9.9%	56,283	60,375	.	.

administrative districts								
<b>Aachen</b> , non-county metropolitan city	247,740	259,030	11.2%	12.5%	49,896	53,904	83.4	189 (18 <sup>th</sup> rank) * including Heinsberg, Düren and Euskirchen
<b>Aachen</b> , county (excluding the city)	309,223	309,929	9.7%	10.6%	50,922	56,940	26.9	
Detmold, governmental administrative districts	2,069,290	2,059,198	9.9%	8.1%	50,712	55,673	.	.
Münster, governmental administrative districts	2,625,637	2,614,361	9.9%	9.1%	48,070	54,587	.	.
Administrative area	Population 2002 <sup>372</sup>	Population 2007 <sup>372</sup>	Unemployment rate 2002 <sup>373</sup>	Unemployment rate 2007 <sup>373</sup>	GDP per employed 2001 (€ at market prices) <sup>374</sup>	GDP per employed 2006 (€ at market prices) <sup>375</sup>	Patent applications average 1992-1994, per 100,000 inhabitants <sup>376</sup>	Patents 1998 per 100,000 employees (planning regions) <sup>377</sup>

<sup>372</sup> Population figures given for the end of the respective year (as of 31.12.). Source: *Statistical Yearbook NRW* from IT.NRW ("*Information und Technik Nordrhein-Westfalen*"), available at <http://www.it.nrw.de/statistik/querschnittsveroeffentlichungen/index.html>

<sup>373</sup> The unemployment rate is given for 30.09. as a percentage of the total number of dependent civil employed persons comprising those obliged to pay social insurance, officials and the unemployed (but excluding self-employed and supporting family members). Source: Landesdatenbank Nordrhein-Westfalen from IT.NRW at <http://www.landesdatenbank.nrw.de/>. Note: Figures are not comparable due to the different method of registering the unemployed since January 2005 (*Arbeitslosenhilfe/Sozialhilfe*). See Informationsfeld zur Statistik 13211. \*Data for Stadt Ratingen (2007, p. 3), see [www.stadt-ratingen.de/01/3/zdf/zahlen\\_daten\\_fakten\\_2007.pdf](http://www.stadt-ratingen.de/01/3/zdf/zahlen_daten_fakten_2007.pdf)

<sup>374</sup> Source: *Kreisstandardzahlen 2003* by the Landesamt für Datenverarbeitung und Statistik Nordrhein-Westfalen (2003), available at <http://www.it.nrw.de/statistik/querschnittsveroeffentlichungen/index.html>

<sup>375</sup> Source: *Kreisstandardzahlen 2008* by the Landesamt für Datenverarbeitung und Statistik Nordrhein-Westfalen (2008) available at <http://www.it.nrw.de/statistik/querschnittsveroeffentlichungen/index.html>.

<sup>376</sup> Source: Greif (1998, pp. 125, 135-136).

<sup>377</sup> Source: Greif (Fraunhofer-Institut für Systemtechnik und Innovationsforschung, Deutsches Institut für Wirtschaftsforschung, Institut für Weltwirtschaft, & Niedersächsisches Institut für Wirtschaftsforschung, 2000, p. 357; Greif, 2000). \*Note: Patent data are given for Germany's 97 wider planning regions (*Raumordnungsregionen*) which comprise cities including their hinterland/counties.

### ***Regional innovation policy-making and local implementation***

The earlier section discussed North Rhine-Westphalia's innovation policy. As it showed, the main policy-makers providing funding for municipalities are the *Land* government, the EU and the national government. Consequently, governance actors of the local innovation and business support system are to be viewed mainly as implementing policy (and funding), which is conceptualised by the *Land* and national (Federal) Ministries. The following quotes from local practitioners illustrate this:

We do not have our own programmes, where we invest our own money in something.<sup>378</sup>

With regards to support, local authorities have for example no opportunity to give financial support; that is the sole responsibility of the *Land*. And we can advise concerning financial support, general support, about programmes as such, which are developed by the *Land* and the EU.<sup>379</sup>

While this shows local governance actors may not conceptualise larger funding programmes, they still develop strategic approaches in order to achieve the main objectives of attracting, maintaining and creating businesses. Accordingly, the whole range of *activities by local business and innovation support organisations* comprise the following activities; it illustrates that their tasks are not limited to the classical provision of general advisory and information services:

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<sup>378</sup> Interview No. 16, transcript page 1

<sup>379</sup> Interview No. 22, transcript page 1

- Provision of newsletters and innovation briefings;
- Organisation of information events, management fora, science days, congresses<sup>380</sup>
- Provision of technological advice; start-up advice, business consolidation advice, problem-solving;
- Initiation of networking to unite actors, i.e. regular round tables (lunches or social evenings) perhaps for certain sectors, applied user clubs;<sup>381</sup>
- Mediation and establishment of contacts between businesses and external consultants, capital providers and so on;<sup>382</sup>
- Communication of a common leitmotif with marketing of trademarks at fairs and conferences, at universities to attract businesses, key people, entrepreneurs to the location<sup>383</sup>
- Organisation of external workshops, economic marketing campaigns abroad,<sup>384</sup> and
- Organisation of competitions for awards, start-up funding (for business plans, perhaps according to sectors), employees, apprentices and so on.<sup>385</sup>

Furthermore, the tasks of local governance actors – just like regional, national and supra-national actors – comprise working towards providing the best framework conditions for businesses to operate successful. The following discourse shows that many local actors endeavour to actively improve local conditions – e.g. in terms of a qualified workforce, sufficient production and office development sites – even though many governance tasks are out of their control.

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<sup>380</sup> Interview No. 44, transcript page 3 and Interview No. 16, transcript page 6

<sup>381</sup> Interview No. 22, transcript pages 2 and 7, Interview No. 16, transcript page 2, and Interview No. 44, transcript page 3

<sup>382</sup> Interview No. 16, transcript pages 1-2 and Interview No. 44, transcript page 3

<sup>383</sup> Interview No. 44, transcript page 3

<sup>384</sup> Interview No. 22, transcript page 11 and Interview No. 44, transcript page 3

<sup>385</sup> Interview No. 44, transcript page 3

### ***Local economic development policy***

Local authorities in Germany have the voluntary right to carry out self-administrative tasks with regards to economic development. Municipalities do so to varying degrees. Overall, the tasks comprise efforts (and responsibilities) across different policy portfolios to improve the location factors, i.e. their attractiveness to businesses. However, in recent years there has been a shift towards focussing upon the maintenance and development of the endogenous business base as well as increasing support to entrepreneurial activities (cf. Hoppe, 2000, p. 60). Together, these strategies represent the classic *holistic tripartite approach* of attracting, maintaining and creating businesses (cf. Henschel-Neumann, 1988, p. 38). By adding support for foreign trade activities, this becomes a *four-pronged approach*, although this latter aspect is more likely to be addressed by regional and not sub-regional actors. In any case, approaches differ and not all municipalities apply such a wide-reaching strategy, as for instance, shown by the pilot case study of Ratingen.

### ***Local economic development policy in the pilot case study of Ratingen***

The small city of Ratingen with a population of around 92,000 in 2002 is situated in the county of Mettmann (population of 508,000) and in close proximity to the larger metropolitan city of Düsseldorf (population of 572,000). It has seen a favourable economic development in the 1990s with a 32% increase in employment from 25,099 in 1989 to 33,013 in 1999 and with a lower unemployment rate than the regional NRW average and its ‘big’ neighbour Düsseldorf.<sup>386</sup> A comparison of employment performance between the municipalities in the county of Mettmann by the chamber of commerce and industry hence labels Ratingen as a

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<sup>386</sup> See <http://www.ratingen.de/23/2/zdf/zdf09.htm> at <http://www.ratingen.de/de/wifoe/index.htm>, last accessed 23.01.2001

‘star’ performer (Industrie- und Handelskammer zu Düsseldorf, 1999a, p. 5 and table 1). While Düsseldorf lost 2.2% of employment between 1980 and 1998, its little neighbour Ratingen gained 39.8%.

This positive development may partly be explained by the high share of the service sector in the local economy (68.5% in 1998). The inter-municipal retail concept of the county of Mettmann from 2000 (GWH Dr. Lademann & Partner, 2000, p. 171) shows that this share is nearly 10% higher of that of the Land at national level.

The city benefits from a favourable infrastructure, good access to the motorway network, and from the close proximity to the Rhine-Ruhr agglomeration and in particular from the neighbouring city of Düsseldorf and its international airport (infas Sozialforschung, 1998; Stadt Ratingen, 2000, p. 4; 2001).<sup>387</sup> Its comparatively lower level of local business tax of a 400% tax collection rate (Stadt Ratingen, 2001a, p. 2 of supplement 'Figures, Dates, Facts') in comparison to neighbouring Düsseldorf (Stadt Ratingen, 2000, p. 4) of around 460% in 1999 (Industrie- und Handelskammer zu Düsseldorf, 2000b, pp. 2 and 35) and other larger cities in the region is a key arguments for businesses to locate in the city.<sup>388</sup> In this way, Ratingen is viewed to ‘profit’ from its neighbour as its population still benefits from access to services of the functional urban area of the Düsseldorf city-region such as cultural activities etc.<sup>389</sup> Consequently, one interviewee pointed out that the city is a ‘special case’ in that ‘one can understand Ratingen only if one understands Düsseldorf.’<sup>390</sup>

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<sup>387</sup> Interviews No. 23, transcript page 1; No. 37, transcript page 1; and Interview No. 4, transcript page 2.

<sup>388</sup> This has been one contributing factor to the relatively high commuting level of the working population to and from the city.

<sup>389</sup> Interview No. 4, transcript page 2.

<sup>390</sup> Interview No. 29, transcript page 7.



Ratingen has shown a predominant focus on providing business land sites and office space for attracting businesses given the reported bottleneck in this area for future expansions (Stadt Ratingen, 2000, p. 7). Efforts by the city's economic development unit to provide direct professional support to the existing business base were minimal – except for attempts of initiating round table networks in the 1990s. Due to staff limitations (i.e. two non-management posts for covering 7,000 firms), the focus was on 'passing on' coordination and one-stop mediation functions.<sup>391</sup> Innovation support was hence not provided and those efforts in support of (female) entrepreneurial activities were only of marginal relevance.<sup>392</sup> This can be explained by a predominance of a mature business base and a high level of business tax for potential start-ups.<sup>393</sup>

Another indication of the limited and narrow provision of economic development support with a lack of an innovation focus in Ratingen is the admitted absence of a formulised strategy for economic development policy by the Mayor's administration office for economic development.<sup>394</sup> Despite the lack of a formulated concept (Unternehmensverband Ratingen, 2000, p. 2), a publicly stated focus on the New Technologies & New Media/ICT location profile and securing the existing SME production base and retail sector are present, together with strategic orientation towards the establishment of further education institutions (Stadt Ratingen, 2001b, p. 3). Cooperation between the University of Duisburg and large firms in Ratingen with regards to the mediation of internships and master theses also exist. The office

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<sup>391</sup> See also the leaflet entitled '*Leistungsangebot der Wirtschaftsförderung*' that lists the services offered by the city's office for economic development and real estate.

<sup>392</sup> More information on the working group on start-ups is available at <http://www.ratingen.de/existenzgruendung>

<sup>393</sup> Interviews No. 23, transcript page 2 and No. 37, transcript page 3.

<sup>394</sup> Transcript page 3

for economic development mediated this cooperation, which was apparently initiated by the University of Duisburg due to its desire to increase university-industry cooperations.<sup>395</sup>

The local employer association ‘UVR’ (Unternehmensverband Ratingen, 2000, p. 3) called for the creation of an independent economic development corporation with extensive cross-sectoral functions and competence by referring to the good practice example of the created public-private partnership in the city of Mühleim/Ruhr.

All in all, this gives the impression that the city of Ratingen does not have the institutional capacity (due to its small size and budget) to carry out a more active and dynamic economic development policy. This, together with the absence of a university, research institutions (despite the proximity of those in Düsseldorf and Duisburg) and business incubators, leads to the preliminary conclusion that the particular case of Ratingen is lacking a critical mass to constitute a *local* innovation system as such at this lowest level of governance.<sup>396</sup> This had implications for the methodology for the thesis and subsequently the case studies were selected at the slightly higher level of city-regions, as noted in the previous chapter. These case studies are presented in the following sections.

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<sup>395</sup> Interview No. 23, transcript page 2.

<sup>396</sup> Yet, there exist nevertheless some private in-business research centres and a vocational training school. See Interview No. 23, transcript page 3.

### ***Local economic development policy and actors in the city-region of Aachen***

While, like the Ruhr area, Aachen struggled to complete structural change, it did not suffer as heavily from the decline of its industrial sectors. While the Ruhr area lost 12.6% of its employment base between 1979 and 1999 – and Dortmund and Duisburg 15.8% and 30%, respectively –, the labour market of Aachen managed to achieve a positive change of 10.7%, more than Düsseldorf's 7.1% and the Land's average of 3.5% (Landesarbeitsamt Nordrhein-Westfalen, 2000, pp. 9-10).

Following the closure of the last coal mine Sophia-Jacoba in Hückelhoven in 1997, Aachen saw a total jobs loss of 20,000 in (Sicking, 2000, p. 25). Due to its traditional industrial focus, the wider Aachen region remains characterised by a 'services gap' (Regionalkonferenz Aachen, 1999, p. 4) with a services share of only 48.7% in the chambers district in 1997 (van Eyll & Eschweiler, 2000p. 461 of the annex). The dominating manufacturing strengths in mechanical engineering & machinery and electrical & precision engineering (Aachener Gesellschaft für Innovation und Technologietransfer mbH, 1996b, p. 4 of part A) can be said to be linked to the strong technical engineering focus of the city's highly rated university. Other remaining traditional sectors include textiles, needle fabrication, glass, food and confectionary, and the paper industry (Eschweiler & Indetzki, 2000, p. 119; Sicking, 2000, p. 26; Thomes, 2000, p. 13).

Due to the lower growth potential of Aachen's traditional sectors, its performance in terms of value added and GDP levels still lack behind (Sicking, 2000, p. 26). However, there was a convergence between 1982 and 1998, during which the gap to the *Land* average in terms of

gross value added and unemployment rate narrowed (Brösse, 2000, p. 65). While the change in employment between 1979 and 1999 was positive (Landesarbeitsamt Nordrhein-Westfalen, 2000, pp. 9-10), a reverse trend occurred between 2002 and 2007 in terms of the unemployment rate, which increased further to 11.2% in 2002 (see Table 26 above). Therefore, the region's structural change was seen to be arduous and incomplete.<sup>397</sup>

These days, competencies within the Aachen economy exist in the key technology fields of new media, laser technology, environmental technologies, new materials, automotive technology and biotechnology (Industrie- und Handelskammer zu Aachen & Rheinisch-Westfälische Technische Hochschule Aachen, 2001, p. I).

#### *Aachen's research-driven excellence and cooperation promotion*

Aachen biggest assets are its leading-edge research institutions that host around 50,000 students and 17,000 qualified staff that offer opportunities for spin-outs and R&D cooperation with firms (Industrie- und Handelskammer zu Aachen & Rheinisch-Westfälische Technische Hochschule Aachen, 2001, p. III). That is also reflected in the city-region's high scores in terms of patent applications and patents filed as described before (see Table 26). For instance, the wider planning region ranked a high 18<sup>th</sup> place out of 97 planning regions in Germany for patent density with 189 patents per 100,000 employees compared to 136 nationwide.

The research infrastructure comprises, first of all, the renowned university of technology 'RWTH' (*Rheinisch-Westfälische Technische Hochschule*) and its 11 affiliated institutes as the biggest employer and educator in the region with a total budget of around €600 million

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<sup>397</sup> Interview No. 19, transcript page 2.

Euro in 2000. Excluding the medical institutions, the university's total budget was about 330 million Euro (over 657 million Deutschmark), of which just over a third came from external public and private third party funding (Rheinisch-Westfälische Technische Hochschule Aachen, 2001b, pp. XV and XVI of the statistical annex). This is a reflection of the university's highly ranked status (cf. Rheinisch-Westfälische Technische Hochschule Aachen, 2001a, p. 8) also illustrated by the German Research Council (DFG) funding for 16 special research areas (SFB) – the highest number nationwide (ibid., p. 20).<sup>398</sup> Comparing all 15 universities in North Rhine-Westphalia (excluding their medical institutions), the RWTH Aachen had by far the highest budget in the *Land* – ahead of Bonn, Bochum, Cologne, Münster and Dortmund – with the big gap principally due to the high amount of third-party funding (ibid., p. 25).

In the winter term 2000/2001, the RWTH alone employed a total personnel of 10,339 – including 410 professors and 1941 academic staff – and had 27,421 students in 9 faculties, of which 42% were registered for the highly rated engineering sciences (Rheinisch-Westfälische Technische Hochschule Aachen, 2001b, pp. 13, 21-22 and 67). Also in Aachen are the polytechnical university of applied science 'FH' (*Fachhochschule Aachen*) as well as the neighbouring (former nuclear) research centre Jülich ltd 'FZJ' (*Forschungszentrum Jülich GmbH*). The research infrastructure and competence have attracted foreign firms such as Ericsson, Ford, United Technologies and Mitsubishi which have located their research laboratories in the region (Industrie- und Handelskammer zu Aachen & Rheinisch-Westfälische Technische Hochschule Aachen, 2001, p. V).

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<sup>398</sup> The DFG supports these 'SFB' (*Sonderforschungsbereiche*) to address complex subjects over a longer time involving interdisciplinary research groups.

The university's non-profit technology transfer and continuing education office 'BTW' (*Büro Technologietransfer und Wissenschaftliche Weiterbildung*)<sup>399</sup> provides transfer services through two units: one dealing with technology and innovation transfer and one with scientific further education. It has the tasks of information management of the RWTH's scientific potential and industry-university mediation (e.g. concerning staff transfer, provision of the DACOR database for cooperation in research<sup>400</sup>, etc.) as well as initiating and promoting start-up companies from the university as a member of the start-up region initiative (e.g. by providing advisory services to young entrepreneurs) even though this was reported not be pursued more strongly to due staff shortages.<sup>401</sup>

Additionally, the BTW has important coordinating and cooperation functions both internally and externally. For instance, it is internally responsible for the executive offices of the university's five interdisciplinary fora that were established in 1988/1989, namely the Forum Space Research, Forum Environmental Science, Forum Materials Science, Forum Information Technology, Forum Technology and Society.<sup>402</sup> The participation of nearly every second professor in at least one of the five fora (Rheinisch-Westfälische Technische Hochschule Aachen, 2000, p. 7) is a sign that the interdisciplinary cooperation networks have become part of the university culture. This seems to not only foster research progress internally but is likely to be a key contributor to the high third-party funding the university receives and the recently awarded status of an elite university following a successful application with the concept

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<sup>399</sup> For more information on the BTW, see its technology transfer and [www.nrw-wissentransfer.de](http://www.nrw-wissentransfer.de) leaflets and its websites <http://www.gruendungen.rwth-aachen.de> and <http://www.money-study-go.de>.

<sup>400</sup> The DACOR database for cooperation in research is available at <http://www.dacor.rwth-aachen.de>

<sup>401</sup> Interview No. H, transcript page 2.

<sup>402</sup> See the BTW's technology transfer and [www.nrw-wissentransfer.de](http://www.nrw-wissentransfer.de) leaflets and the website [http://www.rwth-aachen.de/zentral/dez4\\_InterdiszipForen.htm](http://www.rwth-aachen.de/zentral/dez4_InterdiszipForen.htm)

entitled ‘RWTH 2020: meeting Global Challenges – The Integrated Interdisciplinary University of Technology’,<sup>403</sup>

Furthermore, the BTW is the executive office for two external between university institutes and businesses in the fields of information technologies and biotechnology. This concerns first of all the industry club/network of REGINA (*Regionaler Industrie-Club Informatik Aachen e.V.*)<sup>404</sup> that in 1991 emerged out of the university’s interdisciplinary IT forum.<sup>405</sup> REGINA brings together 56 firms, 19 university departments & research institutions and 4 technology transfer organisations to foster cooperation and clustering in the field of IT (Regionaler Industrie-Club Informatik Aachen e.V., 2001, pp. 22-31). This cooperation, for instance, led to a 250,000 Euro sponsorship of a new university IT chair by four firm members of REGINA (Schiffers, 2001). LifeTec Aachen-Jülich e.V.<sup>406</sup>, the other public-private partnership for which BTW provides the executive office, is an umbrella network in the field of LifeSciences/biotechnology established in 2000.

In addition, the BTW cooperates with the ‘competence centre automotive region Aachen Euregio Maas-Rhein’, in short *car e.V.*, an independent, active network of companies and research institutions in the area of automotive engineering set up in 2001 (further explained later on).<sup>407</sup> Another network linked to the university’s institute for plastics processing ‘IKV’ (*Institut für Kunststoffverarbeitung*) is the ‘INTRA’ network (*Interessengemeinschaft*

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<sup>403</sup> As a result, the university receives additional funding from the national excellence initiative competition (Ministerium für Innovation, 2006, p. 4).

<sup>404</sup> For more information on REGINA, see <http://www.regina.ict-gmbh.de>

<sup>405</sup> Interview No. 26, transcript page 6.

<sup>406</sup> LifeTec Aachen-Jülich e.V. was established in June 2000 out of the structures of the euregional working group on biotechnology (*Arbeitskreis Biotechnologie*) (Rheinisch-Westfälische Technische Hochschule Aachen, 2001a, p. 8) More information is available at [http://www.rwth-aachen.de/zentral/dez4\\_LifeTec\\_LifeTec.html](http://www.rwth-aachen.de/zentral/dez4_LifeTec_LifeTec.html)

<sup>407</sup> For more information about *car e.V.* see <http://www.car-aachen.de> as well the Fromhold-Eisebith & Eisebith (2008) article evaluating the effects of (automotive) cluster promotion with the example of *car e.V.*

*innovative Aachener Unternehmer der Kunststoffbranche e.V.*), which brings together 20 firms in this interest group of innovative enterprises for plastics engineering in the Aachen region.

The extent of the active external coordination and cooperation role of the university transfer unit is arguably more advanced than in other universities. This is also linked to cooperation agreements the BTW has with regional organisations for the promotion of trade and industry and the regional technology centres. A cooperation agreement between the university (RWTH) and the chamber of commerce and industry (IHK) has existed since 1981 and is said to have been influential in the establishment of technology transfer in the region (Pagel & Herwig, 2000, p. 82) and for the establishment of business networks or cluster organisations such as REGINA and LifeTec.<sup>408</sup> However, the cooperation process had to overcome some hurdles at the beginning and required a change of the attitude amongst the university's stakeholders that technology transfer concerned large international firms and not local SMEs (Eschweiler & Indetzki, 2000, p. 121).

For a long time, Aachen seemed unable to develop effectively its enormous potential for technology transfer (Regionalkonferenz Aachen, 1999, p. 6). This is partly because the region is 'too small to absorb high transfer ratios from this university of important international reputation' and because students get 'qualified out' due to a 'lack of sufficient adequate job opportunities' (Fromhold-Eisebith, 1992, p. 282). Put simply, the high-profile university departments and institutes, as well as their students, are looking for connections to companies from outside the region. For instance, half of the 150 annual IT graduates are reported to leave the region according to the REGINA network despite the vacancy of around 800 IT posts in

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<sup>408</sup> Interview No. E, transcript pages 6-9



the Aachen region (Schiffers, 2001). A lack of ‘regional embeddedness’ or ‘regional responsibility’ amongst university actors was reported by two interviewees. Furthermore, two interviewees pointed to the more decentralised university system with strong outward-orientated professors with a world reputation that are allocated parts of the acquired-third party funding (‘principalities’), which may mean that a desired policy towards a regional cooperation focus cannot always be enforced.<sup>409</sup>

In order to facilitate industry-university cooperation, the chamber and university published a cooperation handbook (Industrie- und Handelskammer zu Aachen & Rheinisch-Westfälische Technische Hochschule Aachen, 2001) and useful sectoral reference handbooks e.g. for environmental and textile technologies (Industrie- und Handelskammer zu Aachen, 2001a, 2001b) that list businesses and research institutions.

The dynamic higher education infrastructure in Aachen has for a long time been complemented by innovative policy developments, presented in the following section.

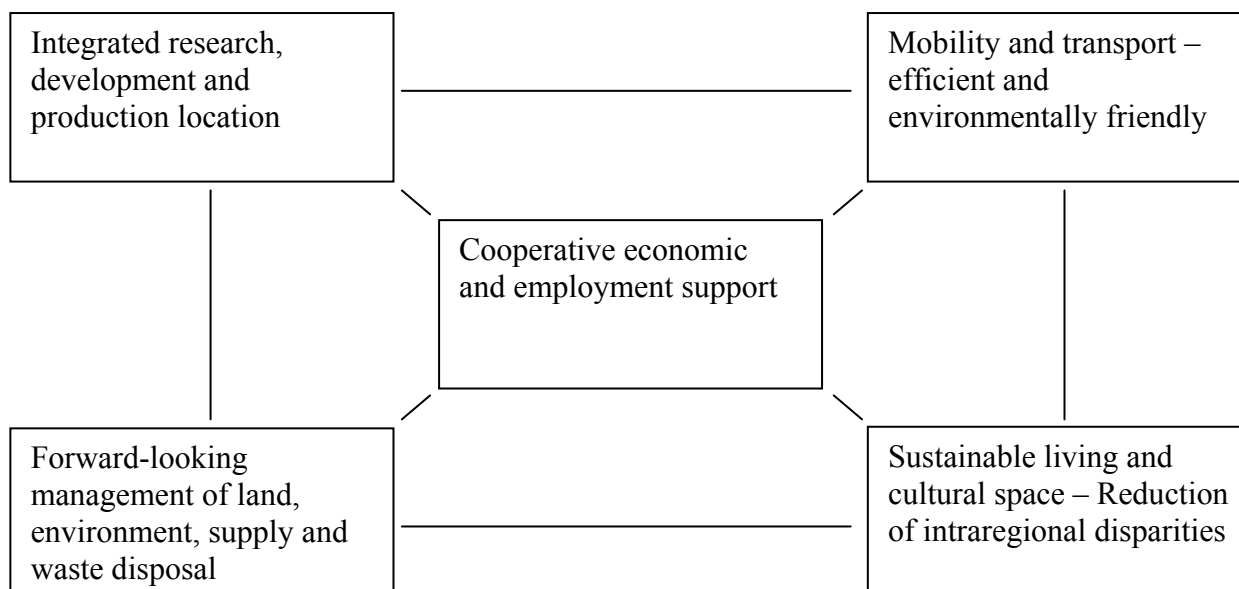
#### *Aachen’s regional development concepts*

The city of Aachen is sometimes said to be North Rhine Westphalia’s master pupil or test bed for new policies and initiatives. Its wider region was the first to develop a regional development concept (*REK*) in 1991 and was amongst those that continued the process in a second round and presented an updated ‘*foREK*’ version (*Fortschreibung Regionales Entwicklungskonzept*) in 1999 (Regionalkonferenz Aachen, 1999). Its five strategic areas are depicted in the following Figure 30:

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<sup>409</sup> Interview No. 25, transcript page 8; No. 47, page 3; No. 19, page 4; and No. 9, page 4.

Figure 30 Central strategic areas of the regional development concept 'foREK'



Source: Regionalkonferenz Aachen (1999, p. 10), own translation.

Placed at the centre of this second regional development concept is a desired cooperative and holistic approach to tackle economic, employment and qualifications issues. A number of activity fields have been outlined for the strategic area of 'cooperative economic and employment support' (ibid., p. 11). This comprises:

- *Regional economic support*: development and support of the existing base, relocation marketing, start-ups, venture capital and support instruments;
- *Initiatives and special tasks*: business cooperation, crafts, services, support to women;
- *Integrative structural, employment and qualifications policy*: labour market, spatial and gender specific initiatives and basic jobs; and
- *Forward-looking education system*: vocational and further education.

This strategic area is linked to the other strategic areas, most directly with a reduction of the urban-rural intraregional development gap and a better use of the region's research and technology potential that is regarded as the most important factor condition.

Two years after the last closure of a coal mine, the foREK stated that in order to become a 'technological competence region', the region must 'strengthen the strength, but also identify new strength' because 'real "world-class regions" create clustering along their core competences' (ibid., p. 13). To do so, the concept suggested more cross-border cooperation within the Euregio Meuse-Rhine (EMR)<sup>410</sup> in a selected number of common regional competency fields with growth potential such as ICT/multimedia, life sciences, and automotive & rail (ibid., pp. 13-14). Linked to these fields, it was planned to undertake international location marketing and the establishment of '(eu)regional' business cooperation as specific priority measures (ibid., p. 12).

In this respect, the foREK concept picked up some of the ideas and measures that the chamber of commerce and industry had tabled to the regional conference in 1998 with the IHK strategic paper entitled 'The Aachen region 2015 – Competences for Europe' (Drewes, 2000, pp. 117-118; Regionalkonferenz Aachen, 1999, p. 12).

An EU-funded INTERREG project (2002-05) entitled 'Heartbeat of Life Sciences in Europe – Meuse Rhine Triangle'<sup>411</sup> is judged to have 'managed to better connect academia and industry across borders' in this field, while overall 'cross-border collaboration [...] has not been

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<sup>410</sup> The Euregio Meuse-Rhine comprises the wider Aachen region in Germany, the Wallonian province of Liège (including the German-speaking community) and Flemish province of Limburg in Belgium, and the Dutch province of Limburg in the Netherlands that includes the city of Maastricht. For more information on the Euregio Meuse-Rhine see <http://www.euregio/mr.org>

<sup>411</sup> For more information on the project see <http://www.heartbeatineurope.org>

sufficiently developed' and further potential for co-operative technology development exists also in other fields (Fromhold-Eisebith, 2007, p. 22).

Besides these proposed measures, it is, however, hard to identify in the the *foREK* an holistic and focussed cluster strategy and systemic innovation support. Interestingly, the *foREK* concludes by pointing to a need for governance action with a call for an intraregional institutional reform and an intensification of the cooperation between the various (eu)regional partners such as chambers, universities and development agencies in order to successfully complete the region's structural change (ibid., p. 14). Given the broad phrasing of this statement, it may well be not just directed at a an improved coordination between the regional actors and those of the Euregio Meuse-Rhine (see Breuer, 2000, p. 107) but also at intraregional institutional reform. Regarding the former, progress was made in that *REGIO Aachen e.V.* – the body representing the Aachen region in the Euregio – was merged with the regional conference for developing the regional development concepts.

An improved internal coordination of the cooperation of technology transfer institutions was amongst the eight measures proposed by an earlier EU-funded 'RITTS' project for 'regional infrastructures and strategies for technology transfer and innovation support' (Aachener Gesellschaft für Innovation und Technologietransfer mbH, 1996a, 1996b, 1996c, 1996d; Europäische Kommission, 1995a).<sup>412</sup> The importance of political support and the dependence on the social process are mentioned as key success factors in this respect (Aachener Gesellschaft für Innovation und Technologietransfer mbH, 1996a, pp. 18-19).

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<sup>412</sup> For more information see [http://www.ris-ritts.epri.org/library/lib\\_regional.html](http://www.ris-ritts.epri.org/library/lib_regional.html) and <http://www.ac-regio.de/ritts/index.html>

The preliminary RITTS analysis had indeed concluded that overall the ‘regional network of technology transfer and innovation support is organised around the Chambers of Commerce, AGIT [Aachen’s corporation for innovation and technology transfer further discussed below] and the RWTH; however the networking is rather low between the various types of organisations and there is no coordination in their activities’ (ibid.,1996b, p. 20 of part A) which ‘deprived the region from synergies and ends up with overlapping (the reasons are both institutional and personal)’ (ibid.,1996b, p. 20 of part B4).

A comparison of the cooperation between the different technology transfer organisations showed that the chambers and some of the university’s technology transfer units were intensely networked, the R&D institutions were averagely networked, while technology and start-up centres, commercial transfer support and other groups were weakly networked with the other actors (ibid.,1996a, pp. 20 and 24).

The suggested eight measures included the implementation of pilot projects for the support of business partnerships along the value chain for potential clustering, an improvement of venture capital provision, the introduction of innovation management techniques via technology transfer personnel and business mentoring – some of which are partly reflected in the *foREK* concept.

In addition to the lack of an overall coordinated approach, the absence of an explicit focus on SMEs reported in the RITTS intermediate report (ibid.,1996b, p. 16 of part A) concerning technology transfer activities is noticeable within the *foREK* concept.

### *Aachen's regional start-up initiative*

Given the indicated lack of cooperation and overall systemic technology transfer support offered, a partial success story can be seen in the coordinated approach of the 'Aachen start-up region' initiative (GründerRegion Aachen 2000, 2001). Since May 1999, this initiative presents the different start-up support measures under an umbrella organisation and brand with the aim to increase the number of new ventures in the wider Aachen region covering the city and its neighbouring counties of Aachen, Düren, Euskirchen and Heinsberg.

A contributor to the development of this initiative was the increasing competition from other regions in the area of start-up policy measures – e.g. the NUK business plan competition launched in Cologne in 1997 being advertising beyond the city region<sup>413</sup> – and a reported existing 'discontent', 'oversupply' and overlapping of similar events.<sup>414</sup> The reported discontent was probably a reason why the initiative was set up with ad-hoc financing of partners but without its own legal entity so that the potentially difficult task of dissolving an association with assets was avoided in the case of failure of this initiative.

With a broad focus on the four areas of technology, services and trade, crafts and business succession, the initiative aims to achieve the following:

- Intensification of start-up support as an advisory offensive;
- Increase of transparency of support;
- Optimisation of the advisory tools; and
- Awareness-raising amongst potential entrepreneurs through marketing and public relations.

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<sup>413</sup> For more information on the association for new entrepreneurship Rhineland 'NUK e.V.' (*Neues Unternehmertum Rheinland*) see <http://neuesunternehmertum.de>

<sup>414</sup> Interview No. F, transcript page 10, 13 and 15.

Although the initiative has a back office based at the location of Aachen's chamber of commerce and industry, it effectively consists of a kind of virtual one-stop-shop, which groups the fragmented 40 advisory institutions for start-up support without centralising them within one organisation. A steering committee of representatives of two local banks, the chambers, AGIT and the economic development offices takes the decisions for the broad direction of the initiative, while a working group of advisors from the service providers has the task to further its implementation.

Since the set-up of a common separate start-up hotline and internet presence in 1999 – that was advertised with a logo and phrase 'we make entrepreneurs' –, the initiative offers first contact phone advice from the chambers, provides information material, and channels requests for appointments to one of the participating organisations according to their specific competencies.<sup>415</sup>

An information pack was developed in the second year of operation and 4790 copies were distributed in Aachen and its neighbouring counties, for example at relevant fairs and through university events and courses (GründerRegion Aachen 2001, p. 2). It includes a detailed start-up reference book, guidelines for the different steps, such as writing a business plan and useful contacts in the support institutions.

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<sup>415</sup> For more information on the 'start-up region Aachen' initiative, see <http://www.gruenderregion.de>

Additionally, the event calendar on the initiative's website, as well its quarterly newsletter, *Gründer*, allowed the different support providers to coordinate their events and avoid overlaps.

In its first year, the initiative managed to involve 17 established businessmen in providing advice to potential entrepreneurs and acting as start-up mentors (GründerRegion Aachen 2000, section 2.2.1). Complementary, it organised an event in 2001 with regards to business succession. It also installed two information terminals (*VOSS – Virtueller-One-Stop-Shop*) at the technical university (RWTH) and the university of applied sciences/polytechnic (FH).

Complementary to the *Land* initiative 'GO!', the concept for this initiative was jointly developed by Aachen's chamber of commerce and industry, AGIT and the local branch of the *Sparkasse*, which also represents the link to the regional awards of the bank's national 'StartUp' competition.<sup>416</sup> Two further award competitions for start-ups were held in 2000: in cooperation with the 'female entrepreneurs network of the Aachen economic region'<sup>417</sup>, the initiative launched the '*VISION*' award for business concepts of female entrepreneurs; with the chambers of handicrafts and another bank, the initiative carried out the second edition of the competition '*Weiter so!*' for young entrepreneurs in crafts.

Overall, the initiative claims to have had 16,019 first contacts with interested potential entrepreneurs through its dense support infrastructure between May 1999 and June 2000,

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<sup>416</sup> The 'StartUp' initiative supported by the *Sparkasse* bank, the consultancy McKinsey & Company and the *stern* magazine comprise the competition, a conference and an internet-based planning game for pupils. The initiative introduced two phases for the competition 2001/2002 with a submission first of a basic business concept idea and calculations, and later a detailed business plan – similar to the start2grow competitions of dortmund-project – and also launched the first German start-up award (*Deutscher Gründerpreis*) in 2002. For more information, see the brochure 'StartUp Kurzinformation 2002' and <http://www.startup-initiative.de>

<sup>417</sup> For more information on the '*Netzwerk für Existenzgründerinnen in der Wirtschaftsregion Aachen*', see <http://www.Netzwerk-gruenderinnen.de>



which led to nearly 4,000 advisory meetings that may have contributed to some of the 5,000 new ventures in crafts, trade and high-tech registered in the chamber district during this timeframe. While Aachen's absolute figure still lags behind other regions, it saw a 35% increase of registered firms between 1990 and 1999, which represents a ranking as the second most dynamic region in a comparison of 12 selected chamber districts nation-wide (GründerRegion Aachen 2001, pp. 13-14). However, this early progress was achieved prior to the set up of the start-up region initiative and thus should rather be attributed to the *Land's* start-up offensive 'GO!' (*Gründungsoffensive*). After the start of GO!, the number of interested potential entrepreneurs making contact with the Aachen chamber of commerce and industry was said to have doubled to 3,000 individual advisory meetings in 1997 (Brösse, 2000, p. 66).

The success of the 'start-up region Aachen' initiative still has to be evaluated itself. While on paper the initiative looks well-coordinated and the virtual signposting is a very useful tool for potential entrepreneurs to find the most suited advisor more quickly, it seems still not to have enabled more closer practical cooperation between the providers of start-up support. An early analysis stressed the importance of more cooperation for achieving a better coordination and transparency of the different advisory services (GründerRegion Aachen 2001, pp. 12-13), which seems crucial for the participation of the practitioners and thus success of the initiative.<sup>418</sup> One interviewee pointed out that the initiative is 'patchwork', lacks organisation and is 'the best example of how little coordination' there is to the extent that one important player decided not to cooperate at all.<sup>419</sup> However, another interviewee also stated that

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<sup>418</sup> An exchange of the working group on establishing aids for the advisors for structured first contacts had to be postponed for instance due to different opinions about the choice of presentations.

<sup>419</sup> Interview No. 13, transcript page 11.

conflicts in this field have decreased in recent years due to a higher concentration of specific target groups.<sup>420</sup>

Therefore, this initiative can be viewed as a partial success in that it appears externally to be a success in terms of having a clear profile and marketing and its virtual coordination but is still in the early stages of internal coordination and cooperation between actors from an oversupply of start-up support organisations.

Nevertheless, given the university's potential for spin-outs from high-calibre graduates and scientific personnel, the region's focus on entrepreneurial support seems particularly appropriate from a strategic point of view. According to AGIT, 85% of all firms located in the region's technology and start-up centres stem from the university sphere (Foerster, 2000). Around 450 spin-outs from the university were created between 1984 and 2001, which created around 4000 jobs directly with a similar indirect effect (Industrie- und Handelskammer zu Aachen & Rheinisch-Westfälische Technische Hochschule Aachen, 2001, p. V).

Furthermore, the 1% start-up ratio amongst Aachen's university graduates was above the national average of only 0.4% (Industrie- und Handelskammer zu Aachen, 2000, p. 22). Yet, the aim of the university's technology transfer unit was to raise Aachen's graduates start-up ratio to 2%.<sup>421</sup>

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<sup>420</sup> Interview No. 25, transcript page 18.

<sup>421</sup> Transcript page 6.

### *Aachen's dense technology centre network*

The efforts for more entrepreneurial activities can further build upon an oversupply of twelve technology and start-up centres in the wider region that are said to have reached the 'absolute degree of saturation' (cf. Eschweiler & Indetzki, 2000, p. 142). In 2000, they provided a total of 90,000 m<sup>2</sup> of commercial space and advisory services to more than 450 firms with 3700 employees. The centres apparently the interest of around 40 to 60 firms annually, of which eventually 20 young firms decide to locate there (Foerster, 2000).

The region's largest centres are the technology park Herzogenrath 'TPH' and the technology centre at the Europa square 'TZE' (*Technologiezentrum am Europaplatz*). The TPH opened in 1989 just outside the boundaries of the city of Aachen after the TZE was approaching its capacity limits. The TZE had opened in 1984 as Germany's second technology centre but as the first of many that were set up in the following years in North Rhine-Westphalia.<sup>422</sup> The TZE and the city's smaller sector-specific medical technology centre 'MTZ' (*Medizintechnisches Zentrum*), which opened in 1993 in proximity to the university hospital, are both operated by AGIT, which is discussed further in the following part. The start of the construction of another bio technology centre 'BTZ' (*Bio-Technologiezentrum*) close to the MTZ was planned for the end of 2001.

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<sup>422</sup> The TPH offers 25,000 m<sup>2</sup> for around 100 firms with 1,100 jobs, while the TZA offers 14,300 m<sup>2</sup> for 70 firms with 929 employees and the MTZ 4,200 m<sup>2</sup> for 20 firms with 150 jobs. For an overview and more information on the region's technology and start-up centres, see the special supplement to the 03/2000 edition of the *Gründer* newsletter (Foerster, 2000). The first German technology centre 'BIG' (*Berliner Innovations- und Gründerzentrum*) was opened in Berlin in 1983 (Henschel-Neumann, 1988, p. 53).

The supporting advisory services provided by the technology and start-up centres in Aachen contributed to the low failure rate of 10% of start-ups according to its operator AGIT (Foerster, 2000). Indeed, technology transfer within the Aachen region is still viewed as a good practice example. This concerns not only Aachen's technology centre (Gesellschaft für Wirtschaftsförderung in Nordrhein-Westfalen mbH, [1987], p. 33), which was mentioned by interviewees from other regions,<sup>423</sup> but also the cooperation between firms and the Fraunhofer institute for laser technology 'ILT'.<sup>424</sup>

Not only did the Fraunhofer institute undertake over ten years over 1000 R&D projects on industry-relevant problems, applied for 250 patents and was the origin of 10 spin-offs from former staff, but it was also able to attract ten firms to locate to its application competence centre. Long-term cooperation contracts with these firms gave them their own office space and access to the technical infrastructure and separate laboratories that was intelligently electronically managed according to project teams. A collaborative culture based on transparency, good communication and trust was said to have been built to the extent that two competing leading laser producers both used the centre for the development of a common platform (Poprawe & Bauer, 1999, pp. 690-692).

#### *The central role of AGIT – Aachen's corporation for innovation and technology transfer*

A special role in Aachen's system of business and support organisations is played by Aachen's corporation for innovation and technology transfer AGIT Ltd. (*Aachener Gesellschaft für Innovation und Technologietransfer mbH*), which was founded in 1983 to

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<sup>423</sup> Interview No. 46, transcript page 2.

<sup>424</sup> Interview No. 18, transcript page p. 4

operate the first of 12 technology centres (MTZ) in the wider Aachen area (Eschweiler & Indetzki, 2000, p. 142).<sup>425</sup>

While at the beginning AGIT was only foreseen to operate for the city and the neighbouring county of Aachen, its institutional set-up was soon widened by bringing together the bodies of the five counties of the wider Aachen region (Mahnke, [1987(?)], pp. 18-19), the chambers, the large research institutions as well as representatives from the private sector which, by 1997, had provided a capital contribution of around 3.5 million Euro (Eschweiler & Indetzki, 2000, p. 129).<sup>426</sup>

AGIT states as its most pressing aims the creation of sustainable jobs and the renewal of the regional economic structure. Its main activities comprise advisory services for technology-orientated entrepreneurs, innovative business (especially developed by the city's higher education institutions) and international investors, the international location marketing of Aachen as a technology region, the support of selected technology fields, and the management of both of the technology centres in Aachen. With regards to the latter, it is said to have had a positive performance on employment effects (Fromhold-Eisebith, 1992, pp. 206-207; Körfer & Latniak, 1994).

AGIT's role has evolved and widened to the leading regional economic development agency in the region, illustrated by the fact that it hosts the back office for the regional conference that is responsible for the regional development concept. Correspondingly, three areas of

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<sup>425</sup> The technology centre at the Europa square 'TZE' (*Technologiezentrum am Europaplatz*) was opened in June 1984 (Eschweiler & Indetzki, 2000, p. 124; Foerster, 2000).

<sup>426</sup> At its beginnings, AGIT was only to serve the city of Aachen, but the planning conference of 1985, a spatial and functional extension was decided (Eschweiler & Indetzki, 2000, p. 129).

work can be identified for AGIT: technology centres, technology transfer and technology-orientated economic development support and location marketing (Eschweiler & Indetzki, 2000, p. 129).

Given its unique combined function in the wider region, AGIT assumes the moderating role of the mediation process between science, intermediary actors and industry, as well as the leading role for providing impulses into thematic cooperation and lobbying networks, and market analysis for specific science and technology fields.<sup>427</sup> This has consequently lead to some reported overlap with the other governance actors in the city-region (Meyer, 2000, p. 42).

The RITTS intermediate report (Aachener Gesellschaft für Innovation und Technologietransfer mbH, 1996c, p. 31) points out the external expectation for the need to maintain the expertise in the implementation of joint projects and the search for additional funding, as well to pressure from political scrutiny concerning the efficiency of technology policy. Concerning the latter, one external interviewee further indicated that the role of politicians as part of AGIT's steering committee was not helpful giving the political criticism and that apparently AGIT were becoming more dependant on third-party funding.<sup>428</sup>

Given the particular role of AGIT, the region's economic development corporations and offices were said to focus their activities more on attracting firm relocations and providing support to the established business base, while innovation and technology transfer remained a more implicit role (ibid.,1996c, p. 31). As economic development support is also the role of

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<sup>427</sup> AGIT's website highlights this development of changing roles. See <http://www.agit.de>, last accessed December 2006.

<sup>428</sup> Interview No. G, transcript page 2 and No. F, transcript page 22.

AGIT, it is thus not surprising that there is no additional public-private partnership 'corporation' besides the economic development office of in the city administration, whereas the region's surrounding counties of Aachen, Heinsberg and Düren do have such body (Brösse, 2000, p. 63).

### *Aachen's competitive network*

Some of the earlier reported criticism concerning the coordination of Aachen's business and innovation support system still very much appeared to be the case in the investigated period of 2002-2003. For instance, one interviewee highlighted that there were 'too many captains' and 'everybody is trying to be the dominant player' to the extent that 'if you cooperate with one, the other looks at you in a bad way'.<sup>429</sup> It was said that 'close cooperation of institutions has failed due to egos and power interests' and that the 'grass is burned' between intermediaries with the effect that new initiatives were said to be best not discussed and arranged with others due to a lack of trust and some organisations seeing each others as enemies. Instead, and a plea was made for less policy and more foresight and annual planning with quantified targets for specific sectors and areas.

A different interviewee reported the 'fighting over the same pot' again and again with another organisation and the potential for more cooperation in particular areas such as location marketing.<sup>430</sup> In this area, the scope for more cross-cluster marketing was identified and pursued via an external consultant as a 'bypass strategy' due to interpersonal animosities. Awaiting a change of staff was the solution mentioned by one interviewee for resolving the reported conflict.

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<sup>429</sup> Interview No. 13, transcript pages 2-3, 5-6 and 11.

<sup>430</sup> Interview No. 19, transcript pages 8-10.

Nevertheless, another interviewee states that while there are still ‘very autonomous, very self-confident individual organisations, they managed to develop a culture of cooperation in the last 10/15 years’ in the Aachen region through informal structures even though several intersections in the network exist.<sup>431</sup> However, ‘vested own interests for the survival of institutions’ and individual political orientations were said to be a more intensive obstacle to cooperation. At a higher level, the multiple levels of governance were criticised for being insufficiently formalised with no binding responsibility, owner and resources.

The strongly raised interpersonal conflicts and consequent lack of cooperation cited in this section is also reflected in the type attributed to relationships with other local core institutional actors within the local economic and innovation support system. Interviewees were asked to complete a supporting matrix tool (see appendix VI) to list other organisations according to their level of activity and the nature of the relationship distinguished broadly between competitive, collaborative or a mixture of both. Based on a non-representative social network analysis (see the following table at the end of this section), the results show that more network combinations with other local actors were said to be a mixture of a competitive and collaborative relationship (16) than purely collaborative (14). This points to a lower degree of cooperation within the system, especially bearing in mind the expected and resulting tendency across all case studies that very few relationships are rated as purely competitive. A positive point is that good cooperation with local bank institutions was mentioned.

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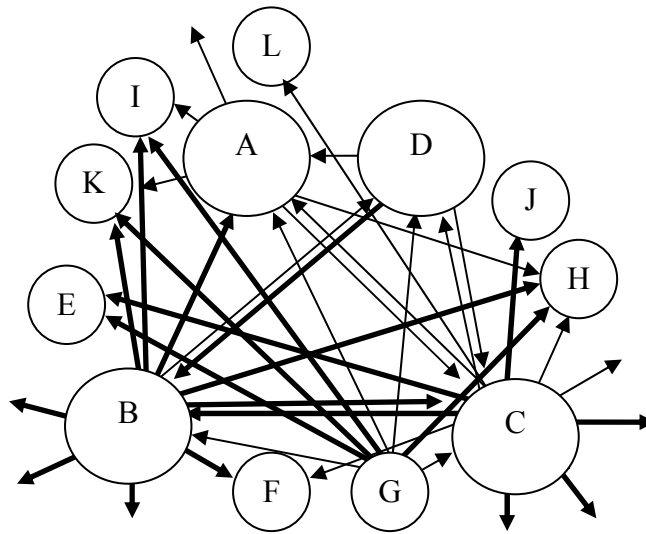
<sup>431</sup> Interview No. 47, transcript pages 6 and 9.



The accompanying figure depicts the relationships according to the matrix results and highlights, for instance, that relationships between the key institutional actors – represented by larger circles – are viewed more as a mix of competition and cooperation. Moreover, it shows that relationships with one organisation are viewed by nearly all others as collaborative, while another organisation is viewed by none as purely collaborative.

A predominantly collaborative mentioning of relationships is found with regional actors indicating good connections at the *Land* level and umbrella networks, while several linkages with national and EU/international actors are also mentioned, more with a balanced assessment. The latter is a reflection of the international orientation of the ‘European’ city-region due to its geographical border location next to Belgium and the Netherlands and the increasing activities within the transnational Euregio Meuse-Rhine initiative.

Figure 31 Network of relationships of the local actors in Aachen



Note: Circles represent local organisations within Aachen. Their names have been omitted for privacy reasons. The thickness of arrows indicates the nature of relationships mentioned as explained below. Arrows pointing at no particular circle represent relationships with regional organisations at *Land* level.

- **Collaborative relationship** mentioned with organisation pointed at.
- **Mixture of competitive and collaborative relationship** mentioned with organisation pointed at.
- **Competitive relationship** mentioned with organisation pointed at.

Table 27 Relationships within Aachen’s business and innovation support system

Level of involvement/ Relationship to other organisations	Local City-region (Aachen)	Regional (Land NRW)	National (Germany)	EU / International Interregional (EU)
<b>Competitive</b>	<b>0</b>	<b>0</b>	2	3
<b>Mixture of competitive and collaborative</b>	<b>16</b>	<b>1</b> (****)	3	2 (* )
<b>Collaborative</b>	<b>14</b>	<b>6</b> (**)	4	5
<b>None of the above or no connections</b>	<b>0</b>	<b>0</b>	0	0

Note: The numbers indicate the network combinations of organisations entered in the institutional matrix mapping tool. There were no fixed numbers or type of organisations that had to be mentioned by interviewees. Stars (\*) represent a double entry of an organisation that was (re)moved, e.g. cooperation with local actors at the international level to be displayed as an entry at the local level. See footnote 537 for more information.

Source to figure and table: Own creation based upon supporting matrix tool completed by 5 local interviewees (one academic was not asked to complete it).

### *Local economic development policy and actors in the city-region of Dortmund*

While Dortmund's industrial tradition of coal production ended in the 1980s and steel production was reduced to refinements by 2000, the city is still one of Europe's biggest brewery locations although with significantly lower dominance in terms of employment.<sup>432</sup> Overall, Dortmund suffered severely from employment reductions in the 1990s; around 15,000 jobs in industry were lost between 1990 and 1997 (see Stadt Dortmund, 2001, annex 2). Consequently, the city had to cope with a very high unemployment rate of 14.7% in 2002. While the city did not manage to reduce the structural unemployment – it even rose slightly to 15.5% by 2007 –, Dortmund considerably raised its GDP ratio per employed person from nearly €54,000 in 2001 to nearly €64,000 in 2006 (see Table 26).

As the old sectors coal, steel and beer have declined, new sectors are emerging but are not yet fully developed, such as microsystems technology (Bömer, 2001; Jonas, Berner, Bromberg, Kolassa, & Sözen, 2002, p. 47; Dieter Rehfeld & Wompe, 1999). A number of young but internationally recognised software developing firms have been regarded as the core focus for the city's structural change as reflected in the city's economic development initiatives. Dortmund's regional airport has become a new city asset in terms of infrastructure following the airport's enlargement in 2000 and a consequent increase in the route network and passenger numbers (Kommunalverband Ruhrgebiet, 2001, p. 29).

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<sup>432</sup> By 2000, 35 beer brands were still brewed in the city (Industrie- und Handelskammer zu Dortmund, 2001, p. 44) with the Brau und Brunnen AG producing 6 million hecto litres of beer annually, while the Dortmunder Actien-Brauerei (DAB) produced around 4 million (Kommunalverband Ruhrgebiet, 2001, pp. 22-23).

Dortmund's business and employment promotion agency 'WBF-DO' (*Wirtschafts- und Beschäftigungsförderung*) as a unit of the city's administration with about 70 staff has the classic economic development tasks of looking after its business base, location marketing and providing advisory services concerning commercial locations and financial support schemes, as well as several tasks linked to the field of employment (and start-up) support as its name indicates.<sup>433</sup> This comprises managing the local labour market fund and coordinating functions concerning European Social Funds, and equality and youth related activities (Bömer, 2000, pp. 141-143; Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 33; Küpper & Röllinghoff, 2000, pp. 23-24).

In the early 1990s, the WBF-DO took the lead for the work on the Dortmund part of the regional development concept (REK) for Dortmund/Unna/Hamm (Bade & Theisen, 1997, p. 124). The regional development concept for the wider Eastern Ruhr area and its action programme did not appear to have had a significant influence in Dortmund's economic development strategy judging from overlaps in terms of content according to the KVR (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. XXXIII-XXXVIII of annex).

The WBF-DO viewed itself as a 'learning organisation' (Stadt Dortmund, 1999, p. 2) and added sectoral and technology development as another activity field in 1997. The combination of business and employment functions is also clearly reflected in the city's strategic approach in terms of sectoral skills development and personnel recruitment (cf. Bömer, 2000, pp. 141-143).

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<sup>433</sup> Interviewee from WBF-DO, transcript page 2.

*dortmund-project: organisational innovation for local cluster policy making*

The city's sectoral and cluster orientation was further enhanced at the end of 1999 when a project group developed a future concept for a 'new' and 'fast' Dortmund as a response to the end of steel production in Dortmund. This led to the creation of the 'dortmund-project' in May 2000 as a public-private partnership by the City of Dortmund (initiated through WBF-DO) and the steel corporation ThyssenKrupp Inc., in close cooperation and strategic input from the consultancy McKinsey and Co. Inc.<sup>434</sup>

The consultancy input was financed by Thyssen Kruppen Inc. as a corporate contribution – i.e. 'regional political responsibility'<sup>435</sup> – to the city's further structural change necessary to compensate for the firm ending steel production in the city.<sup>436</sup> The McKinsey study on the future concept is said to have played a key role in developing dortmund-project's strategic business plan and cluster approach.<sup>437</sup> While the McKinsey study picked up the results of an earlier IAT study (Rehfeld & Wompel, 1999) that identified the three innovation and competence fields in Dortmund, it perhaps was rather more instrumental in developing the implementation strategy for the cluster initiatives in these areas and in bringing attention to the project's objectives. Inspiration for commissioning the work to McKinsey was the consultancy's role in developing the model regional economic development concept for Wolfsburg Inc. (AG).

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<sup>434</sup> For more background on the establishment of dortmund-project, see the supplement of the magazine 'Ruhr Nachrichten PLUS extra', volume 19 – January 2002, Dortmund.

<sup>435</sup> Interview No. 36, transcript page 3.

<sup>436</sup> See the article of Heinrich Kahmeyer, the ThyssenKrupp representative for Dortmund on the establishment of dortmund-projects entitled 'Die Vorgeschichte', see the supplement of the magazine 'Ruhr Nachrichten PLUS extra – Information für Handel, Handwerk und Gewerbe', volume 19 – January 2002, pp 2-3.

<sup>437</sup> Wolfsburg Inc. (AG) is a joint subsidiary of the Wolfsburg city and its main employer Volkswagen (VW). For more information on the Wolfsburg AG, see <http://wolfsburg-ag.com>

Another model reference in this context was Pittsburgh's experience with a similar economic background especially in terms of cooperative planning processes and effective public-private partnership (Kunzmann, Lang, & Theisen, 1993), where McKinsey also provided a SWOT analysis in 1997 (Güntner, 1999). This link also led to an international cooperation agreement with the Pittsburgh Regional Alliance (PRA) in December 2001, mutual delegation visits and cooperation projects (Wirtschafts- und Beschäftigungsförderung Dortmund, 2002) as well as with the establishment of the internationalisation team at WBF-DO.<sup>438</sup>

The dortmund-project is seen as 10 year project with the aim to create 70,000 new jobs by 2010 (dortmund project, 2000, p. 5; Opl, 2002). This target has been set high <sup>439</sup> – probably deliberately too high – but the boldly stated ambitious vision together with the aim to achieve it quickly, as implicit in the pronounced slogan 'the new Dortmund is the fast Dortmund' (*'Das neue Dortmund ist das schnelle Dortmund'*), certainly succeeded in gaining attention. One interviewee highlighted the following in this respect:<sup>440</sup>

'People listen with such a figure. They may not believe that one can achieve this but they listen. And if one can provide them with reasonable arguments, they may then even believe it. It is not really that we have thought this figure up and said let's do it, but we have thought about it and deliberated it [...] to use the sledgehammer approach'.

The dortmund-project focuses on specific projects on Dortmund's attractiveness as a business location and on supporting the growth and development of businesses in the following three future growth sectors or clusters with high innovation potential (Rehfeld & Wompe, 1999):

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<sup>438</sup> See also Wirtschafts-report of WBF-DO of February 2002.

<sup>439</sup> Interview No. 34, transcript page 1.

<sup>440</sup> Interview No. I, transcript page 8.

information technologies (IT, including e-commerce); microsystems technology (MST or MEMS); and e-logistics. The employment in these three sectors was envisaged to have the potential to rise from 13,000 jobs identified in 2000 to 73,000 by 2010, thereby creating 60,000 jobs, whereas an additional 10,000 were expected from secondary effects in complementary and other sectors.<sup>441</sup> Thereby, it was hoped to halve the city's unemployment rate, which in 2002 was still 14.7% (see Table 26).<sup>442</sup>

By 2006, the city hosted around 680 IT and software firms with around 12,000 employees, 100 e-commerce firms with more than 3,000 employees, 250 logistics firms with nearly 22,000 employees, and 24 MST firms (up from only 10 with 1200 employees in 1999), which is claimed to be the largest MST-Cluster in Germany (Stadt Dortmund, 2002, p. 11) and one of the biggest in Europe with linkages to medical technologies and the automotive sector – representing 15% of all jobs in this field according to the dortmund-project.<sup>443</sup> This would show that some progress towards the ambitious objective was made. Iking (2004, p. 17) also reports that the number of commercial enterprises rose between 1999 and 2003 from 34,886 to 42,455 creating around 9000 jobs. The city certainly provided sufficient redeveloped industrial land sites in six particular locations for new business developments, some of them being allocated to one or more of these strategic sectors (see dortmund-project, 2000, p.

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<sup>441</sup> PowerPoint presentation on 'dortmund-project' of 19.06.2000 provided by dortmund-project. See also the article of Dr. Thomas Heuser from McKinsey on the analysis ('*Die Analyse*') of the consultancy's study for Dortmund economic development concept, see the supplement of the magazine '*Ruhr Nachrichten PLUS extra – Information für Handel, Handwerk und Gewerbe*', volume 19 – January 2002, pp 4-5. It details that the forecast potential of 60,000 jobs in the lead industries were based upon an expected 34,000 in IT, 16,000 in microsystems technologies and 10,000 in logistics and established sectors.

<sup>442</sup> See also the six core of the dortmund-project aims stated in the brochure of WBF-DO entitled 'Engagement für Innovation und Arbeit', Wirtschafts- und Beschäftigungsförderung Dortmund, October 2000.

<sup>443</sup> See website of dortmund-project at <http://www.dortmund-project.de>, Stadt Dortmund (2002, p. 11), the flyer of 'e-port-dortmund: Kompetenzzentrum für E-Logistik', ARGE PHOENIX et al. (2000, p. 5), and confer Jonas et al. (2002, p. 12).

27).<sup>444</sup> A mid-term review report by the Dortmund city council of June 2005 also showed positive progress in the three lead sectors above the State and national average. However, it also ascertained that it would be unlikely that the project will attain its ambitious objectives after 10 years given overall economic conditions (Küpper & Röllinghoff, 2005).

The focus on three key sectors with high potential, based on identified strength and competences in industry and science, together with a holistic approach in developing projects supporting their development from various angles seemed highly innovative at the time. A policy approach, that previously seemed to be reserved for the national and occasionally wider regional level, was applied to the sub-regional city level. Importantly, it succeeded to maintain a narrow sectoral focus on the three selected growth clusters – for which a critical mass for a potentially leading national position was identified in Dortmund – despite intensively debated calls for including sectors such as bio-medicine/biotechnology, environmental technologies, media and robotics & automatisisation technologies.<sup>445</sup> This concentrated approach allowed sufficient resources for detailed support and animation. This contrasts with the majority of comprehensive cluster policies that can usually be found to cover too large a portfolio, which often appears to be watered down due to political pressure and vested stakeholder interests.

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<sup>444</sup> The six sites include the former iron and steel works site PHOENIX, the technology park Dortmund, the harbour, the Westfalenhütte, the old airport, and a site in the eastern part of the city (*Stadtkrone Ost*). See also PowerPoint presentation on ‘dortmund-project’ of 19.06.2000 provided by dortmund-project that outlines the locations of the new lead industries as well as the identification of sector development needs for location in ARGE Phoenix et al. (see 2000, p. 11).

<sup>445</sup> See the article of Dr. Thomas Heuser from McKinsey on the analysis (*‘Die Analyse’*) of the consultancy’s study for Dortmund economic development concept, see the supplement of the magazine *‘Ruhr Nachrichten PLUS extra – Information für Handel, Handwerk und Gewerbe’*, volume 19 – January 2002, pp 4-5 as well as the minutes of the meeting on 07.11.2001 of the City Council committee for economic and employment promotion ‘AWBF’ (see Stadt Dortmund, 2001, p. 5 and annex 4).



In this respect, it was important that the setting up of this new organisation in the local governance system received the political backing not only from the city council, who decided upon its implementation in June 2000, but also from the city's lord mayor (Jonas et al., 2002, p. 38; Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 33) who acts not only as chairmen of the City Council but as chief of the city administration too (Tata, 2007, p. 14). The latter declared the project as a matter of his own top level priority giving it the status of an independent unit responsible only and directly to the lord mayor, hence not a sub-unit of WBF-DO.

In addition to this important direct link to the Lord Mayor, controlling processes were foreseen to assess the progress of dortmund-project (see Stadt Dortmund, 2001, annex 3) e.g. through annual reporting to the City Council committee for economic and employment promotion 'AWBF' (*Ausschuss für Wirtschafts- und Beschäftigungsförderung*).

The governance structure of dortmund-project also includes a supervisory 'steering committee' (*Steuerkreis*) and a supporting 'project committee' (*Projektausschuss*) to provide directions and advice (see Figure 32 further below). The composition of the steering committee as the supervisory board brought together 24 key movers and shakers from industry, politics and science. The participation of the high-profile actors was said to mirror the 'Dortmund consensus' for innovative economic development support in the city (Stadt Dortmund, 2001, annex 3).<sup>446</sup>

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<sup>446</sup> The members of the steering committee initially included the Lord mayor, the CEO of WBF-DO, the chairpersons of the three political parties in the City Council, the vice chancellors of the universities, the CEOs of the regional chambers, the director of the job center, two high representatives of unions, the CEOs of Projekt Ruhr and IKR, the *Land's* minister for the economy and three senior officials, the chief administrator of the Arnsberg regional administrative district, and the business CEOs of RWE Systems and ThyssenKrupp, latter of which was also represented with two further board members and the ThyssenKrupp Dortmund representative.

What appears to be unique to the dortmund-project is the entire professional approach that can be grasped when visiting the organisation. This impression is also reflected in the analysis by Tata (2007, p. 14), who reports about a 'special culture of work' with a readiness to work overtime which he believed to have evolved from the initial involvement of consultants from McKinsey and the employees of ThyssenKrupp. The involvement of these inspiring movers and shakers together with the recruitment of fresh university graduates supported by a certain financial budget may explain this visible dynamism.

While the initial concept foresaw a 36-strong team, the dortmund-project and was eventually allocated 18 staff by the City Council (see Table 28), together with 3 additional secondees from ThyssenKrupp for the first 2 years, and a significant financial commitment of an annual budget of around 6.5 million Euro (13 million DM) over 10 years.<sup>447</sup> Having its own PR staff, a large marketing budget, specialised staff allocated to the growth sectors and cluster initiatives (see Table 28) means that the dortmund-project is able to create trademarks for its activities, which communicate leitmotifs and secure a positive external presentation. Although obviously the dortmund-project has received large scale financial support and the employment target may be more marketing than actually achievable, the approach is seen here clearly as a good practice model.

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<sup>447</sup> The project started temporarily with a 25-strong team at the end of October 2000. See the articles of Dr. Thomas Heuser from McKinsey on the analysis ('*Die Analyse*') of the consultancy's study for Dortmund economic development concept, the article on the makers ('*Die Macher*'), the interview article with Udo Mager, the CEO of dortmund-project, on the organisation's start ('*Startbilanz*'), and the article on the steering committee ('*Der Steuerkreis*') in the supplement of the magazine '*Ruhr Nachrichten PLUS extra – Information für Handel, Handwerk und Gewerbe*', volume 19 – January 2002, pp 4-5, 7 and 14-15. See also dortmund-project (2000, p. 28).

This view is shared by some interviewees from other city-regions and wider stakeholders, who refer to Dortmund's overall policy approach as good practice<sup>448</sup>, even though there was scepticism raised by one interviewee with regards to the future of one of the projects measures, namely the Phoenix land site development.<sup>449</sup>

*Table 28 Personnel of dortmund-project according to activity areas*

Activity areas	Own full-time personnel	Additional seconded personnel
Location, spin-outs and development E/IT Location, spin-outs and development MST E-logistics Start2grow competitions	2 staff 1 staff 1 staff 3 staff	1 staff for 75% from ThyssenKrupp Inc. and 1 staff for 50% from the City of Dortmund
E-City location development Human resources Project communication	3 staff 1 staff 2 staff	
Administrative support	5 staff	2 staff from ThyssenKrupp Inc.
Total staff of dortmund-project for all areas	18 own staff	3 seconded staff

Note: E/IT stands for Information technologies and software development for e-commerce and mobile services; MST for microsystems technology linked to nanotechnology and production technology; and e-logistics for software solutions which are specially developed for logistics application sectors (City of Dortmund, 2007). Source: Own translation of presentation by Udo Mager from dortmund-project of October 2001 (see Stadt Dortmund, 2001, annex 5).

In addition to the direct funding of the dortmund-project, the city was said to have provided further funding of around €50 million for key initiatives. All in all, together with funding from the EU, the *Land* and other private and public actors, about €500 million of investment

<sup>448</sup> Interviews No. 18, transcript page 2, No. 17, pages 5 and 9.

<sup>449</sup> Interview No. 14, transcript page 19.

were said to be invested in projects linked to the dortmund-project.<sup>450</sup> This success was strongly attributed to the conviction of the political actors.<sup>451</sup>

Out of the 69 projects selected by the Projekt Ruhr GmbH out of roughly 400 applications for €400 million in the framework of the objective 2 funding<sup>452</sup> for the Ruhr area, Dortmund alone gained support for a total of nine specific projects, nearly all linked to the dortmund-project, together with further support for the future development location of Phoenix West and Ost (Projekt Ruhr GmbH, 2002). The nine particular projects include support for: the MST.factory and the establishment of a robotic and automisation centre (RACe) in the competence fields of industrial technologies and materials; a software shed at Phoenix West, the establishment of an ‘Internet III Development Centre’, and the B1st Software factory in the competence field ICT; the e-port-dortmund in the field of logistics; for a biomedical centre Dortmund in the competence field of medical technology and health economy; the further transformation of the former coal mines Zollern Zollern II/IV as cultural locations for the Triennale; and the new housing development of the economic vocational schools for hotel business and catering trade (WIHOGA). This might be viewed as an indication of the conceptual quality of Dortmund’s strategic approach for economic development support.

Moreover, the Dortmund-foundation (*Dortmund-Stiftung*) was set up in July 2000 to support institutions and individual projects with funds of private donors in view ‘to support public welfare in terms of science, research, education, education and culture, if they, at the same

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<sup>450</sup> Interview No. 40, transcript page 3.

<sup>451</sup> Interview No. 34, transcript page 14.

<sup>452</sup> Over the period 2000-2006, objective 2 of the EU Structural Funds aimed “to revitalise all areas facing structural difficulties, whether industrial, rural, urban or dependent on fisheries”. For more information see [http://ec.europa.eu/regional\\_policy/objective2/index\\_en.htm](http://ec.europa.eu/regional_policy/objective2/index_en.htm).

time, help to secure the future chances of Dortmund as a location for innovative technologies and creating new jobs'.<sup>453</sup>

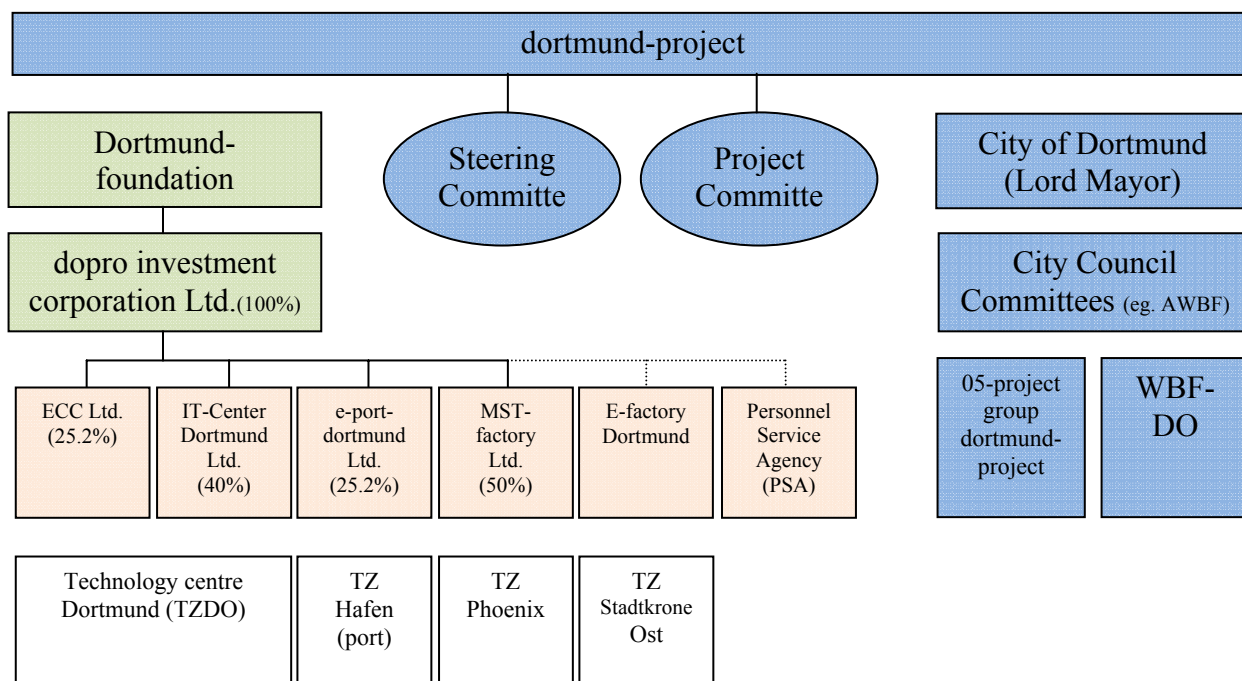
The Dortmund-foundation already accumulated endowments of over 1.5 million Euro (3.1 million DM) from 100 donors (see Stadt Dortmund, 2001, annex 6) by June 2001, while this rose to over 2 million Euro from about 120 private donors by 2005 (Küpper & Röllinghoff, 2005). The foundation's statute allows that up to 50% of its endowments are used to support the start-up or investment in businesses, which activities can be seen to follow this objective. For this purpose, the investment corporation *dopro Beteiligungsgesellschaft mbh* was set up at the same time as a 100% subsidiary of the non-profit Dortmund-foundation.<sup>454</sup> Figure 32 highlights some of these strategic investments in public-private partnerships closely linked to the dortmund-project's key initiatives. Some of them are described in the next section.

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<sup>453</sup> Own translation of the draft statute of the Dortmund-Stiftung of 19.06.2000 provided by dortmund-project. For more information see <http://www.dortmund-stiftung.de/> By March 2009, nearly 100 contributing supporters for the Dortmund Foundation were registered.

<sup>454</sup> The capital endowment of *dopro* was raised to 200,000 Euro by April 2001 (Stadt Dortmund, 2001, annex 6).

Figure 32 Organisational set-up and network of the dortmund-project



Source: Own creation, partly based upon similar figures in Ruhr Nachrichten Plus, 19. Ed., January 2002, p. 15 and PowerPoint presentation on 'dortmund-project' of 19.06.2000 provided by dortmund-project and see Stadt Dortmund (2001, annex 5)

*Innovative tools and instruments: strategic implementation for local cluster initiatives*

The following quote illustrates the strategic approach applied by dortmund-project to achieve its ambitious goals, which is not focussed on supporting innovation as such but on supporting key sectors in a holistic manner:

**Our aim is not to support innovation technology but employment** and we achieve that by doing three things: on the one side, to get business, which are already located at our end, to grow; on the other side, to catch new external businesses and bring them here; and thirdly, to contribute to start-ups. It's true that these are general things but we really tackle this. And that means that we run regular workshops in the United

States and IT firms and soon also systems technology will have a location here. With regards to the area of start-ups, we do start-up competitions split up into sectors. That is the IT sector, the systems technology sector and a competition where all sectors are fixed up.<sup>455</sup>

The dortmund project appears to have been very active in its self-proclaimed role as an ‘accelerator’<sup>456</sup> and initiated several projects such as the MST.factory dortmund and e-port-dortmund incubators, the campaign ‘Locate IT’ aiming to attract foreign IT business, the annual start up competitions ‘start2grow’ and the similar growth aid competitions ‘ziel.wachstum’, and the JOY (Junior of the Year) initiative to get more young people interested in an apprenticeship in the software industry.<sup>457</sup> It is evident from the range of projects that the dortmund project has innovatively followed a holistic approach covering infrastructure projects and entities, addressing skills issues and marketing/communication aspects as well as implemented measures at the local level that are usually found at national or the wider regional *Land* level. Some of the projects are briefly introduced in this case study to show their strategic alignment.

The dortmund-project helped to establish the MST.factory in 2000, which is the first start-up and development centre for micro systems technology (MST or MEMS) in Germany providing office and laboratory space and especially, since its completion in April 2005, a clean room facility with equipment – built as a collective good accessible on a rental basis – as well as integrated business advisory services from around 6-8 employees e.g. for the development of prototypes, training, coaching and networking. This competence centre for micro and nanotechnology sees itself as an incubator for young enterprises in the field, which

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<sup>455</sup> Interviewee from dortmund-project, transcript page 3.

<sup>456</sup> Interviewee from dortmund-project, transcript page 17.

<sup>457</sup> Interviewee from dortmund-project, transcript page 14.

after three to five years of support shall then find their own location in the 110-hectare Phoenix West business park, where the MST.factory is based.

While the infrastructure development received 32.3 million € funding from the *Land* and an ERDF contribution of 18.2 million €, the operating corporation MST.factory Dortmund GmbH was set up in 2001 as a limited company from a partnership between the Dortmund Foundations' investment corporation dopro and the microsystems technology industry association 'IVAM NRW e.V.' (*Interessengemeinschaft zur Verbreitung von Anwendungen der Mikrostrukturtechniken NRW e.V.*), each providing 50% of the starting capital.<sup>458</sup> It was later transferred to the technology centre Dortmund management corporation, itself a 100% subsidiary of the city of Dortmund. The heavy public investment into the MST.factory may have also addressed a market failure, given the reported initial unwillingness of businesses to commit the risk capital (Jonas et al., 2002, p. 40).<sup>459</sup> By May 2007, the MST.factory incubator was said to be fully occupied with four out of the twelve start-ups hosted having relocated from abroad.<sup>460</sup>

The integration of IVAM NRW e.V. – which in 2001 brought together around 83 firms and 31 institutions as members of this microsystems technology network based in Dortmund (cf. Jonas et al., 2002, p. 29) – can be seen an important aspect that provided a driving force for MST.factory's development as well as linkages to the Centre for Structural and

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<sup>458</sup> Transcript page 1 and PowerPoint presentation entitled 'MST.factory Dortmund: Tasks and concepts' of September 2002 provided by MST.factory Dortmund GmbH. For more information on the MST.factory see <http://www.mst-factory.com>.

<sup>459</sup> Interview No. 20, transcript page 1.

<sup>460</sup> See case study about the MST.factory entitled 'MST-Factory: a high-tech incubator hatching a "nano-future"', available at the European Commission's Regional Policy – Inforegio website under Regional Innovation Projects in the section 'Bringing ideas to the market' at [http://ec.europa.eu/regional\\_policy/cooperation/interregional/ecochange/studies\\_a\\_en.cfm?nmenu=5#cl3](http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/studies_a_en.cfm?nmenu=5#cl3)



Interconnection technologies ‘AVT’ (*Zentrum für Aufbau und Verbindungstechnik*).<sup>461</sup> The cluster organisation IVAM started as an initiative in 1993, established an association in 1995, and founded a fee-based service corporation in 2000.<sup>462</sup>

Another incubator established by dortmund-project with a similar concept is e-port-dortmund, a start-up and competency centre for e-logistics. The e-port-dortmund GmbH (Ltd.) was set up in December 2000 (Stadt Dortmund, 2001, annex 6) and since 2002 provides office space at Dortmund’s port and advice to 24 enterprises.<sup>463</sup>

A further e-factory Dortmund was planned to support businesses in the areas of IT, software and e-commerce with the establishment of the ‘E-Lab dortmund’ incubator with private funding and with supporting roadshows and competitions. The ECC Electronic Commerce Centre Ltd. located at the technology centre Stadtkrone Ost started in August 1999 to pool the products and services of 18 companies (see dortmund-project, 2000, p. 7). It goes back to the concept of the thematic development of the location Stadtkrone Ost (see Stadt Dortmund, 2001, annex 8).<sup>464</sup>

The particularity of the three annual start up competitions ‘*start2grow*’ for nurturing business plans into start-ups and two similar growth promotion competitions ‘*ziel.wachstum*’ is the inherent socialised learning that is encouraged and for which a strategy is provided. They are both not simply submission-based competitions but follow a standardised support and advisory programme, which brings applicants into contact with each other through

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<sup>461</sup> For more information on IVAM e.V. see <http://www.ivamnrw.com>

<sup>462</sup> Interview No. 5, transcript page 2.

<sup>463</sup> For more information about e-port-dortmund see <http://www.e-port-dortmund.de>

<sup>464</sup> For more information on the ECC, see <http://www.ecc-gmbh.de>

networking events (especially in the growth aid competition) as well as with a mentor and pool of experts in around 10 advisory sessions/events spread over several months that interactively help to bring ideas to implementation in the business community. This is also reflected in the prize winning incentive structure. For instance, in its second edition in 2002, the microsystems technology start2grow competition awarded 2,500 € in phase 1 for each of the five best initial basic business plans, a total of 230,000 € to the six best refined business plans in phase 2, while the best three start-up teams were awarded 12,500 € each.

Two of the start-up competitions follow the cluster focus, while one is open to all sectors. The sector-specific start2grow competition for e-commerce, m-commerce and IT started in March 2001 and the business plan competition for microsystems technology firms – the first in Europe - started in April 2001.<sup>465</sup> The former attracted 75 teams, of which 45 submitted a detailed business plan at the end of phase 2 after about four months, while the latter comprised 12 teams which all submitted a detailed business plan at the end of phase 2. For the latter, an intensive phase 3 was added for prototype development, which means that this competition lasts longer for the successful teams.<sup>466</sup> These sustainability figures for the initiative were better than the 50% retention rate predicted by McKinsey. The open competition also attracted another 100 teams.<sup>467</sup> Overall, these start-up competitions developed by McKinsey managed to activate over 550 volunteer coaches and created 3 IT firms, 5 microsystems technology firms and 56 other firms from the competitions for all

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<sup>465</sup> See start2growth brochures and website of dortmund-project at <http://www.dortmund-project.de>, last accessed December 2006 as well as <http://www.start2grow.de>.

<sup>466</sup> Interview No. I, transcript page 4.

<sup>467</sup> See the article on start2grow ('*Gründungswettwerbe*') and the interview article with Udo Mager, the CEO of dortmund-project, on the organisation's start ('*Startbilanz*') in the supplement of the magazine '*Ruhr Nachrichten PLUS extra – Information für Handel, Handwerk und Gewerbe*', volume 19 – January 2002, pp 9, 14-15.

sectors between 2001-2004 (Küpper & Röllinghoff, 2005).<sup>468</sup> The relatively small number of five new microsystems technology firms was seen to be a success for this sector given that there were apparently only a total of nine start-ups in the sector nationwide in 1999 and that there were only around 15 firms in this sector in 2002 in Dortmund.<sup>469</sup>

Correspondingly, the two growth promotion competitions '*ziel.wachstum*' support the growth of SMEs with up to 250 employees through corporate development coaching. One competition targets IT businesses while the other is open to all sectors. Both foster growth plans and provide prizes for growth awards along with networking and partnering events along the process. Given that coaching involves a degree of ('mirror') self-analysis, firms must be carefully approached and can need quite some convincing to participate: this dimension was said to have improved after product was launched and better explained, and further sponsors were found.<sup>470</sup> The first edition of the growth competitions attracted around 40 businesses. A specific growth initiative for the microsystems technology firms at the time was not set up given that the around 15 existing firms were said to have been growing already at double-digit rates.<sup>471</sup> By 2002, about 70 evening events were said to be organised annually for both the start2grow and growth promotion competitions with around 50-200 people attending each.<sup>472</sup>

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<sup>468</sup> The development of such learning and cooperation platforms is particularly important for clustering processes in cross-cutting sectors such as microsystems technologies that require the combination of different competence fields (cf. Jonas et al., 2002, pp. 15 and 33). Further – off the record – ideas for improving the efficiency of the coaching system were mentioned by one interviewee from the dortmund-project (transcript page 6).

<sup>469</sup> Interview No. I, transcript page 11.

<sup>470</sup> Interview No. I, transcript page 10.

<sup>471</sup> Interview No. I, transcript page 9.

<sup>472</sup> Interview No. I, transcript pages 10-11.

Sectoral location marketing complements the start-up and growth competitions. The ‘Locate IT’ campagne, for instance, aims to attract foreign IT business by means of road shows and scouts in other contries, detailed welcome packages and so on (City of Dortmund, 2007).<sup>473</sup>

The annual JOY competition raises the profile of apprenticeships in the IT sector aiming to ensure an adequate supply of skilled labour in the core sectors. It is targeted, on the one side, at getting more young people interested in an apprenticeship and, on the other side, to drive the software industry in Dortmund to employ more trainees.<sup>474</sup> This measure complements the pool of high-skilled graduates from the city’s higher education institutions, namely the university and the polytechnic university, where more than 4,500 students are enrolled in informatics subjects producing around 400 graduates annually.

The IT-Centre (ITC) of the International School for Advanced Study in Information Technologies also provides the opportunity to obtain after the 2-year fast-track ‘IT-professional’ degree, as well as the Bachelor and Masters degrees. The ITC was set up in 2000 by Dortmund’s university and polytechnic, the chamber of commerce and industry and dortmund-project and its exceptional accelerated model was officially authorised by the *Land* in March 2002.<sup>475</sup>

Another planned initiative was the setting up of a Personnel Service Agency ‘PSA’ (*Personalserviceagentur*) intended for active specialist search and recruitment of employees

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<sup>473</sup> Interview No. 36, transcript page 8.

<sup>474</sup> Interviewee from dortmund-project, transcript page 14.

<sup>475</sup> For more information about the ITC, which was based at B1st-Software-factory but is now part of the International School of Management (ISM), see [http://www.ism.de/itc\\_dortmund/](http://www.ism.de/itc_dortmund/)

for the growth sector firms, including personnel and organisation advisory services, and advertising and location marketing in this respect.<sup>476</sup>

These initiatives clearly show the focus on qualified employees and personnel training (see dortmund-project, 2000, pp. 22-23) as a ‘decisive factor’ for fostering the growth sectors based on competences and excellence. These measures were further complemented by a range of urban development projects aimed at increasing Dortmund’s (‘e-city’) attractiveness as a business location and its quality of life, e.g. with projects such as a new central railway station with multiple city functions – known as *3do*, which later failed after the investor pulled out in 2007 –, the redevelopment of industrial sites and the building of lakeside residential housing and leisure-time amenities like a concert hall for the Dortmund philharmonic. This was viewed as being also an important part of attracting highly skilled workers to the city for its growth sectors in competition with other cities such as Munich, regarded as having a high quality of life.<sup>477</sup>

Overall, a tripartite economic development policy can be identified in Dortmund’s vision for 2010 as a ‘e-city’. The ‘local and regional management of change’ (Küpper & Röllinghoff, 2000, p. 30) comprises the three pillars of lead sectors, people and event city Dortmund (see dortmund-project, 2000, p. 25 and 5).<sup>478</sup> The clear focus on lead sectors/clusters is embedded in the implementation across different measures such as in terms of fostering entrepreneurship and growth, location marketing, infrastructure and property development, and creating a new skills base. This is linked to the other complementary policy pillars addressed at people and

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<sup>476</sup> See the article on the concept of dortmund-project (‘*Das Konzept*’) in the supplement of the magazine ‘*Ruhr Nachrichten* PLUS extra – Information für Handel, Handwerk und Gewerbe’, volume 19 – January 2002, pp 6-7.

<sup>477</sup> Interview No. 34, transcript page 15 and No. 44, transcript page 11.

<sup>478</sup> See also PowerPoint presentation on ‘dortmund-project’ of 19.06.2000 provided by dortmund-project.

competences through training and qualifications and at attractiveness of the city as place to live and work.

In contrast to the *Land*'s dense structure and oversupply of technology centres that overall have been criticised (Elle et al., 1997), Dortmund's technology centre (*TechnologieZentrum-Dortmund*) and adjoining technology park next to the university campus is mentioned first as one that has fulfilled expectations with its connection between university and technology centre (City of Dortmund, 2007; Dreher, [1987(?)], p. 22; Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 42).<sup>479</sup> These links were initially supported through a cooperation agreement.<sup>480</sup> Sectoral reference handbooks listing businesses and research institutions in a particular field were seen as simple but very useful tools for facilitating cooperation.<sup>481</sup>

The close proximity of Dortmund University, with its strengths in engineering and natural sciences (Dreher, [1987(?)], p. 22) is a key asset of the technology park. Following its establishment in 1985, it had attracted around 220 companies with over 6000 highly qualified and predominantly scientific employees by 1999, while this rose to 265 companies with 8400 employees by 2009.<sup>482</sup> Even though in the early days Henschel-Neumann saw only limited employment effects (Henschel-Neumann, 1988, p. 188), Dortmund's technology centre is

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<sup>479</sup> The KVR names over 100 companies with 2200 employees at the technology centre which compares well to total of more than 600 companies with around 4600 employees that have located in all of the 30 technology, innovation and start-up centres in the Ruhr area (Kommunalverband Ruhrgebiet, 2001, p. 46).

<sup>480</sup> Interview No. 45, transcript page 10.

<sup>481</sup> Interview No. 45, transcript pages 17 and 35; No. 36, transcript page 16.

<sup>482</sup> See brochure 'TechnologiePark Dortmund' by WBF-DO of August 1999 and information from the website of the technology park at <http://www.technologiepark.de> and the technologie centre at <http://www.tzdo.de>, last accessed 30.03.2009. Core areas were said be in 1999 micro systems technologies, software/ITC, electronics, quality control, logistics/material flow/packaging technology, environmental technologies, robotics and materials technology. The technology centres' partners are the city of Dortmund (46.5%), Dortmund banks (25%), the chambers (16%) and the university and polytechnic (12.5%).

nowadays viewed as a good practice example by both internal stakeholders and external stakeholders from other regions.<sup>483</sup>

### *Cooperative and inclusive network*

Already in the early 1990s, decision-making structures and processes for the development of the regional development concept of the wider eastern Ruhr area (Dortmund/Unna/Hamm) were said to be inclusive. Representatives from the social partners, such as the chambers, employer's associations and unions, as well as other stakeholders like environmental, equal opportunities, education and charity representatives, were consulted in the irregular Dortmund conference (Bade & Theisen, 1997, p. 129).

This inclusive approach was still reported by the interviewees. For instance, close cooperation with the Federation of German Trade Unions 'DGB' (*Deutscher Gewerkschaftsbund*), as well as with the association 'windo' (*Wissenschaft in Dortmund*) comprising all the city's scientific institutions, was reported.<sup>484</sup> While the latter was said to be an important stakeholder to have on board, the former was said to be a reflection of the unique consensus-driven approach still prevailing. The involvement of the DGB was, for instance, not mentioned in any of the other case study city-regions.

Similarly, one interviewee pointed out that it had been achieved to 'unite the actors of the location' in a 'remarkable way'<sup>485</sup> for the development of the dortmund-project. However, it was also pointed out that this did not happen naturally. To the contrary, it was highlighted that

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<sup>483</sup> Interview No. 46, transcript page 2; No. 1, page 3; and No. 45, page 10.

<sup>484</sup> Interview No. 44, transcript page 12; No. 45, pages 27 and 33.

<sup>485</sup> Interview No. 44, transcript page 7.

a ‘delicate situation’ had existed in the years prior to 1998 when ‘one was attacking the other’ due to interpersonal conflicts at the heads of organisations and actions were ‘to make one’s mark and that was it then’.<sup>486</sup>

While one interviewee still reported that one individual network organisation did not to work properly due to conflict on a personal level caused by egos and power battles<sup>487</sup>, in general interviewees predominantly reported very collaborative relationships. For instance, one interviewee saw no competition in the business and innovation support system at all<sup>488</sup> while another stated: ‘Well, at local level I can only say that we cooperate with all’.<sup>489</sup>

The dortmund-project mentioned its collaboration with small and large business consultancies on the start2grow and growth promotion competitions, and in other activities, with supporting institutions that seconded personnel.<sup>490</sup> Furthermore, the regional relation or embeddedness of higher education institutions was said to be an existing high priority and a result of traditionally grown structures.<sup>491</sup> Cooperation with the job centre and the ‘Early bird’ association of the software industry in Dortmund was also mentioned.<sup>492</sup>

Therefore, Dortmund’s business and innovation support system should be seen as both inclusive and cooperative due to the overall picture of very positively rated relationships

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<sup>486</sup> Interview No. 44, transcript page 7.

<sup>487</sup> Interview No. 36, transcript page 10.

<sup>488</sup> Interview No. 7, transcript page 11.

<sup>489</sup> Interview No. 44, transcript page 18.

<sup>490</sup> Interview No. I, transcript page 13.

<sup>491</sup> Interview No. 45, transcript page 28.

<sup>492</sup> Interview No. 44, transcript page 13.



between the different actors and the integrated approach towards a ‘Dortmund consensus’, as reported by several interviewees.<sup>493</sup>

The positive relationships mentioned with other core local actors within the local economic and innovation support system were also reflected in the results of the interview supporting matrix tool (see appendix VI), with which interviewees were asked to map other organisations according to their level of activity and the nature of the relationship distinguished broadly between competitive, collaborative or being a mixture of both. A non-representative social network analysis (see following table) indicatively shows that the overwhelming majority of network combinations with other local actors were said to be collaborative relationships (22) while only a few (5) were mentioned as being a mixture of a competitive and collaborative relationship. The accompanying figure highlights this picture clearly.

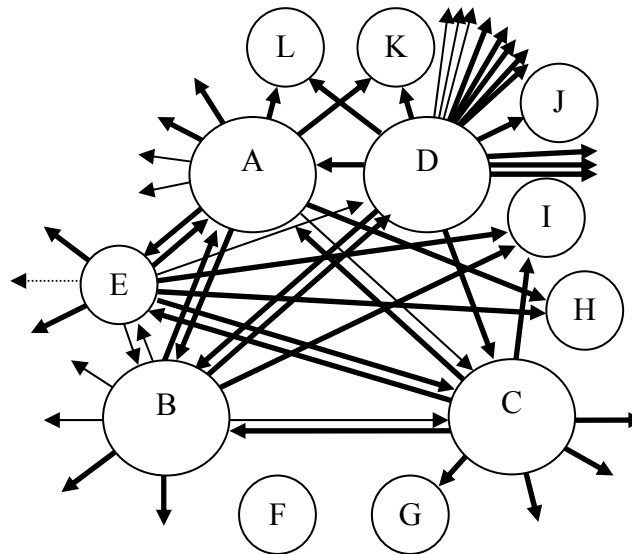
Furthermore, the relationships with regional actors at *Land* level were also predominantly characterised by cooperation as collaborative relationships were mentioned 17 times, while a mixed relationship between competition and collaboration was mentioned 7 times and a competitive relationship once. This included a close collaborative relationship mentioned with the *Land* ministries<sup>494</sup>, while most of the competitive and competitive/collaborate combinations at Land level were attributed to local actors of other competing city-regions.

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<sup>493</sup> Interview No. 36, transcript page 5.

<sup>494</sup> Interview No. 41, transcript page 4.

Figure 33 Network of relationships of the local actors in Dortmund



Note: Circles represent local organisations within Dortmund. Their names have been omitted for privacy reasons. The thickness of arrows indicates the nature of relationships mentioned as explained below.

Arrows pointing at no particular circle represent relationships with regional organisations at *Land* level.

- Collaborative relationship mentioned with organisation pointed at.
- ==→ Mixture of competitive and collaborative relationship mentioned with organisation pointed at.
- .....→ Competitive relationship mentioned with organisation pointed at.

Table 29 Relationships within Dortmund's business and innovation support system

Level of involvement/ Relationship to other organisations	Local City-region (Dortmund)	Regional (Land NRW)	National (Germany)	EU / International Interregional (EU)
<b>Competitive</b>	<b>0</b> (* )	<b>1</b>	<b>0</b>	<b>0</b>
<b>Mixture of competitive and collaborative</b>	<b>5</b>	<b>7</b>	<b>1</b> (* )	<b>0</b>
<b>Collaborative</b>	<b>22</b> (* )	<b>17</b> (***** )	<b>2</b> (*** )	<b>9</b> (** )
<b>None of the above or no connections</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Note: The numbers indicate the network combinations of organisations entered in the institutional matrix mapping tool. There were no fixed numbers or type of organisations that had to be mentioned by interviewees. Stars (\*) represent a double entry of an organisation that was (re)moved, e.g. cooperation with local actors at the international level to be displayed only as an entry at the local level. See footnote 537 for more information.

Source to figure and table: Own creation based upon supporting matrix tool completed by 5 local interviewees (two interviewees did not complete the matrix and one academic and one interviewee were not asked to complete – the latter because the interviewee was from the same organisation as another interviewee).

Cooperation with venture capitalists at the national level was mentioned <sup>495</sup>, whilst at the international level collaborative relationships were mentioned with actors from the EU and international partners.

A crucial part in driving the process towards a common vision and joint action was explicitly said to have been the involvement of the consultancy firm McKinsey: an external actor without vested interest or binding ties, but with expertise and a renowned name. The participation of McKinsey was reported to have ensured that a contentious strategy focus on a limited number of sectors was agreed by stakeholders. An important contributor was that all of the relevant actors were integrated into the process through individual consultations with an advisor or a senior consultant. After people were properly integrated into the project, they carried the vision to the outside.<sup>496</sup>

Yet, while dortmund-project is focussing its endeavours upon the three future growth sectors, other actors such as the chamber of commerce and industry and the City of Dortmund's business and employment promotion agency (WBF-DO) have to serve all, or the remaining business base. Firms operating outside the three key growth sectors were said to have voiced their impressions of not being sufficiently looked after.<sup>497</sup> This, together with highly imbalanced press coverage, are a potential source of conflict.

When asked whether his organisation was viewed as being part of a regional innovation system, an interviewee from dortmund-project highlighted the success in advancing

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<sup>495</sup> Interview No. 41, transcript page 18.

<sup>496</sup> Interview No. 44, transcript pages 7-9.

<sup>497</sup> Interview No. 36, transcript page 13.

‘dortmund-project as a vision or as a task’ in the way that around 500 people are part of it. Yet, he pointed also out that ‘dortmund-project as a institution or a unit of 20 or 30 people’ is part of many networks, with the difficulty of distinguishing between the task and institution and consequent marketing problems.<sup>498</sup>

However, it seems that the actors have so far overcome this in a cooperative network. The more recent decision to merge the dortmund-project with the WBF-DO to an independent department of the city administration also reduces potential future conflict from overlaps in this respect.

An analysis of the learning processes by Tata (2007, p. 16) concludes that ‘the core team of dortmund-project seems to be closer to being a community of practice than other organisations of this kind’, even though he points out that the ‘initial euphoria has partly declined – a tendency which might be usual during the life cycle of an organisation’ and that some stakeholders kept a ‘critical-constructive distance’.<sup>499</sup>

The question remains whether the driving role of dortmund-project and the initial ‘open, transparent, creative and innovative’ atmosphere (Tata, 2007, p. 16) can be maintained over time. It certainly managed to reach out to stakeholders in its early phase and engage them in the implementation of their activities.

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<sup>498</sup> Transcript page 17.

<sup>499</sup> Besides the previous outlined governance structure, Tata (2007) further highlights the importance of trust, transparency and clear communication for ensuring learning effects and enabling collaboration between partners.

### *Local economic development policy and actors in the city-region of Duisburg*

Similar to the economic history of other cities in the Ruhr area, Duisburg's industrial tradition is closely linked to coal and steel production. Although these sectors declined over the last decades and contributed heavily to the loss of 50,000 jobs in Duisburg between 1980 and 2000 to a level of only 157,000 – a loss of every 4th job –, traditional sectors with low growth rates are still overrepresented. For example, steel production represents one in eight jobs and every second job in the processing industries (Stadt Duisburg, 2001, p. 5).<sup>500</sup> Correspondingly, Duisburg's economic structure is heavily dominated by large firms such as Thyssen, Klöckner, and Haniel and hence lacks a strong SME base. Thyssen steelworks is still the most important employer in Europe's largest remaining steel city (Kommunalverband Ruhrgebiet, 2001, p. 22) – an important difference in comparison to Dortmund. Linked to this competence in steel are other industrial strengths in the materials, metal, and chemical industry (Burkhard, [1991(?)], pp. 31-42).

### *Duisburg's economic development corporation GFW and technology development corporation GTT*

The Corporation for Economic Development 'GFW Duisburg' (*Gesellschaft für Wirtschaftsförderung Duisburg mbH*) was founded in 1988 as the first economic development agency in Germany privately organised as a Limited corporation.<sup>501</sup> It is a public-private partnership with 50% funding coming from the city and 50% coming from private enterprises, which in 1988 comprised 33 firms including the chambers of industry & commerce and handicrafts as well as the Ruhr/Lower Rhine business association of the metal industry

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<sup>500</sup> The iron and steel producing sector alone lost around 22,000 jobs between 1974 and 1986, nearly as much as the mining sector following its earlier crisis from 1961 (Stadt Duisburg, 1988, p. 5).

<sup>501</sup> GFW website: [www.gfw-duisburg.de/](http://www.gfw-duisburg.de/).

(Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 32). GFW's supervisory board also reflects the public-private partnership nature as it comprises 12 members with equal representation from the private and public sectors with the chairman being Duisburg's Lord Mayor and the deputy chairman being the CEO of the chamber of commerce and industry.<sup>502</sup>

GFW employed around 19 persons in 2000 focussing its activities on providing classical support services for existing firms and SME activities, providing and managing landsites and office accommodation, and attracting new businesses and providing relocation services (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 32).<sup>503</sup> Judging also from GFW 2000 annual report (Gesellschaft für Wirtschaftsförderung Duisburg mbH, [2001]), a clear overall focus on facility support service in terms of arranging business locations and office space can be identified. This may partly be rooted in GFW's former main aim of addressing the bottleneck in business development land sites (Gesellschaft für Wirtschaftsförderung in Nordrhein-Westfalen mbH, [1987], p. 40; Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 32; Niederrheinische Industrie- und Handelskammer Duisburg-Wesel-Kleve zu Duisburg, 1993, p. 9; Stadt Duisburg & Niederrheinische Industrie- und Handelskammer Duisburg-Wesel-Kleve zu Duisburg, 1990, p. 3).

Perhaps as a consequence, other business support services and activities offered by GFW appeared to be rather traditional with funding advice and measures such as business networking events and get-togethers of CEOs, which seemed to lack innovative approaches.

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<sup>502</sup> The supervisory board further comprises one MP (*MdB*) and four councillors as well as four CEOs and two chairmen of supervisory boards of large firms (Gesellschaft für Wirtschaftsförderung Duisburg mbH, [2001]).

<sup>503</sup> See also GFW's website at <http://www.gfw-duisburg.de>

A start-up award (*StartUp Duisburg – Existenzgründerpreis 2005*) was later added in 2005 addressed at the 110-120 participants of the annual small business management course at the Duisburg Campus with the three winners being able to use Duisburg's technology centre services and coaches for up to a year.<sup>504</sup>

Duisburg's technology centre 'TechnologieCentrum' together with the event and communication part of the telematic forum (*TelematikForum*), the *MicroElectronicCentrum* (MEC) and the house of economic development – where GFW is based – are all located in the business park ElecTronicPark Duisburg, later renamed 'Tectrum – Technologiezentrum für Duisburg'.<sup>505</sup> The number of business based at the technology centre has remained fairly stable with 25 in 1994 after 7 years of completion (GTT, [1994]) and 23 firms hosted by Tectrum in 2009.<sup>506</sup>

The technology centre has been funded and operated by the separate corporation for technology support and advice Ltd. – 'GTT' (*Gesellschaft für Technologieförderung und Technologieberatung mbH*), which is in charge of renting the office space, centre management, providing advice for start-ups and mediation of contacts. GTT was established at the end of 1986 to support the structural change in the city and region. Its founding partners are the city of Duisburg, the chamber of commerce and industry, the *Land's* bank WestLB

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<sup>504</sup> See press release of 02.05.2005 entitled 'Duisburg stiftet Existenzgründerpreis', available at <http://www.tectrum.duisburg.de/tectrum/tectrum/pressemitteilungen/2005/102030100000006261.php>

<sup>505</sup> For more information see <http://www.tectrum.de>

<sup>506</sup> See <http://www.tectrum.duisburg.de/tectrum/tectrum/unternehmensdatenbank/index.php>, accessed 08/04/2009

(now NRW.bank) and the Duisburg sections of the large banks of Stadtsparkasse and Deutsche Bank.<sup>507</sup>

### *Duisburg's structural economic policy*

The city's current structural policy programme of 2001 entitled 'impuls.duisburg' (Stadt Duisburg, 2001) builds upon the established development paths that were outlined in the 'Duisburg 2000' programme agreed in 1988 following the steel crisis, but also adds new development options (ibid., diagram 2 on p. 10). The earlier programme was the outcome of the consensus decision of the Duisburg regional conference that took place in October 1987 in the framework of the 'ZIM' *Land* initiative and was further developed as a local action programme on several occasions, most recently in 1999 under the title 'Future Duisburg' (ibid., p. 6).

While the city's structural policy objective in the building phase between 1987-2001 was to 'develop strengths', the new objective in the reinforcement phase from 2002 until 2010 is to 'strengthen the strengths'. The new impuls.duisburg programme outlines Duisburg's sectoral policy approach that focusses its activities on the following *six competence fields or impulse sectors* with growth potential: Internet-Economy [ICT] & microtechnology; material technology [with the link to the strong steel and metal sector]; people related and business-oriented services; urban entertainment & retail; logistics; and city tourism.<sup>508</sup> Later on, the competence field of environment & energy replaced urban entertainment, which was merged

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<sup>507</sup> See brochure entitled 'ElecTronicPark Duisburg – Veransaltungen'.

<sup>508</sup> For more information on the impuls.duisburg programme see Stadt Duisburg (2001), available at <http://www.duisburg.de/micro/impuls/programm/medien/impuls.duisburg.pdf> and <http://impuls.duisburg.de/impuls/>



with city tourism.<sup>509</sup> The areas of microelectronics and logistics already featured explicitly in the earlier ‘Duisburg 2000’ programme (Stadt Duisburg, 1988, pp. 9-10).

While the impulse.duisburg programme makes reference to ‘economic cluster’ in relation to its concentration on core competences, a clear overall cluster approach does not shine through. Conceptionally, there is no clear overall cluster approach (e.g. illustrated by the generic mentioning of the overall service sector and the grouping of competence fields) but predominantly infrastructure/technology park projects accompanied by envisaged competence centres. This is also reflected in the three outlined activity priorities, which are:

1. Creation of space for new future-oriented employment in relation to the reactivation of fallow land.
2. Improvement of the quality of these spaces by means of optimal traffic connections, attractive environmental quality and a positive image.
3. Support to the creation of new future-oriented jobs though the improvement of technology-orientated infrastructure (technology transfer, advice etc).

The programme also underlines the objective to develop a *location profile* in light of the increasing trend of regional profiling and thematic marketing of regions – mentioning ChemSite [Ruhr area], biotechnology regions [Aachen/Cologne/Düsseldorf], media cities [Cologne], exhibition cities [Düsseldorf], E-Cities [Dortmund].<sup>510</sup> However, it then outlines several generic and non-sectoral regional profiles and corresponding lead projects, master

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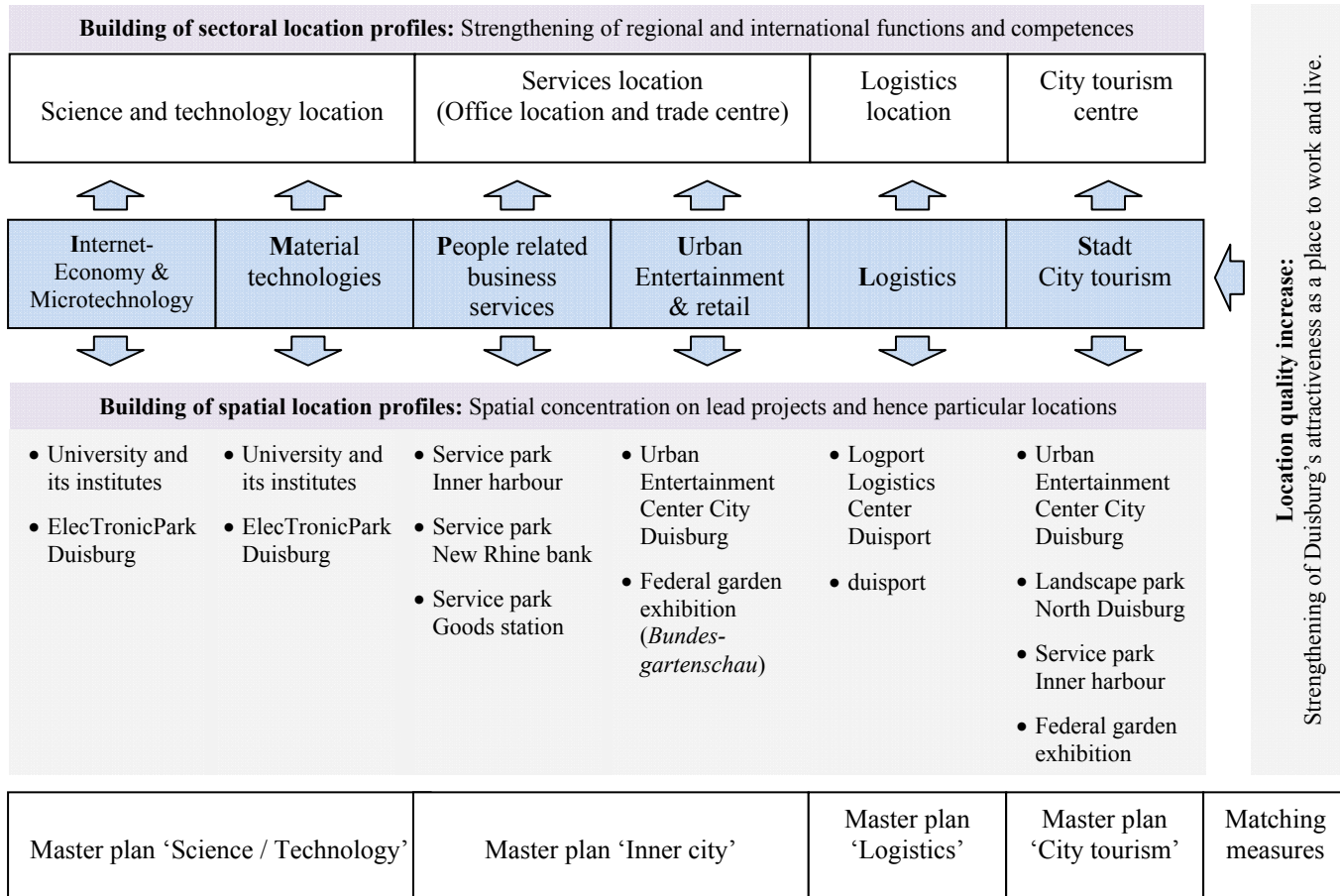
<sup>509</sup> See [http://www.gfw-duisburg.de/standort\\_duisburg/branchen\\_impuls/index.php](http://www.gfw-duisburg.de/standort_duisburg/branchen_impuls/index.php), accessed 08.04.2009. The sectors of environment and energy also feature in the six competence fields of the 2007 regional economic development strategy ZIKON for the Lower Rhine region (agiplan, 2007, p. 11). In addition, agro-business / food are also present due to the strength of the county of Kleve in this area, while the service sector is omitted.

<sup>510</sup> The examples added here in squared brackets only concern the cities and regions in North Rhine-Westphalia that follow the famous example of Silicon Valley. There are obviously many other examples in Germany and globally.

plans and activity fields, such as ‘science and technology location’, ‘services location’ and a ‘city tourism centre Lower Rhine/Ruhr’ (Stadt Duisburg, 2001, pp. 6-7), which, with the exception of the ‘international logistics location’ profile, are likely to fail in the objective to be of lasting value for city marketing. A complementary activity is the overall improvement of the location quality including education and qualification levels, good administrative support, quality of life and urban development projects, such as the failed MultiCasa project. Education and qualification levels are particularly important given the reported clear deficits in terms of a qualified workforce (Niederrheinische Industrie- und Handelskammer Duisburg-Wesel-Kleve zu Duisburg, 2001, p. 13).

The above-mentioned sectoral focus on six competence fields and functions was accompanied by a spatial concentration, which means that specific locations considered to have particular qualities were allocated to the different sectoral profiles. Yet, the spatial concentration appears to be somewhat hidden given that the technology centre, for instance, does not have such a noticeable presence as in other cities. Figure 34 below depicts this sectoral and spatial profiling.

Figure 34 Sectoral and spatial profile of the future Duisburg according to impuls.duisburg



Source: Stadt Duisburg (2001, diagram 1 on p. 10), slightly adapted and own translation

The city of Duisburg followed the approach of dortmund-project by also giving itself a quantified target by stating the ambition to create 25,000 jobs in the decade up to 2010 (Stadt Duisburg, 2001, p. 9).

An explicit reference to the dortmund-project can be found in the more recent regional development concept (*REK*) entitled 'future initiative competence region Lower Rhine – ZIKON' (*Zukunftsinitiative Kompetenzregion NiederRhein*) that was developed in 2007 as

part of the *Land's* regionalised structural policy for the city of Duisburg and its neighbouring counties of Kleve and Wesel.<sup>511</sup> The ZIKON strategy highlights the strategic-communicative framework and considerable budget of dortmund-project and its success in terms of increasing positive public perception as reflected in improved positions in city rankings (agiplan, 2007, pp. 16-17 and 106).

In contrast, the ZIKON strategy points out that the bundling of activities in Duisburg was only driven by internal expert groups and was not the subject of strategic marketing efforts to communicate the stakeholder consensus with the result that location advantages are not so well known publicly (agiplan, 2007, p. 106). Correspondingly, the ZIKON strategy added location communication as well as the creation of an innovative environment (by more actively fostering entrepreneurship and synergies through an innovation dialogue) to the development of the competence fields and the optimisation of Lower Rhine as a living location. In terms of organisation, it also highlights that sufficient human resources must be made available for the project and suggests using the resources of the LowerRhine regional agency (*Regionalagentur Niederrhein*) in this respect (agiplan, 2007, p. 21).<sup>512</sup>

#### *Duisburg's specific sectoral logistics focus*

A core of focus in Duisburg's economy are the river port and logistics (cf. Niederrhein, 1993; Stadt Duisburg, 2001, pp. 5-6), which in 2001 already accounted for around 15,000 direct and indirect jobs (Stadt Duisburg, 2001, p. 16). Duisburg hosts the world's largest inland port with modern container terminals and is connected to a close waterways canal network giving direct

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<sup>511</sup> The regional development concept ZIKON is available at [http://www.regionalagentur-niederrhein.de/index.php?option=com\\_content&task=view&id=88&Itemid=83](http://www.regionalagentur-niederrhein.de/index.php?option=com_content&task=view&id=88&Itemid=83)

<sup>512</sup> For more information on the LowerRhine regional agency, see <http://www.regionalagentur-niederrhein.de>

access to the North Sea (Kommunalverband Ruhrgebiet, 2001, pp. 29-31). With the additional rail container terminal and connection to a dense motorway transport network, Duisburg markets itself as a perfect ‘trimodular logistic centre’.<sup>513</sup> Adding the proximity to Düsseldorf’s international airport 15 km away, Duisburg has a clear competitive advantage in terms of transport infrastructure which also goes back to its position on the ancient Hellweg trade route (Kommunalverband Ruhrgebiet, 2001, pp. 22-23) and membership of the Hanse during the middle ages (Heid et al., 1996, p. 61).

Duisburg’s sectoral support is clearly concentrated on logistics. This is reflected in the Lower Rhine (*Niederrhein*) area’s regional development concept (*REK*) from 1993 (see summary in Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. XXVI of the annex; Region NiederRhein, 1993, p. 131), on the basis of which Duisburg also established a list of projects and measures to follow up on the core focus areas of Duisburg as a logistics location, entrepreneurial activities, tourism innovation, employment impulses and qualifications (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. XXX of the annex). For instance, out of the 32 projects listed as part of the 2001 impuls.duisburg programme, 12 projects alone are linked to the competence field of logistics (Stadt Duisburg, 2001, p. 20).

The strategic focus on the logistics sector was further developed in the master plan for the Lower Rhine (*Niederrhein*) logistics region that was presented at the end of 1998 by Dornier SystemConsult – a consultancy specialised in the area of transport. This master plan was commissioned by the *Land*’s Economic Ministry for Duisburg and the surrounding area to provide an input to developing a strategy for a logistics region through a new regional

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<sup>513</sup> See the Logport Logistic-Center Duisburg website at <http://www.logport.de>, accessed December 2006.

coordination committee for logistics that included the Land's State Secretary and economic ministry (ex-MWMTV), the Lord Mayor of Duisburg, GFW, and Duisport – Duisburg's port group (*Duisburger Hafen AG*). This kind of intervention by the *Land* government is said to be the result of the perception that the decision-making mechanism of the regional conference (in charge of the regional development concept REK) was too cumbersome (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 32).<sup>514</sup>

The master plan stressed concentrating support on the *three pillars* of management, capital and competence. This included the following recommendations:

- establishment of management capacities in dedicated organisations for the marketing of the logistics location and its services;
- mobilisation of regional and international capital for the development of logistics locations (e.g. through an investment agency);
- complementary supply of existing competences and creation of new competences (e.g. by setting up International Business School of Logistics).

#### *Logport – Duisburg's specialised agency for supporting the logistics sector*

In operation since the beginning of 1999, Logport Logistic-Centre Duisburg Ltd., with 6-8 staff (including 2 engineers), is a full-service provider of location management in terms of development and marketing a 265-hectare industrial business park area in Duisburg-Rheinhausen at the site of the former Krupp steelwork.<sup>515</sup> This praised mobilisation of new commercial space and focussed land site management was at the centre of projects to develop

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<sup>514</sup> An interesting aspect in this respect is that the composition of the regional conference Lower Rhine for developing regional development concept (*REK*) structures process was on purpose restricted to political and administrative elite. It excluded several stakeholders, most notably actors from the private sector, which can be said to have only be represented through the chamber (Forth & Wohlfahrt, 1997, pp. 40, 57 and 76).

<sup>515</sup> Interviewee of logport, transcript pages 2 and 5.

Duisburg further as a logistics location (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 46 and p. XXX of the annex).<sup>516</sup> The use of the Krupp site was already envisaged in the ‘Duisburg 2000 programme’ (Stadt Duisburg & Niederrheinische Industrie- und Handelskammer Duisburg-Wesel-Kleve zu Duisburg, 1990, p. 92) and the regional development concept (Region NiederRhein, 1993, p. 144).

At the heart of the strategy to attract new firms to Logport’s logistics centre was the enlargement of Krupp’s former harbour and the setting up of the trimodular Duisburg Intermodal Terminal (DIT) that started in October 2002 with a capacity of 200,000 tons of transship container goods. This project also received support in the framework of objective 2 funding (ERDF) following the successful bid with the Projekt Ruhr GmbH (2002, pp. 13-14).

By 2002, around 70% of the site was developed and 40% already allocated to investors (Logport, 2002, p. 11). In October 2001, the logistics competence centre ‘KCL’ (*Kompetenz-Centrum Logistik*) was established in close cooperation with logport to provide information and advisory services and support demand-driven qualification of the labour pool.<sup>517</sup>

Between 2000 and 2004, around 225 million € were invested into the redevelopment of the logport site by logport’s mother corporation, the duisport group (Duisburger Hafen AG, 2001, p. 17), which is jointly owned by the German Federal level, the *Land* and the City of

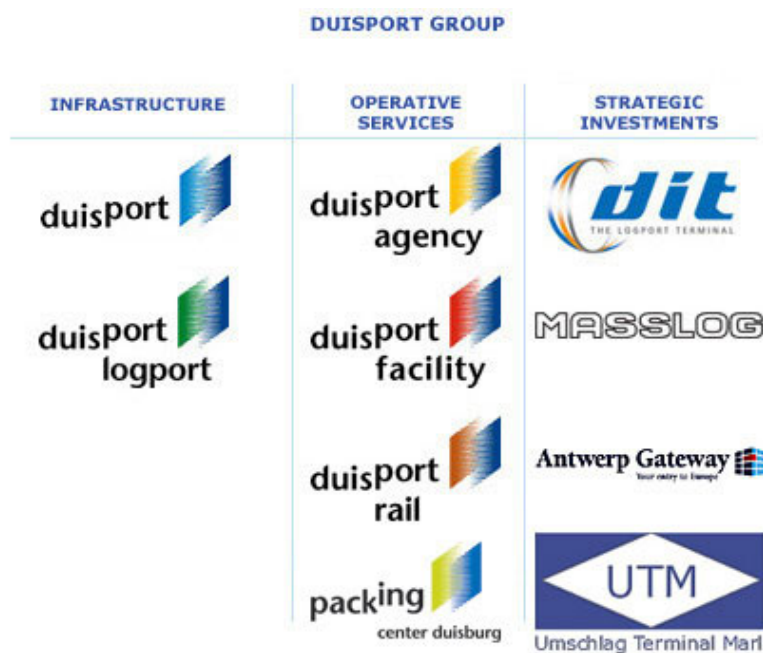
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<sup>516</sup> The measures of city were titled as Duisburg projects for compensating the reduction of coal subsidies and the merger in the steel area (*‘Duisburger Projekte zur Kompensierung eines Abbaus der Kohlebeihilfen und der Fusion im Stahlbereich’*).

<sup>517</sup> For more information on the KCL, see the website <http://www.kcl-duisburg.de/>

Duisburg (Duisburger Hafen AG, 2001, p. 88).<sup>518</sup> The potential synergies with the more than 200 logistics firms already located at the other site – Duisburg’s main harbour area – were highlighted. This includes the services offered by the duisport group such as the established duisport rail services between the two port areas or the Packing-Centre-Duisburg (PCD), a specialised firm for the stuffing and stripping (i.e. loading and unloading) of containers. The following figure illustrates the various organisational units of the duisport port group which, in 2000, had 236 employees and a turnover of around 30 million € (Duisburger Hafen AG, 2001, pp. 37 and 43):

Figure 35 The duisport group’s organisational units



Source: Logport’s website at <http://www.logport.de>, last accessed December 2006

Logport’s cluster orientation is also visible in the label ‘Silicon valley of transport services’ that it was apparently given by the P&O chairmen Lord Jeffrey Sterling and which it now

<sup>518</sup> For more information about Duisburg group see <http://www.duisport.de>, while more information about the history of Duisburg’s harb our can be found in Appelbaum & Franz Haniel & Cie. GmbH (1991) and Heid et al. (1996, pp. 60, 161-166 and 202-203).



uses to market itself.<sup>519</sup> As a result of its concerted focus on logistics, the wider Lower Rhine area has been labelled as a ‘pioneer of a sectoral and cluster-orientated structural policy in North Rhine Westphalia’ (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. XXXI of the annex). The reported fast and unbureaucratic strategic approach of Logport in dealing with potential investors, for instance, is said to derive from three factors: flexibility in terms of construction restrictions due to the area’s former brownfield use; the pressure to act following persistent unemployment and increasing competition, in particular from the Netherlands; and the organisation’s direct link to strong politicians who sit on the steering committee. This support from the city’s high-level politicians is said to have allowed for fast-track approvals of investment undertakings.<sup>520</sup>

*On the lacking connectedness and critical mass of Duisburg’s network*

The ambitious but narrow focus on logistics risks a future over-reliance on this sector, which leaves the city vulnerable to changing framework conditions, such as the recent financial crisis affecting world-wide trade. This is particularly problematic given that Duisburg seems to find it very hard to nurture new areas of strength. This is illustrated by the comment of one interviewee who states that ‘there are structures, which we also try to create somehow, to bring people together and bring institutions together, but the critical mass is still very low’. Yet, the provision of an example where apparently 1,500 businesses were invited to an information event and only 10 businesses took it up with the addition of the statement that ‘you need to constantly dig deep to keep people on board’ does not just raise the question about the dynamism of the business base, but also about the innovativeness, effectiveness and demand-orientation of the support offered. The latter question appears to be more pressing

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<sup>519</sup> See the Logport Logistic-Center Duisburg website at <http://www.logport.de>, accessed December 2006.

<sup>520</sup> Interviewee from Logport, transcript pages 2 and 5.

when at the same time no references are made to good practice models – except to the national competence network competition – and no influential persons or organisation for the implementation of measures are mentioned.<sup>521</sup> The use of conditional language with regards to networking activities also hints that the predominance of large businesses may not be alone the reason for a lack of dynamism of SME cooperation and business networks.

Another interviewee concludes that ‘structural policy does not reach the firms’<sup>522</sup> even though networking and cooperation were apparently the building stones of professional change management at the chamber of commerce and industry (Niederrheinische Industrie- und Handelskammer Duisburg-Wesel-Kleve zu Duisburg, 2001, pp. 5-7).

A different interviewee points out that ‘Duisburg is ill [in terms of entrepreneurial spirit] with few approaches, no networking, no network [...] and a weak industry’ and a ‘lack of high-tech firms means that the university potential cannot be used’. The need for ‘a lighthouse, a vision’ is stated and while other policies and initiatives are mentioned as good practice examples – such as those in Dortmund –, the question was raised as to why it was not tested here. An answer might be provided with the statement that ‘everybody is trying to do their thing’.<sup>523</sup>

The statement of one interviewee also suggests a rather non-collaborative environment amongst the support organisations by pointing out that ‘if I want to market a product, I do it alone’ and by bemoaning that ‘everybody has a say’ even if the organisation has ‘no funding competences and only a coordination role’.<sup>524</sup> This is exactly what another interviewee saw as

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<sup>521</sup> Interview No. 22, transcript pages 5, 6 and 10.

<sup>522</sup> Interview No. 14, transcript page 1.

<sup>523</sup> Interview No. 18, transcript pages 1, 2 and 4.

<sup>524</sup> Interview No. 14, transcript page 24.

a problem: that ‘one is often of the opinion that one can do everything alone [...] and then a quick shot is launched at some activity mainly to be positioned there first’ while the ‘tasks are pushed into the background’ and a perhaps more effective joint initiative was not considered.<sup>525</sup> This also meant for this person that the relationships with a different organisation in the governance structure had to be seen as flexible: for one activity it may represent a competitor, for another, a useful collaborator (e.g. for the EU/international level).<sup>526</sup>

Another interviewee also refers to ‘counterproductive’ similar overlapping functions launched by different local organisations and the consequent lack of coordination by adding that ‘it is not always clear which unit represents competition and which not. Well, it is really the interfaces that are not clear and there is always an intersection that is served by two organisations at the same time.’<sup>527</sup> A different interviewee highlighted the 2-3 working groups that existed in the area of e-logistics and pointed to the field of start-up support as another area where usually a high number of organisations are active and under pressure to justify their existence.<sup>528</sup>

High-level actors were said to be ‘ill-advised’ in strategic terms by trying to cling to the steel sector, which has a low innovation effect, and focus on logistics, which is characterised by a low value added.<sup>529</sup> Strong efforts in bringing together SMEs in other sectors seems to be absent. Indeed, other emerging sectors and competences indeed appear not to be very visible, even if innovative materials (linked to the traditional competence in the steel industry) as well

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<sup>525</sup> Interview No. 16, transcript pages 18 and 23.

<sup>526</sup> Interview No. 16, supporting interview tool of the institutional matrix mapping.

<sup>527</sup> Interview No. 22, transcript page 12.

<sup>528</sup> Interview No. 16, transcript page 17.

<sup>529</sup> Interview No. 18, transcript pages 2 and 6, and No. 17, transcript page 2.

as environmental technologies/recycling (linked also to the existing steel and chemical industries) have been outlined as core competences of the city (Kommunalverband Ruhrgebiet & ISA Consult GmbH, 2000, p. 32).

Existing competences appear not well. For instance, one of the city's competence centres appeared to be neither well integrated into governance structures nor well mentioned in interviews (once) although referenced in the impulse.duisburg programme (Stadt Duisburg, 2001, p. 11).<sup>530</sup> This concerned the competence centre of the network for optical and optoelectronic technologies and systems OpTech-Net (*Netzwerk für optische und optoelektronische Technologien und Systeme e.V.*), which had around 40 members, mostly SMEs, by March 2002. The fact that out of the 32 member firms, only four were located in Duisburg, may partly explain that the competence centre was not on the radar of other local stakeholders.<sup>531</sup>

The establishment of a centre for fuel cell technology 'ZBT' (*Zentrum für Brennstoffzellen-Technologie*) and the extension of the Fraunhofer Institute for Micro Electronic Switches and Systems 'IMS' following a successful bidding for funding from the Projekt Ruhr GmbH (Projekt Ruhr GmbH, 2002, pp. 5-10) was also only mentioned by one local interviewee, while the former was criticised by an external stakeholder due to the apparent lack of a business base in this field.<sup>532</sup>

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<sup>530</sup> Interview No. 14, transcript page 8, and No. 31, transcript page 6.

<sup>531</sup> This competence centre was established in 1999 by several firms together with the university under the name of 'DiEnO' – service and development centre opto-electronics (*Dienstleistungs- und Entwicklungszentrum Optoelektronik*), which changed its name in February 2001 to OpTech-Net following the merger with the Aachen competence network for optical system technology 'AKOS' and its successful bidding for national funding from the competition for regional competence centres for optical technologies by the German Federal Ministry for Education and Research (bmbf). For more information about OpTech-Net e.V. see <http://www.OpTech-Net.de>

<sup>532</sup> Interview No. 16, transcript page 20.

The reported lack of a functioning network between firms<sup>533</sup> appears to be reflected by the lack of cooperation between governance support actors, despite the pressing urgency for economic and structural change. This view is shared by one interviewee who points out that contacts still exist between the main business and innovation support actors but that these are less regular than previously.<sup>534</sup>

Technology transfer was reported by one interviewee to have become less of a priority for the city's university. Given its principle occupation to negotiate the terms of a merger with the University of Essen at that time, Duisburg University's cooperation with industry was said to be only managed and not actively pursued.<sup>535</sup> Nevertheless, another interviewee reported recent efforts by the university to increase these linkages due to the heightened pressure on the university to find third-party financing for research projects. For instance, a cooperation with large firms in the neighbouring city of Ratingen was initiated by the university.<sup>536</sup>

Overall, the reported breakdown of close ties, institutional and functional overlaps, and lack of cooperation and coordination raises serious questions about the notion of an innovation system in Suisburg. The statements by interviewees recited in this section provide a consistent picture that is also reflected in the indicative social network analysis of the relationships between the core institutional actors within the local economic and innovation support system of Duisburg. The following figure indicatively shows that the majority of relationships between local actors were not characterised as fully cooperative but are as a mixture of cooperation and competitive collaboration. Duisburg is one of the two city-regions where this

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<sup>533</sup> Interview No 22, transcript page 9.

<sup>534</sup> Interview No 16, transcript page 16.

<sup>535</sup> Interview No 16, transcript page 16.

<sup>536</sup> Interview No. 23, transcript page 2.

is the case (Aachen being the other). One likely reason contributing to the reported overlap could be the additional presence of organisations with tasks for specific sectors.

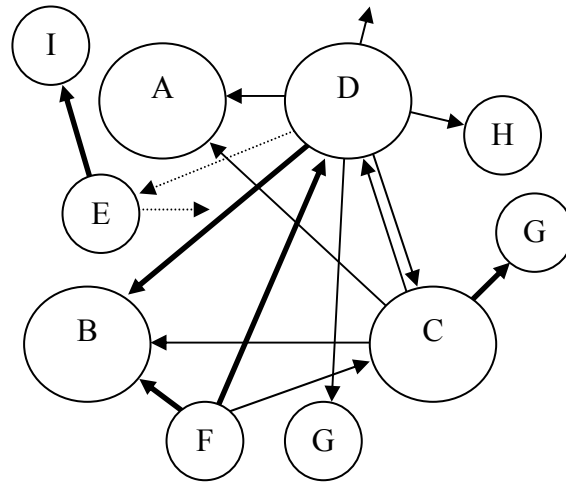
It should be noted that one of the two network combinations in the category of ‘none of the above or no connections’ concerns an overall collaborative relationship that was not explicitly attributed to individual organisations but can be assumed to concern several organisations. Therefore, this response distorts the picture slightly by making it appear more positive than it is (or rather, less negative than it is).

In addition, the accompanying table shows that very few references to regional (1), national (0) and EU/international (1) actors have been made, indicating that perhaps actors are too inward-looking and therefore the system does not have access to global nodes and input for fresh ideas.<sup>537</sup> Furthermore, a negative feature of the support system is the absence of any reported active involvement of local banks in the governance system – even though banks are involved, for instance, in the corporation for technology support and advice Ltd. – ‘GTT’.

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<sup>537</sup> It should be noted that a duplicated entry of three local organisations at EU/international level was removed (indicated by stars in the following table) in order to have cooperation with local actors at the international level only displayed as an entry at the local level so that the (important) indication of cooperation with international actors is not distorted. As elaborated earlier, the reason for the double entry was probably that the interviewee separated the nature of relationships of local actors according to local and EU/international level (or tasks) instead of considering actors from the EU/international level.

Figure 36 Network of relationships of the local actors in Duisburg



Note: Circles represent local organisations within Duisburg. Their names have been omitted for privacy reasons. The thickness of arrows indicates the nature of relationships mentioned as explained below. The arrow pointing outwards at no particular circle represents a relationship with a regional organisation at *Land* level, while the arrow pointing to the centre at no particular circle represents a general competitive relationship without individual mentioning.

- Collaborative relationship mentioned with organisation pointed at.
- Mixture of competitive and collaborative relationship mentioned with organisation pointed at.
- Competitive relationship mentioned with organisation pointed at.

Table 30 Relationships within Duisburg’s business and innovation support system

Level of involvement/ Relationship to other organisations	Local City-region (Duisburg)	Regional (Land NRW)	National (Germany)	EU / International Interregional (EU)
<b>Competitive</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Mixture of competitive and collaborative</b>	<b>8</b>	<b>1</b> (* )	<b>0</b>	<b>0</b>
<b>Collaborative</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>1</b> (***)
<b>None of the above or no connections</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>

Note: The numbers indicate the network combinations of organisations entered in the institutional matrix mapping tool. There were no fixed numbers or type of organisations that had to be mentioned by interviewees. Stars (\*) represent a double entry of an organisation that was (re)moved, e.g. cooperation with local actors at the international level to be displayed only as an entry at the local level. See previous footnote 537 for more information.

Source to figure and table: Own creation based upon supporting matrix tool completed by 4 local interviewees (one interviewee did not complete the matrix and one academic was not asked to complete the matrix).

### ***Local economic development policy and actors in the city-region of Düsseldorf***

The *Land's* capital, Düsseldorf is host to many international businesses and often acts as a headquarter location for Germany. For instance, seven of the top 100 German firms, with together a turnover share of 9.7% of the top 100, have their headquarters in the city (Schneider, 1998, pp. 32-33). Furthermore, as mentioned earlier, there is a strong concentration of Japanese firms in Düsseldorf. Around a third of all of the 1076 Japanese firms located in Germany in 1999 were based in the wider Düsseldorf area alone, while around 450 firms in total were said to be located in NRW (see Gesellschaft für Wirtschaftsförderung Nordrhein-Westfalen mbH, 2000a; 2000b, p. 16; Legewie, 1995).

### ***International business location with strength in creative industries***

Efforts to attract international businesses and support foreign trade were already strong in the 1980s (Gesellschaft für Wirtschaftsförderung in Nordrhein-Westfalen mbH, [1987], p. 39). By 1989, of the 30,000 firms in the wider job office district of Düsseldorf, 4,000 had been foreign branches a decade earlier.<sup>538</sup> The largest presence of foreign firms were from the USA and the Netherlands (400 each), Japan (320), Great Britain (270) and France (160) (Region Düsseldorf / Mittlerer Niederrhein, 1991, p. 89). According to Henning (1981b, p. 715), there are however different purposes behind these presences. While Düsseldorf is merely the gate to the Rhine-Ruhr area for Dutch firms, it is generally the gate to the whole of the German market for American firms, and to the entire EU market for Japanese firms.

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<sup>538</sup> Even as early as 1966, the chambers district (IHK) of Düsseldorf hosted 942 foreign firms (Henning, 1981b, p. 705).



The city's international Rhein-Ruhr-airport – the largest in NRW and the third largest in Germany with 15.4 million passengers in 2001 (Landeshauptstadt Düsseldorf, 2002, p. 5) – ,good transport linkages, international exhibition centre, highly ranked quality of life and international schools are favourable factor conditions for the city's attractiveness. The infrastructure associated with the long-standing presence of Japanese firms constitutes an important location factor for Japanese firms today causing a virtuous circle: the presence of a Japanese school since 1971; three Japanese Kindergarten; the social and cultural network that includes the EKO house of Japanese culture and the Japanese club with nearly 6000 members; the Japanese chamber of commerce and industry with 600 members; a presence of the Japanese foreign trade centre JETRO; a Japanese general consulate; and Japanese supermarkets and banks (Landeshauptstadt Düsseldorf, 2000b).

The city has a strong presence of business services and creative industries, such as banking, insurance, legal and management consultancies, fashion, media and advertising (Wirtschaftsförderung Landeshauptstadt Düsseldorf, 2001, p. 5). Because of its traditional strength in services provision for the wider area and the location of the *Land's* parliament and government, it has been called the 'writing desk of the Ruhr area' (Henning, 1981a, p. 14; 1981b, p. 745), despite being located outside the Ruhr area delimitations. Already by 1989, Düsseldorf had a service sector share of 69.1% of the region's economy in contrast to the *Land's* average of 50.7% (Region Düsseldorf / Mittlerer Niederrhein, 1991, p. 42). For instance, in the year 2000, Düsseldorf employed 26,000 persons in 1,500 companies in the ICT sector; 9,000 persons in 2,000 media companies; and 7,000 persons in 1,000 companies in the advertising sector (Landeshauptstadt Düsseldorf, 2001b, p. 3). The latter comprises 12 of the top 100 advertising agencies including the three largest German advertising agencies:

BBDO Group Germany, Grey Global Group Deutschland and Publicis Gruppe (ibid., pp. 12-13).

At the same time, Düsseldorf still has strong employment in the traditional industrial sectors due to the closeness of the Ruhr area (Regierungspräsident Düsseldorf & Seering, 1966, p. 9). Degussa, the world's largest specialist chemical company and Henkel are located in the city (Kommunalverband Ruhrgebiet, 2001, p. 22). The industrial core in Düsseldorf in 2000 was the metal producing and refinement industry with the highest industrial turnover and 33,208 jobs, while the chemical industry accounted for the second highest industrial turnover and with 13,056 jobs (Industrie- und Handelskammer zu Köln & Industrie- und Handelskammer zu Düsseldorf, 2001, p. 64). Vehicle construction with 10,047 jobs and machinery construction with 9,488 were the other strong industrial sectors.<sup>539</sup> It should be noted that handicrafts are also much stronger in Düsseldorf than the other cities and counties in the wider region (Regierungspräsident Düsseldorf & Seering, 1966, pp. 176-177; Region Düsseldorf / Mittlerer Niederrhein, 1991, p. 48).

The case of the Mannesmann corporation is a successful example of Düsseldorf's structural change from manufacturing to services over the last decades. This traditional company reputed for producing large seamless pipes transformed itself by diversifying its activities successfully into telecommunications with the effect that it was merged with Vodaphone following a public and highly contested take-over bidding war (Dross, 2007, pp. 135-136; Kommunalverband Ruhrgebiet, 2001, p. 22). In addition to D2/Vodaphone's presence

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<sup>539</sup> In 1989, the chemical industry and machinery construction were both the industrial core with each representing around 16% of industrial employment in the wider region (Region Düsseldorf / Mittlerer Niederrhein, 1991, pp. 41 and 44), while vehicle construction, the iron producing industry and the steel & metal procuring industry were the other remaining strong traditional industrial sectors.

managing the European activities, another leading private mobile telephone operator – E-Plus Mobilfunk GmbH – is also located in the city, together with 30 other network operators (Landeshauptstadt Düsseldorf, 2001b, p. 5).

With its own stock exchange, several headquarters of large firms, high value services, international exhibitions, excellent transport infrastructure including the international airport, attractive office spaces, Düsseldorf has been characterised as a global city and node in the network of the globalised economy (Schneider, 1998, pp. 30-43) – even though it is a small global city compared to the likes of London and Paris.

Düsseldorf and the wider region had an economic performance in the 1980s that was above the *Land* average in terms of value added (Region Düsseldorf / Mittlerer Niederrhein, 1991, p. 39). Despite the strong wealth indicators, the city has suffered from a high unemployment rate of 9.2% in 1990 (ibid., p. 74 ) and 10% in 2002 (see Table 26 above) even though it was still generally lower than most of the *Land's* larger metropolitan cities. The unemployment rate was certainly comparably higher than its hinterland and some of Düsseldorf's negative employment performance – a reduction of 2.2% between 1980 and 1998 – can hence be seen as a decentralisation effect with firms locating just outside Düsseldorf (Industrie- und Handelskammer zu Düsseldorf, 1999a, p. 5 and table 1).

#### *The regional development concept 1991*

As part of the *Land's* regionalised structural policy, a regional development concept (*REK*) for fostering the Düsseldorf / Middle Lower Rhine region as 'the modern European industry and service region' was presented in 1991 (Region Düsseldorf / Mittlerer Niederrhein,

1991).<sup>540</sup> The concept recognises the important political and economic role of the *Land*'s capital for the wider region (ibid., p. L2) and identifies the following ten activity fields:

1. Intensification and permanent adaptation of professional qualifications
2. Provision of commercial space according to demands
3. Extension of the inter- and intraregional traffic network
4. Extensions of transport and communication links within the European area
5. Creation of a long-term waste disposal security
6. Extension of the communication infrastructure
7. Troop reduction and regional development
8. Living, leisure, culture
9. Regional marketing
10. Strengthening of administrative power

With regards to the higher education infrastructure under point 1, the establishment of a law faculty and extension of the faculty of commerce at Düsseldorf's Heinrich-Heine-University were proposed (ibid., pp. L4-5 and 80-81).<sup>541</sup> This was viewed as an important issue given the strong international and export orientation of the economy and its role as an important investment location of foreign companies.

Despite the wide range of activity fields, the *REK* 1991 should be regarded primarily as an economic concept. The strategic content focuses mainly on the following six more detailed activity fields of further development of a strong economy; the restructuring of the labour market; forward-looking transport infrastructure; an infrastructure of utility supply and disposal capable of development; demand-orientated communication infrastructure; and the

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<sup>540</sup> The region comprises 33 municipalities including the metropolitan cities of Mönchengladbach, Krefeld and Düsseldorf as well as the counties of Viersen, Neuss and Mettmann – latter of which covers the pilot case city Ratingen.

<sup>541</sup> The Heinrich-Heine-university Düsseldorf now comprises five faculties (law, medicine, philosophy, mathematic/natural sciences and commerce) and has around 25,000 students.

soft location factors. The further development of a strong economy comprises the provision of business landsite and office space, regional marketing, information and cooperation of actors and the – then underdeveloped – area of technology and innovation support (Region Düsseldorf / Mittlerer Niederrhein, 1991, pp. 62 and 70).

#### *Düsseldorf's programme for strengthened SME support*

The city council unanimously adopted in November 2000 the 'programme for strengthened SME support in Düsseldorf' (Landeshauptstadt Düsseldorf, 2000d) by the city's office for economic development support (*Wirtschaftsförderungsamt*). The programme does not outline any clear overall strategic approach but instead presents an annotated catalogue of measures that are categorised into 13 activity fields (see table below). The stated objective of the programme as its title states is to support and look after SMEs, especially craft firms, in view of developing their innovation and employment potential (*ibid.*, p. 2). This is complemented by the support of start-ups and attracting the relocation of SMEs.

Table 31 Activity fields and measures of Düsseldorf's programme for strengthened SME support

Activity fields	Examples of measures	Number of measures
1. Supply of land sites and office space	Mediation; consultation; demand identification; development of location concepts (e.g. trade/craft yard, media harbour, WTZ technology centre); SME land register, new site for university spin-offs.	13
2. Advisory and information services	Thematic information sheets and brochures (e.g. construction, environment); firm visits and business mentors for young entrepreneurs from senior experts of the chambers.	3
3. SME-orientated administrative behaviour	Extension of guiding functions to SME service for administrative tasks; support hotline.	2
4. Start-up support ( <i>Gründungs-Offensive NRW 'GO'</i> )	Extension of the Düsseldorf start-up network and events with sectoral emphasis on ICT/media and biotechnology.	4
5. Financial support	Extension and intensifying of financial support and advice, in cooperation with banks.	2
6. 'SME offensive NRW' initiative ( <i>Mittelstands-Offensive NRW</i> )	Participation in the initiative; organisation of SME congress and an annual competition for 'innovative ideas for SMEs'.	3
7. Science and technology transfer	Joint SME events with universities/VDI for better information and contact mediation.	1
8. Foreign trade support	Mediation of information and contacts via chambers and <i>Land</i> ; support of joint firm stands at foreign exhibitions.	3
9. City marketing	Set up of the ' <i>Düsseldorf Marketing und Tourism GmbH</i> '; organisation of city district campaigns; retail development concept.	3
10. Public procurement	Creation of fair framework conditions for competitive public calls for tenders.	2
11. Taxes and fees	Review of the communal taxes and fees to reduce the burden on SMEs	1
12. Further education and qualifications	Adaptation of professions (dual system), extension of the city's vocational courses	4
13. Employment support	Cooperation with SMEs: direct mediation, qualifications, school-industry	1

Source: Own translation and summary of Landeshauptstadt Düsseldorf (2000d).

The programme lists several measures that are the responsibility of other organisations and therefore calls for an improved and enhanced cooperation in the framework of the SME network. In addition, the subjunctive tense used for several measures and lack of strategic ambition seem to be linked to the statement that '[t]he implementation of the programme for strengthened SME support, i.e. the intensification of current measures and the realisation of additional activities, is only possible if improved personnel and financial framework conditions are created for the city's economic development support' (ibid., p. 10). In terms of human resources, the programme specifies the demand by calling for four additional posts together with two administrative support personnel.

Out of the 42 listed measures, nearly a third (13) concern the provision of commercial space. Therefore, the programme's focus clearly lies in the activity field of supplying land sites and office space. Here, a more strategic approach can be detected as these measures also include the development of specific location concepts such as a trade/craft yard (*Gewerbehof/Handwerkerhof*) and the establishment of sectoral start-up centres and technology centres (Landeshauptstadt Düsseldorf, 2000d, p. 3). This comprises the setting up of a start-up centre for the media sector in the media harbour (*Gründungszentrum für die Medienbranche im MedienHafen*) and a science and technology centre 'WTZ' (*Wissenschafts- und Technologiezentrum*) at the Merowinger Square with links to biotechnology.

This reflects the relevance attached to firms from 'future sectors', which are viewed as important for the necessary modernisation of the city's economic structure (ibid., p. 2).

In addition to the focus on media and biotechnology in terms of location concepts, the programme also states this sectoral focus for start-up support (ibid., p. 6) and the adaptation of further education and vocational qualifications. Concerning the latter, the areas of ICT – especially telecommunications –, environmental technology, alternative energies, mechatronics, logistics, service technology, medical technology, care management and IT are mentioned (ibid., p. 9).

Support to businesses is provided by the city's office for economic development support, which in September 2002 consisted of 22 staff in two units: one dealing with the existing business base, attracting foreign firms and foreign trade, the other with location site advice and support to firms (Landeshauptstadt Düsseldorf, 2002, p. 16).<sup>542</sup> In addition to the head of the office and two unit managerial posts, six posts at least partly dealt with the supply of land sites and office space; five posts were allocated to attracting foreign firms and economic analysis and statistics; four to press and public relations; while technology advice/funding support, start-up advice/coaching and acquisition in biotechnology and acquisition in ICT (*Information & Kommunikation*) were each only allocated one post. To an extent, this reflects the core focus of the city's SME support programme and the wider region's development concept which emphasise commercial locations but are weak on specific sectoral support.<sup>543</sup>

Even though overall specific sectoral support is not so actively pursued, at least for the media/ICT sector networking activities and events do take place. The city's office for economic development support initiated the 'digital city Düsseldorf' network association

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<sup>542</sup> For more information on Düsseldorf's office for economic development support, see <http://www.duesseldorf.de/wirtschaftsfoerderung>

<sup>543</sup> According to a firm survey carried out by the Institute for Economic and Social Research 'IWS' for the city, firms raised the wish for the organisation of sectoral networking events (cf. Landeshauptstadt Düsseldorf, 2002, p. 7).



(‘*Digitale Stadt Düsseldorf e.V.*’) in 1995.<sup>544</sup> The network aims to bring together businesses from the media industry (i.e. printing, publisher, TV, radio, internet, film and music), communication industry (i.e. advertising, public relations and design), information technology and telecommunications (including software, hardware and services) and service providers and applicant industries. By April 2009, ‘digital city Düsseldorf’ comprised 113 fee-paying member organisations.<sup>545</sup> Plans for creating a similar network in the field of medicine were also reportedly envisaged.<sup>546</sup>

The 2001 report by office for economic development support on office space development (Landeshauptstadt Düsseldorf, 2001a, p. 5) further outlines the city’s location profile and sectoral core focus areas, yet without providing strategies to support the sectors: fashion, communications and media, banks, foreign trade, insurance services, exhibitions and congresses, business consultancies and stock exchange.

Overall, Düsseldorf’s economic development support appears to be of a rather traditional nature focusing on serving its established business base and providing good framework conditions such as the city’s efforts towards becoming an e-city (i.e. with e-school, e-governance and e-commerce).<sup>547</sup> Having a dynamic business base in comparison to the other city-regions studied here might be an explanation for the absence of groundbreaking or energetic innovation support. However, focussing on providing good framework conditions might have well been the right strategy, given that the city’s economy is comparatively doing fairly well.

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<sup>544</sup> More information about the network is available at <http://www.duesseldorf.de/digitalestadt/>

<sup>545</sup> See <http://www.duesseldorf.de/digitalestadt/mitglieder.shtml>, last accessed 19.04.2009

<sup>546</sup> Interview No. 1, transcript pages 1 and 9

<sup>547</sup> Interview No. 1, transcript page 2

*Düsseldorf's urban planning with a sectoral focus on media*

An important recent urban planning project in Düsseldorf is the media harbour (*MedienHafen*), which aims at 'positioning Düsseldorf as a European location for advertising, art and the media – in short, for the creative industries' (Landeshauptstadt Düsseldorf, 2001b, p. 10). The conversion of the old Rhine harbour gained a visible flagship with the opening of the landmark three eye-catching buildings by architect Frank O. Gehry (*Neuer Zollhof*) in 1999. Architecture has played a key role in making this site a popular location for the communications industry.

By 2001, the media harbour in the Kaistrasse/Zollhof area had received investments of 400 million € and further investments of 600 million € were planned at that time (Landeshauptstadt Düsseldorf, 2001b, p. 11).<sup>548</sup> According to the fifth edition of the firm reference handbook of the media harbour, 268 mostly small firms in the advertising and art, communications and TV production sector were said to have located by August 2001 to the riverside development area providing 5,000 jobs, while a further 3,000 jobs were expected to be created in the extended areas (Landeshauptstadt Düsseldorf, 2001d, p. 2). Importantly, the city had also started building a public start-up centre for the film and TV economy (Landeshauptstadt Düsseldorf, 2001c, p. 11) indicating a shift towards providing more specialized business and start-up support.

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<sup>548</sup> For more information on the media harbor, see <https://www.duesseldorf.de/medienhafen/index.shtml>

### *Düsseldorf's specific location concept in the field of biotechnology*

Another recent project in the city is the Düsseldorf Life Science Centre (LSC), an incubator initiated in 2001 by the city of Düsseldorf in cooperation with the Heinrich Heine University Düsseldorf. The idea for its establishment was said to have come from one of the university professors that was also the co-founder of a large biotechnology firm, which was then pushed by the city at the highest level.<sup>549</sup> The following Figure 37 gives an overview of its entire supporting institutional network. While the city of Düsseldorf provided the land site, the Centre was implemented and is operated by the property development corporation Düsseldorf 'GEO mbH' (*Grundstücksentwicklungs-Gesellschaft Düsseldorf*), which is jointly owned by the city's 100% subsidiary firm 'IDR AG' (*Industrieterrains Düsseldorf-Reisholz AG*) and the bank Stadtparkasse Düsseldorf.

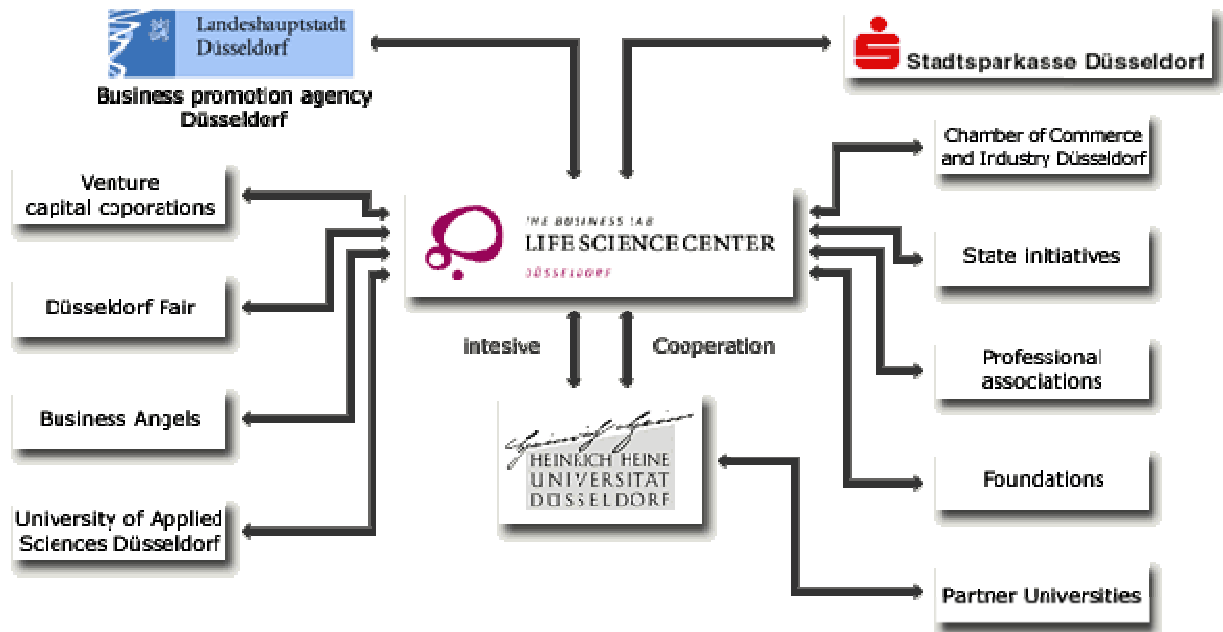
Since opening in 2002, the LSC supports the establishment and enlargement of business activities of start-ups, young enterprises and established firms in the areas of biotechnology/genetic engineering, bioinformatics, biopharma, biomedicine and medical technology.<sup>550</sup> It aims to support cooperation and technology transfer through networking among firms and contacts with the neighbouring university, university hospital and polytechnic / university of applied science by combining the three pillar functions of a technology centre, start-up centre and service centre.

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<sup>549</sup> Transcript page 2.

<sup>550</sup> See the LSC website at <http://www.lsc-dus.de>, accessed 19.04.2006.

Figure 37 The institutional network of the Life Science Centre Düsseldorf



Source: <http://www.lsc-dus.de>, last accessed December 2006

The sectoral focus of the incubator seems to be suitable given the university's strength in this area and the overall lack of technology and start-up centres in the city means that it does not represent an addition to an already existing oversupply.

The technology centre offers support services from a network of experts in the areas of finance, patents, R&D and technology transfer as well as 12,000 m<sup>2</sup> of laboratory and office space, complemented by a further 9,000 m<sup>2</sup> in an adjacent office building. By April 2009, the centre has attracted 36 organisations renting office space, of which 32 are firms.<sup>551</sup> The centre's activities are further linked to those of the Bioregio Rhineland network of the (other)

<sup>551</sup> For more information on the media harbor, see <https://www.duesseldorf.de/medienhafen/index.shtml>

ABCD cities of Aachen/Jülich, Bonn and Cologne (in addition to Düsseldorf) that also focus on the biotechnology sector.

*Assessment of Düsseldorf's institutional support network*

Düsseldorf's business and innovation support system was reported to lack proactive initiative and ideas for fostering cooperation amongst firms amongst its support institutions, where one actor was said to 'always wait until somebody comes up with an idea'<sup>552</sup> and university-industry linkages were only nascent due to a slowly developing uptake of this opportunity by professors and students.<sup>553</sup> It therefore seems that the city is not fully using its potential in terms of support for cooperation. Given that that city does not have a specific public-private partnership active in the field of economic and business support – such as AGIT, dortmund-project or GFW in the other case studies –, one could surmise from this that perhaps the scope and extent of activities is more limited.

An apparent more dynamic self-driven business base may also mean that pressure for innovation support is not as high as elsewhere. However, as comparative economic key figures indicate that Düsseldorf is doing relatively well, a more general focus on providing good framework conditions may well have been a successful strategy.

In any case, while there was some criticism about the local inter-institutional relationships in that it was reported that 'too many have a say, too much is done democratically'<sup>554</sup>, an overall collaborative support certainly still appears to prevail. A non-representative social network

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<sup>552</sup> Interview No. 2, transcript page 4.

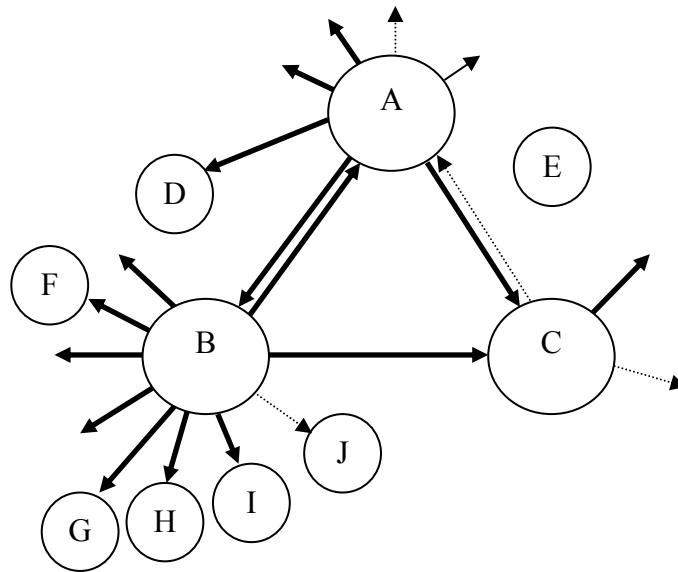
<sup>553</sup> Interview No. 8, transcript page 8.

<sup>554</sup> Interview No. 46, transcript page 5

analysis of the relationships between the core institutional actors within the local economic and innovation support system of Düsseldorf (see following figure and table) suggests that the interactions between local actors are broadly characterised by cooperative attitudes. However, the overall number of local actors mentioned by the core institutions has been low, perhaps indicating that a vibrant network of business and innovation support actors does not exist. The reported active involvement of local banks in the activities should be seen as positive feature of the support system.

In summary, it is the author's impression that Düsseldorf seems to be characterised by a collaborative yet less forceful governance system. Although a clear strategic approach cannot be detected, some lighthouse projects have been pushed through and the city might be able to rely on maintaining its good framework conditions. Admittedly, a somewhat mixed picture therefore emerges for this particular case study given the rather positive relationships between the governance actors and the city's economic performance.

Figure 38 Network of relationships of the local actors in Düsseldorf



Note: Circles represent local organisations within Düsseldorf. Their names have been omitted for privacy reasons. The thickness of arrows indicates the nature of relationships mentioned as explained below. Arrows pointing at no particular circle represent relationships with regional organisations at *Land* level.

- Collaborative relationship mentioned with organisation pointed at.
- Mixture of competitive and collaborative relationship mentioned with organisation pointed at.
- Competitive relationship mentioned with organisation pointed at.

Table 32 Relationships within Düsseldorf's business and innovation support system

Level of involvement/ Relationship to other organisations	Local City-region (Düsseldorf)	Regional (Land NRW)	National (Germany)	EU / International Interregional (EU)
<b>Competitive</b>	<b>2</b>	<b>2</b>	1	0 (* )
<b>Mixture of competitive and collaborative</b>	<b>0</b>	<b>1</b>	0	0 (* )
<b>Collaborative</b>	<b>10</b>	<b>6</b>	2	4
<b>None of the above or no connections</b>	<b>0</b>	<b>0</b>	0	0

Note: The numbers indicate the network combinations of organisations entered in the institutional matrix mapping tool. There were no fixed numbers or type of organisations that had to be mentioned by interviewees. Stars (\*) represent a double entry of an organisation that was (re)moved, e.g. cooperation with a regional actor at the international level to be displayed only as an entry at the regional level.

Source for figure and table: Own creation based upon supporting matrix tool completed by 3 local interviewees (one interviewee did not complete the matrix and two interviewees were not asked to complete it – one due to a telephone interview and one because he was part of the same organisation as another interviewee).

## **CHAPTER 9**

### **FIELDWORK FINDINGS: COMPARATIVE ANALYSIS AND ISSUES RAISED CONCERNING GOVERNANCE DYNAMICS**

Following the description of the strategies and support provided, the key actors for policy-making and implementation, and the dynamic governance aspects that influence the working of the innovation system in each of the case studies discussed before, this chapter compares, in the first part, the fieldwork findings of the case studies, especially in regard to governance dynamics. It highlights differences and similarities in the dynamics of the innovation systems studied and provides some possible explanations as to why these exist.

To facilitate the cross-case analysis and discussions, a tabular overview is introduced to give an overview linking the fieldwork findings in relation to the research questions raised in the thesis. These dynamics very much concern the measures and processes of policy development and implementation, organisational and relationship issues between the actors within the governance infrastructure, and their perceptions that were outlined as drivers of systemic-ness of the governance system.

The second part of this chapter presents more explorative issues raised by the interviewees concerning governance dynamics. It aims to capture the overall different perceptions by academics, on the one hand, and policy-makers and practitioners, on the other, in terms of innovation policy-making and implementation of core issues, as well as obstacles and contributing factors, for instance, for achieving more coordination and cooperation between



the different actors. These issues are therefore presented in a thematic structure. This is complemented by an indication of the overall trends that were identified in local economic development policy before this part concludes with a list of enablers for building governance systemic-ness for business and innovation support that was identified from the fieldwork findings.

The final part provides comparative inferences by outlining implications from the fieldwork findings for policy and theory.

### **Comparative analysis of the governance dynamics inherent to the local innovation and business support system of city-regions**

The following Table 33 provides an overview of the extent of governance dynamics within the different case studies and at multiple levels of governance. It should be noted that since a qualitative research approach has been taken, these assessments have to be interpreted as a qualitative academic judgement.<sup>555</sup> The table serves also as a conclusion to the previous chapter, as well as an introduction to the discussion of the governance dynamics, as it provides an indication of the author's impression of the governance patterns found across the case studies.

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<sup>555</sup> Due to the limitations of this research approach, the judgements on the extent of governance dynamics represent only an indicative inference since the qualitative judgement was based on a snapshot of insights from a small sample of actors (cf. chapter 8).

Table 33 Extent of governance dynamics according to case studies and level of governance

Aspects of governance dynamics - Characteristics and activities	Level of governance					
	NRW	AA	DO	DU	D	Rtg
<i>Policy measures (and funding)</i>						
- Own programme/instruments developed	++	+	++	o	-	--
- Outlined holistic strategic orientation	+	+	++	-	-	-
- Cluster policy approach	++	+	++	-	o	--
- Informed by diagnostic and comparative analytical studies (e.g. by consultancies)	o	+	++	-	-	--
- Own competitions for funding	++	+	++	-	o	--
<i>Structure (and policy links)</i>						
- Connections between actors (i.e. contacts and exchange as opposed to fragmentation)	++	+	++	--	o	+
- Clear-cut allocated responsibilities between actors (as opposed to overlap)	o	--	-	-	o	o
- Coordination of tasks amongst actors (as opposed to duplication)	-	++	+	--	o	o
- Recent organisational innovation within governance structure (e.g. new core organisation or mediator)	++	o	++	-	-	--
- Existence of hybrid organisations (PPP)	+	+	+	+	o	--
- Existence of dynamic business base	o	o	o	-	+	+
<i>Relationships (and cooperation ties)</i>						
- Cooperative attitudes/mutual trust (as opposed to competitive attitudes/ conflict, opportunism, antagonism)	+ (reg.) / -- (sub-reg.)	+/-	+	-	+	-
- Identifiable lead organisation (main communication or strategy hub)	+	+	++	-	--	+
- Identifiable animateurs and drivers (mover & shakers) or mediators	o	o	++	--	--	o
<i>Processes (and decision-making)</i>						
- Intense and consistent interactions	++	++	++	o	o	o
- Inclusiveness of stakeholders (i.e. participatory approach)	+	+	+	-	o	o
- Openness/outreach to external actors	--	++	+	-	++	++
<i>Perceptions (and ideas) of policy</i>						
- Theory-derived or awareness	++	++	++	--	--	--
- Reference to good practice models	+	+	+	-	-	--

Source: Own creation. The categories have been phrased in a way, so that a '++' denotes a very positive extent or quality of the characteristic; '+' positive; 'o' average/normal; '-' negative; and '--' very negative.

NRW=North Rhine-Westphalia; AA=Aachen; DO=Dortmund; DU=Duisburg; D=Düsseldorf; Rtg.=Ratingen

Table 34 Characteristics of the local governance dimension across the four case studies

<b>Key drivers of the systemic-ness of the governance system</b>	<b>Aachen</b>	<b>Dortmund</b>	<b>Duisburg</b>	<b>Düsseldorf</b>
Focus of policy measures and strategy	Entrepreneurial activities and university potential (start-up region); transnational cooperation	Clearly focussed cluster policy and holistic implementation approach; e-city	General policies with one clear sectoral focus (logistics)	Supply-side urban development focussed on sectoral strength; global city
Organisational structure and policy links of the governance systems	Virtual (via umbrella organisation)	Dynamic core organisation	Separate organisations driving themes	Lack of specific business support actor but links to government
Relationships and cooperation ties between actors	Competitive and bypassing	Collaborative (identification) and constructive	Rather competitive and weak	Collaborative but weak, yet global ties
Processes and decision-making	Inclusive but dominated	Inclusive (community of practice); external moderation	Restricted and disconnected from stakeholders at multiple levels	Self-driven; key individuals
Perceptions of policy and sources of innovative ideas	External input; transnational cooperation	External input; qualified personnel; international cooperation	Traditional; networks but lack of business dynamics	Policy-push; Non-interventionist; global pipes

Source: Own creation.

The cross-case findings clearly suggest that there are *important differences in terms of governance dynamics* across different city-regions within the same *Land* setting.<sup>556</sup> Not only do some individual actors seem to be more successful in actively driving certain processes within their respective governance system, but it also seems that the overall degree of *systemic-ness*, i.e. the coordination and cooperation, differs among the municipalities.

<sup>556</sup> The same *Land* setting means that the various governance structures of case city-regions consist, overall, of fairly homologous settings and actors (cf. chapter 8).

To briefly summarise, Dortmund and Aachen are viewed here to represent cases where systemic-ness of the governance dimension of their innovation system was found, or at least partly found (in the latter case). The question of what makes these cases distinct from the others, Duisburg and Düsseldorf, where governance relations do not appear to constitute systemic-ness is of particular interest.

Dortmund is viewed as a model case of a successful construction of a functioning network of actors, which was reported to have managed to overcome and avoid an ‘immobilisation of policy as a result of conflict between different elites’<sup>557</sup>. This was seen partly as the result of an open and participatory governance approach. A critical incident in this case was the involvement of the consultancy firm McKinsey<sup>558</sup> in the development of a committed cluster strategy. The creation of the fundamental dortmund-project with a reported ‘massive implementation capacity’<sup>559</sup> can be seen as an investment by a learning city-region. Correspondingly, the start2grow competitions are an example of how the dortmund-project has tried to construct socialised learning in communities of practice with the objective to create new start-ups. By providing intellectual and social leadership in building a cooperation space for learning to take place, the dortmund-project can be partly regarded as a *community of practice* as defined by Wenger and Snyder (2000, p. 139): ‘groups of people informally bound together by shared expertise and passion’ with the primary output being knowledge.

The business and innovation support system in Aachen was partly seen to be systemic. Despite a strategic approach to use the university’s potential more efficiently, the city-

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<sup>557</sup> Interview No. 29, transcript page 5.

<sup>558</sup> Interview No. 44, transcript page 8.

<sup>559</sup> Interview No. 48, transcript page 6.

region's dynamism appeared to be on hold due to rather competitive interinstitutional relationships and 'parallel structures'.<sup>560</sup>

Duisburg on the contrary was viewed rather as a 'dark black spot' in terms of economic development support<sup>561</sup> with no functioning network due to non-collaborative actors and a university that appeared to be less embedded into the innovation system than its counterparts in Aachen and Dortmund.<sup>562</sup>

The author's impression of Düsseldorf's governance system was of a weak one due to a limited focus on urban development projects and a lack of strategic design of implemented policies even though a collaborative environment seemed to be present. Given that the subjective feeling of a weak governance system is not reflected in the economic performance indicators, this mixed picture should be viewed more as a snapshot of how this innovation system is working. A likely dynamic business base – only covered indirectly through intermediaries – may be a potential driving force here.

The underlying reasons that are viewed as obstacles and drivers are discussed in more detail in the following and a list of key enablers is provided later on in this chapter.

Besides the sub-regional differences across the case studies, there appear to exist also significant *horizontal differences* regarding the characteristics of governance dynamics. Most notably, this concerns the allocation of responsibilities between actors, the coordination amongst them, and the degree of cooperative attitudes. These three determining factors of

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<sup>560</sup> Interview No. 29, transcript page 10.

<sup>561</sup> Interview No. 35, transcript page 12

<sup>562</sup> Interview No. 29, transcript page 8.

governance systemic-ness seem to have been difficult to achieve in the case study city-regions (cf. Table 33). This strongly suggests that governance dynamics prevail that act as obstacles to achieving a systemic-ness. The reverse implication of this is that there is widespread overlap of responsibilities, duplication of tasks, and opportunism or antagonism between stakeholders.

***Cooperation and coordination amongst governance actors: Systemic-ness to be found?***

A key finding of this thesis is the extent of inter-institutional conflict and lack of systemic-ness, i.e. lack of a common vision and cooperation which, at least partly, feature in all the case studies. While inter-institutional competition had been expected, the reported scale of conflict was surprising.

The following two tables give an indicative overview in this respect as they compile the types of relationships mentioned by local actors of the business and innovation support system across the case studies.<sup>563</sup> It shows for instance that in two of the four case studies, namely Aachen and Duisburg, the relationships amongst local actors were seen as a mixture of competition and collaboration. Dortmund and, to a lesser extent, Düsseldorf are noticeable positive examples of predominantly cooperative relationships.

Concerning linkages to the meso (e.g. Projekt Ruhr) and regional (*Land*) levels, Dortmund stands out as a positive example, whilst Duisburg is a negative example, with the lack of cited relationships to regional actors.

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<sup>563</sup> Due to the overall low numbers of relationships mentioned at national and international level, a compiled table was only produced for the local and regional governance levels. However, the results for the national and international level are still listed individually in each of the case study reports.

This negative impression of the limited outreach of Duisburg is also reflected in the low number of relationships mentioned with actors at the national and EU/international levels. Due to its geographical border location and its Euregio activities, it is not surprising that Aachen appears to be more active at these levels.

Table 35 Relationships amongst local actors compared across the four case studies

Level of involvement/ <b>Relationship to other organisations</b>	Local City-region <b>Aachen</b>	Local City-region <b>Dortmund</b>	Local City-region <b>Duisburg</b>	Local City-region <b>Düsseldorf</b>
Competitive	0	0 (*)	1	2
Mixture of competitive and collaborative	16	5	8	0
Collaborative	14	22 (*)	5	10
None of the above or no connections	0	0	2	0
<i>Total number of combinations</i>	<i>30</i>	<i>27</i>	<i>16</i>	<i>12</i>
<i>Number of interviews</i>	<i>5</i>	<i>5</i>	<i>4</i>	<i>3</i>
<i>Average of combinations</i>	<i>6</i>	<i>5.4</i>	<i>4</i>	<i>4</i>

Table 36 Relationships with regional actors mentioned by local actors across the case studies

Level of involvement/ <b>Relationship to other organisations</b>	Regional (Land NRW) mentioned by <b>Aachen</b>	Regional (Land NRW) mentioned by <b>Dortmund</b>	Regional (Land NRW) mentioned by <b>Duisburg</b>	Regional (Land NRW) mentioned by <b>Düsseldorf</b>
Competitive	0	1	0	2
Mixture of competitive and collaborative	1 (****)	7	1 (*)	1
Collaborative	6 (**)	17 (*****)	0	6
None of the above or no connections	0	0	0	0
<i>Total number of combinations</i>	<i>7</i>	<i>25</i>	<i>1</i>	<i>9</i>
<i>Number of interviews</i>	<i>5</i>	<i>5</i>	<i>4</i>	<i>3</i>
<i>Average of combinations</i>	<i>1.4</i>	<i>5</i>	<i>0.25</i>	<i>3</i>

Note to both tables: The numbers indicate the network combinations of organisations entered in the institutional matrix mapping tool unilaterally by local actors. The first table corresponds to the relationships mentioned with other local actors, the second table to the relationships mentioned with regional actors at the meso (e.g. Ruhr area) or *Land* level (NRW). There were no fixed numbers or types of organisations that had to be mentioned by interviewees. Stars (\*) represent a double entry of an organisation that was (re)moved, e.g. cooperation with a regional actor at the international level to be displayed only as an entry at the regional level.

Source for both tables: Own creation based upon the supporting matrix tool completed by 17 local interviewees (four interviewees did not complete the matrix and three interviewees were not asked to complete it – one due to a telephone interview and two because they were part of the same organisation as another interviewee). Academics were not asked to complete the matrix and actors operating mainly at the meso and regional levels are not considered here as they were asked only to indicate relationships with local actors in general but not specifically for the individual case studies.



The causes for the extent of previous (Dortmund) or current (Aachen and Duisburg) conflicts and competitive relationships within the innovation systems were reported to be different but interpersonal animosities and functional overlaps of the business and innovation support organisations were commonly mentioned .

For instance, one interviewee pointed out that ‘overlap is normal as everybody targets the same customer – its firms’<sup>564</sup>. Therefore, it was highlighted that interpersonal communication is important when activities in intersections are concerned. Interestingly, start-up support was singled out by a number of interviewees in three of the four case-studies as an area where the potential for conflict was apparently higher than in other areas.<sup>565</sup> Correspondingly, a few interviewees actually reported different types of relationships to other organisations according to the different activity fields concerned. As an example, the relationship between two organisations was labelled as competitive in the area of start-up support but collaborative in location marketing. Therefore, it seems that flexibility is required from actors of the business and innovation support system and a friend-or-enemy attitude in terms of ‘you are either with me or against me’ would be counter-productive.

In addition, there appears also to be a prevailing level of overlap of responsibilities and continuous duplication of activities (such as the provision of similar thematic information or networking initiatives and services) by actors within the same business and innovation support system. The following selected extracts from interviews with policy-makers and

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<sup>564</sup> Interview No. 17, transcript page 7

<sup>565</sup> Interview No. 15; No. 27, transcript page 17; and No. 45 for instance.

practitioners provide an insight into from where competitive attitudes stem and why a systemic-ness of the governance dimension can be so hard to achieve.

### *Lack of cooperation*

Firstly, the following quote illustrates the scale of the reported lack of cooperation between governance actors:

[W]e have ascertained that **we work massively against each other**. Everybody has partly supported projects. It is not the aim of *Land* support measures that we use the funding for the same or similar offers.<sup>566</sup>

[...]

Good cooperation is due to close personal contacts, then one can repair many things.<sup>567</sup>

The interview extract below gives an explanation for this:

It is rather that the individual institutions or organisations only work together locally/regionally if at all. Supra-regionally is always difficult, because of the different interests and positions.<sup>568</sup>

[...]

[Cooperation] is in principle always dependent upon people. And one has to see that there is inevitably some overlapping, where one has to be very **communicative**, otherwise irritations will soon arise. [...] We ascertain strongly that, overall, businesses are massively overloaded with offers and information. [...] In this respect, it would be useful if certain things, areas or activities would go in the same direction, if one would

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<sup>566</sup> Interview No. 16, transcript pages 20-21

<sup>567</sup> Interview No. 16, transcript page 22

<sup>568</sup> Interview No. 16, transcript page 6

do such things together, or just coordinate them with each other via email lists and so on.<sup>569</sup>

### *The creative pressure of economic suffering*

Multiple reference were made across many interviewees to ‘pressure from economic suffering’ (*Leidensdruck*) being a key driver of reform.

‘The severity or **necessity** of the economic problems once brought all the main actors together, but the close working ties have broken down’<sup>570</sup>

The desperateness and necessity of municipalities or regions to do something in the wake of severe structural difficulties acts as a strong incentive to cooperate. It is arguably an enabler of stakeholders ‘burying the hatchet’ and overcoming any apparent interpersonal and inter-organisational antipathy and conflict.<sup>571</sup>

### *Overlap of responsibilities and functions*

There is also an overlap in responsibilities, or functions. The subsequent quote is just one of many examples where this was reported. This consequently hints at a lack of coordination.

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<sup>569</sup> Interview No. 16, transcript page 7

<sup>570</sup> Interview No. 16, transcript page 16

<sup>571</sup> For instance, interviews No. 33, transcript page 5 and No. 43, transcript page 7.

The city, for example, also has a contact unit, a kind of administration hearing, which shall also be a contact point for businesses. We perceive this as a bit **counterproductive**, although not in every aspect.<sup>572</sup>

[...]

There are **overlaps**, which one could transfer from competition into cooperation. [...] It really concerns the interfaces, which are often not sufficiently clarified. And there is always an intersection, which is covered by two organisations at the same time.<sup>573</sup>

The following extract from an interview with one practitioner provides a more detailed insight into the underlying reasons behind the occurrence of duplication and competitive attitudes amongst the different actors within the innovation and business support system.

If you have two or three working groups in the e-logistics sector at our location, then the businesses ask themselves “what is the difference?”. [...] **There is a bit of pressure to perform, everybody must always show that they have a right to exist** and that is particularly the case for the start-up area. There is a start-up organisation for women and alternative existence, many organisations that deal with and want to help start-ups. And we need to be careful that this does not also happen for the innovation area.<sup>574</sup>

[...]

But **the problem is always that with constant consensus talk nothing happens**. One has to drive in a peg and say “I do this, irrespective of whether somebody participates or not”. If others participate, the better, then one can vote on how to go about it. It is very important to be open, for instance, when creating a logo for the operating circle or clearly indicating the participating organisations. That also creates a higher acceptance amongst businesses, who see that the initiative is not merely organised by one organisation.<sup>575</sup>

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<sup>572</sup> Interview No. 22, transcript page 12

<sup>573</sup> Interview No. 22, transcript page 12

<sup>574</sup> Interview No. 16, transcript pages 17-18

<sup>575</sup> Interview No. 16, transcript page 19

This call for more coordination can be seen to exemplify the need to create institutions that mediate between and coordinate actors. The set-up of a virtual one-stop-shop, that bundles activities and provides clear responsibilities under one umbrella organisation without centralising expertise in one organisation, is to be seen as a possible solution in this respect as the case of Aachen's 'start-up region' initiative shows. This appears to be a particularly suitable approach in the case of interpersonal or interinstitutional conflicts.

Another possibility is the support of networking and cooperation between different stakeholders by supporting the process of joint policy development and discourse.

I would support projects that foster **inter-institutional dialogue and create [such Regional Innovation Strategies]**, however I see a problem in the financial support. I would welcome such an initiative but **would not support it with money**. Instead, the actors need to come together and collaborate out of their own free will or on their own initiative, otherwise you do not achieve anything.<sup>576</sup>

However, there are diverging opinions on whether such activities ought to be financially supported or not. While the previous interviewee speaks out against it, another practitioner takes a different stance by pointing out that if such an action is done 'voluntarily, then it is often not consequently followed-up.'<sup>577</sup>

The next quote also indicates that there is a waste of resources as a consequence of the duplication that occurs:

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<sup>576</sup> Interview No. 35, transcript pages 16-17

<sup>577</sup> Interview No. 16, transcript page 8

There are no arrangements [with regards to the integration of different programmes] between different funding institutions, between different actors even within the Ministry of Economic Affairs, who work on that. This is rather arbitrary [...] and it happens that you look into other databases and suddenly see a firm with the same title with the same project that already applied for EU funding or Federal funding. You can interpret that as you wish.<sup>578</sup>

The duplication of activities and services does not only mean that resources are wasted, but that the client base is alienated too. This obviously threatens the governance system's ability to reach out to its business base and to initiate cooperation between and with them.

[T]oo much is **duplicated** here, double and threefold. For instance, a different initiative and a different institute work on the same project as we do, sometimes without knowing about it. I see a further weakness in that **we are often in danger of losing the practical relevance**. In that projects are too theoretical and too scientific for our clients, that is too abstract for SMEs. [...] They often do not understand – not because they are stupid – what such a network can actually offer them. [...] The practical relevance is often already lost because the language of SMEs is not used. Many consultants speak High German, a consultant dialect [...] and talk about benchmarking and so on. The ordinary businessman then shuts down and then it is over. Sometimes, even a tie may already be too much. Advisers, whether technology advisors or business consultants are always equated with job rationalising measures.<sup>579</sup>

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<sup>578</sup> Interview No. 35, transcript page 6

<sup>579</sup> Interview No. 35, transcript pages 13-14

### *Perceptions of innovation policy-making and -implementing*

Having mainly asked policy-makers and practitioners for their understanding of successful innovation support, it becomes obvious that there is an abundance of different perceptions on how to support innovation – let alone what innovation means.

Nevertheless, the following quotes show that there are some common themes in the different opinions. Broadly they can be distinguished according to the point of view taken. For instance, some practitioners respond with an answer about a more effective set-up of innovation support programmes; others refer to ways on how to reach the business base with their support, or make them cooperate with each other; whilst others stress a systemic view and point to the need for cooperation within the governance dimension.

### *Flexibility and openness of programmes*

With regards to the successful structure of programmes in support of innovation, it is stressed that these programmes have to remain flexible and open in order to achieve a demand-led orientation and ensure that a critical mass of business with specific competencies is found.

Interviewer: What in your opinion and your expertise epitomises successful innovation support?

Interviewee: The **organisation of innovation should definitely be flexible**.[...] If I say open and flexible, I do not mean without delimitation. There should be some delimitation but it should have very wide corridors. Let's say not just the shape of a corridor, but also **funnel-shaped**. So that one can enter a lot at the top [...]

of the funnel, and that the conical form produces an output that one desires to achieve all measures of innovation.<sup>580</sup>

The interviewee later explains his conceptualisation with his perception of demand often being too narrow for specific programmes available for certain spatial areas.<sup>581</sup>

Another interviewee also names flexibility as important for programme design in order to have a demand- led orientation.

Interviewer: What in your opinion and your expertise epitomises successful innovation support?

Interviewee: Well, an intelligent innovation support, that is fairly easy to answer. It is a support generally for SMEs, which must be cleverly knit together. This means that I don't have to complete an application of over 10-20 pages, and that it is not about describing what one is doing. If I have to fill in the relevant forms, how many staff, what costs and so on, then many businesses are overstretched with that. [...] After all, such a programme is one that is relatively **flexibly handled**; because different businesses have different needs.<sup>582</sup>

Later comments further highlight that there is a need to provide the right targeted approach to reach businesses and this involves, as the practitioner point outs, not to create too many administrative hurdles – certainly not at the beginning of making contact.

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<sup>580</sup> Interview No. 35, transcript pages 3-4 and cf. 17

<sup>581</sup> Interview No. 35, transcript page 17

<sup>582</sup> Interview No. 16, transcript pages 4-5



### *Reaching the business base*

The fact that several interviewees stressed the need to reach the business base provides an indication that this is a thorny task. Still, it remains a crucial task if the governance dimension is to play a role within the innovation system and if a cooperative and associative type of innovation system is aspired to.

The point is that **many small enterprises shy away from bringing external consultants into their businesses**. It is not that they cannot afford it [...], but they are afraid of it, **because they are getting a mirror held up in front of them**. And you are also told that what you are doing is stupid and nobody wants that. [...] One has to be a bit careful in this respect and we have to explain to businesses why this makes sense for them.<sup>583</sup>

As much as SMEs may be concerned about being lectured by consultants providing advice, is it equally hard to bring them together and convince them to engage in cooperative activities (cf. Burfitt et al., 2002, p. 29), as the next comment stresses.

The individual businesses are mainly all lone fighters, who look out for what is happening. [...] Trust grows slowly amongst businesses [...] and it is hard work getting businesses to cooperate. That is a process that can often take two years.<sup>584</sup>

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<sup>583</sup> Interview No. 44, transcript pages 9-10

<sup>584</sup> Interview No. 16, transcript page 13

A careful selection of structures and processes for networking and cooperation activities is thus important in the ‘fight to keep people interested’ as one practitioner put it.<sup>585</sup> The following description by an interviewee points exactly to that.

The [specific round table club] rules lay down clearly that it is a **democratic body**, which means that members can decide by a majority what topics they want to discuss and what they want to see transferred into activities. We ensure that the organisational framework remains in our hands, but that the moderation is undertaken by elected members of these specific round table clubs.<sup>586</sup>

It should not be forgotten that especially small enterprises often lack the resources to engage in lengthy and continuous gatherings. This is sometimes even worse if these businesses are based upon an internal management where the CEO does everything, cannot delegate, and has to read everything, i.e. is a ‘chain businesses’ as an interviewee called them.<sup>587</sup> However, one important challenge for practitioners is to facilitate cooperation amongst innovative SMEs and facilitate their participation, for instance, in cluster organisations that ‘provide or channel specialised and customised business support services, especially to SMEs’ (European Commission, 2008a, p. 44).

### *Systemic view of innovation support*

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<sup>585</sup> Interview No. 22, transcript page 10

<sup>586</sup> Interview No. 16, transcript page 3

<sup>587</sup> Interview No. 35, transcript pages 14-15

Other interviewees also stress the need for businesses to engage in networking, which at its core means bringing people together.

Interviewer: What in your opinion and your expertise epitomises successful innovation support?

Interviewee: ‘There is the question of what we want to understand as **innovation**. Well, technology is always one aspect, but it is often equated with innovation. There is the question of whether a new marketing strategy can also be an innovation, or whether a certain kind of network can be an innovation, when businesses say that it does not make much sense to view each other just as competitors, because in certain aspects it makes sense for us individual businesses, for example, **to work together in networks.**’<sup>588</sup>

As much as this applies to networking and cooperation amongst businesses, this is equally important for the governance dimension, as the next excerpt stresses.

Interviewer: What in your opinion and your expertise epitomises successful innovation support?

Interviewee: What from my experience in every case has to be achieved – and we place that before innovation – [...], one has to succeed in **uniting the actors at a location**. And we achieved that in a remarkable way. We had, in the years 1998 and before, a delicate situation, where one attacked the other and did not get along with each other, meaning against those people at [managing] Director level, or equivalent, in the various institutions like, I don’t know, for example, unions, chamber of commerce, economic development agency and so on. “Great we can do that, that serves our own profile”, but that was it. So, what we did was: **we created a vision** and that vision is very, very daring. That came from the anglo-saxon area. There it is not that unusual what we did with [our ambitious] objective, which we put out as a slogan. Yet, people listen and

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<sup>588</sup> Interview No. 22, transcript pages 1-2

then start at some point, if they are properly integrated, to identify with it and to support that externally.<sup>589</sup>

Interviewer: But how were you able to get there from the previous **conflictive situation**?

Interviewee: Very simple. **We brought in an external person**. Because if I would do this [...] and would go there and say: “Listen, folks, that doesn’t work, that is totally stupid. You all have to sit down at one table and we should support three sectors instead of supporting everybody with the watering can. Furthermore we should think about this and that”; then they would say: “We do that already. We know that. Who are you anyway and what is all that about?” [...] Because **one needs the big, renowned, independent name, who can move things**. Yet, that person costs a lot of money.<sup>590</sup>

[...]

[I]t is very important [in a political stalemate situation] to bring in the external element and really go in there with a crowbar. The point is that these people are external; they can withdraw themselves because they are not from the region. They can say: “Yes, we understand this, or we don’t understand this and it is silly, if you think about it, that – leaving the predominating circumstance aside – Mr. XY does not get along with Mrs. So-and-so.”<sup>591</sup>

The latter comment also makes a case for the need to have a mediator, yet it argues that it is beneficial if this person is an external high-profile, renowned actor and thus potentially can be viewed by the different stakeholders as being objective.

Finally, the role of universities and research institutions is also stressed as shown by the subsequent two quotes. Their involvement is seen as crucial for achieving the systemic view of innovation.

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<sup>589</sup> Interview No. 44, transcript page 7

<sup>590</sup> Interview No. 44, transcript pages 7-8

<sup>591</sup> Interview No. 44, transcript page 8

[With regards to cooperation] it is necessary **to have also these [scientific institutions] on board**, because if you have one who starts firing against it, then it becomes difficult.<sup>592</sup>

The fact that there is a **university** [...] **is very important for technological innovation**, which is something that the city cannot decide. Universities are *Land* matters but the university as such is of course one of our key partners with regards to technology support – to support the cooperation between the different departments, research institutes and businesses.<sup>593</sup>

*On innovation policy and cluster policy – are they implemented?*

The question is raised as to whether there is actually ‘such a thing’ as innovation policy in practice as conceptualised by academic theory. The inclination here is to answer this in the affirmative since a clear *holistic cross-cutting policy approach* has been identified at least in one or two settings, namely Dortmund and perhaps Aachen (cf. Table 33 above), as well as at the *Land* level. Having said this, overall it is possible to detect a deviation from the strategic, holistic and systemic orientation of innovation policy. In many cases, innovation policy is understood as merely one element of either SME growth policy, pure technology policy or general economic development policy, and so on. The impression was gained that not only is reference rarely made to innovation but its elements are also treated more as standalone policy initiatives (cf. also Lagendijk, 1999a, pp. 22 and 24). In other cases, innovation policy is simply not the priority as the following quotes demonstrates:

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<sup>592</sup> Interview No. 44, transcript page 12

<sup>593</sup> Interview No. 22, transcript page 2

**Our aim is not to support innovation technology but employment.**<sup>594</sup>

[...]

**Innovation support, we don't do that;** we also don't do information transfer or knowledge transfer. Our task is actually to help people with ideas – which are commercial – insofar that they are able to transfer these ideas, that they can turn it into a business and at best, of course, employ people at the location and thus have more employment.<sup>595</sup>

Assessing the extent of innovation policy orientation is particularly difficult if explicit references to it are rare. Therefore, attention has also been placed on cluster policy, which is subjectively regarded here as a key tool for innovation policy. Indeed, cluster policies are viewed as a 'vital element of building strong innovation systems' (European Commission, 2008a, p. 32) that are most effective when they represent a 'horizontal approach' that brings together different policies (cf. Organisation for Economic Co-operation and Development, 2007).

Overall, several of the formulised strategies at the *Land*, meso (Projekt Ruhr) and local (dortmund-project and Aachen's *foREK*) levels, as well as numerous interviewees, referred explicitly to the cluster approach and the national competence centre initiative as a source of inspiration. Furthermore, their underlying concept was implicitly referred at by numerous mentionings of the need to 'strengthen the strength'. This is quite a significant finding given North-Rhine Westphalia's previous 'subsidy mentality' that was still reported by some actors to be an obstacle for successful innovation policy-making.<sup>596</sup>

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<sup>594</sup> Interview No. 44, transcript page 3

<sup>595</sup> Interview No. 44, transcript page 3

<sup>596</sup> Interview No. 29, transcript page 8.

Although the cluster approach appears to be a fashionable concept – given its repeated mentioning by interviewees –, a cluster policy was only found to be seriously implemented in one case study, namely the city-region of Dortmund.

In the other case studies this approach was only partly visible and mostly lacking an overarching local approach across different policy fields. For instance, Aachen managed to focus its strategic policy orientation on a narrow number of sectors but this focus is not explicitly reflected in measures addressing skills shortages, as in the case of Dortmund. Still, an attempt to foster clustering and university-industry linkages, and support to the establishment of several cluster organizations were found in Aachen.

In Duisburg, a holistic cluster approach was found but was restricted to one sector (logistics). In Düsseldorf, such a holistic approach was not explicitly noticeable, although the urban land site development of the media harbour could be viewed as being a potential innovative element.

Given the holistic nature and different departmental competencies and responsibilities concerned, it appears that the implementation of full-scale cluster policy has high hurdles to overcome. Such an approach needs support from high-level politicians in order that stakeholders subordinate their vested interests and keep their criticism constructive. Furthermore, an inclusive process that is perhaps mediated by neutral externals can be a contributor to achieve this – as in case of dortmund-project –, especially if inter-personnel or inter-institutional conflict is present.

*The theory-practice gap of conceptualising innovation policy and governance*

There appear to be varying degrees of awareness of theoretical and best-practice models for business and innovation support and policy at a wider scale.

Interviewer: Were there any **theoretical models or best practice examples** that inspired initiatives?

Interviewee: Well, let's say, **not explicitly**. Explicitly that played no role. What I see, for example in the area of technology, [...] is that there is a focus on competence centres and competence networks, which were supported by the Federal government as well as by the State governments. They don't follow anymore the watering can principle, where everybody can try to develop something, but very strongly place an emphasis on competition. Competition between locations, so that it is not anymore said that everybody can do everything equally well, but that there are cities and regions that can do some things better than others and these develop a competence centre.<sup>597</sup>

It is surmised that there is indeed a significant *gap* between theoretical conceptualisations and those of practitioners. This gap is seen here to be fuelled from both sides. First, academic conceptualisations are seen here to lack operational guidance and relevance, while on the other hand practitioners' unawareness of theoretical models acts as an obstacle in the successful implementation of theory-derived policy.

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<sup>597</sup> Interview No. 22, transcript page 5



It is speculated here that this is potentially a source for common policy pitfalls (see chapter 7) and perhaps also epitomises the assumed lack of institutional capacity by municipalities to develop endogenous growth strategies.

### ***Overall trends in local economic development policy***

The following section provides the author's impression of current overall trends in local economic development policies on the basis of the findings of the case studies. It builds upon and goes beyond the identification of trends by Hoppe (2000) in her analysis of the implementation of European Regional Policy comparing information and support services for SMEs in North Rhine-Westphalia and the English North West region.

Hoppe (2000, pp. 60-62) identifies three trends in the decentralised provision of local economic development support by municipalities. In summary, they are:

- the *widening of measures applied* besides the classical measures of improving infrastructure and provision of office and accommodation and plant sites (e.g. by including activities concerning communication and process-orientated cooperation, location marketing, moderation of thematic projects);<sup>598</sup>
- an emerging *customer service orientation* (with a demand-led provision of information and advisory services and mediation, including more support for start-ups); and

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<sup>598</sup> Confer also Grote-Westrick, Müller, & Rehfeld (2002, pp. 1-2).

- an increasing *reorganisation and externalisation of local economic development support* (with tasks or policy fields being transferred from local public administration to private firms or public-private partnerships).

Although these trends were not found universally in the economic development policy of this study's case city-regions, the overall trends are indeed corroborated by the present fieldwork findings. However, the externalisation trend is viewed here more strongly. While Hoppe (2000, p. 61) explains this trend as a reaction to new challenges and budgetary constraints, the case of dortmund-project GmbH, together with that of Projekt Ruhr GmbH at the intermediary level, lends credence to a more proactive explanation of this trend. Thus the following trend is added here:

- an increasing approach of institutional innovation by establishing new organisations with a limited life span – hence the label ‘project’ – in order to provide an impetus for a new dialogue process towards achieving a paradigm change in attitudes and activities.

Furthermore, the two examples of dortmund-project and Projekt Ruhr GmbH also suggest a further trend in local economic development support and policy, namely of

- a *rising and widening use of the cluster approach* (i.e. the application of topic- and sector-focussed strategies for networking, for building competency centres, and for the externalisation of economic development agencies, increasingly at local level).

Indeed, there seems to be an increasing decentralised application of the cluster concept. The trend in North Rhine-Westphalia is labelled here as representing a '*localised regional cluster policy approach*', which indicates that the development of individual cluster concept applications is localised, whilst the *Land* retains central top-down strategic policy-making control (e.g. over the selection of sectoral and thematic cluster fields).

While overall, this study advocates the cluster model as a useful methodological tool for developing economic strategies, it has to be noted that their success at the local level (i.e. micro cluster strategies that go beyond mere networking) should be questioned. The reason for this is that the problem of a critical mass (of firms and supporting specialised institutions) is likely to be greater at the local level.

Moreover, two further trends are identified that strongly affect the local economic development policy, which are

- the *growing relevance and dependence upon funding from competitive bidding*, which is increasingly used at national level, but also introduced at regional and more importantly sub-regional (e.g. in the case of allocation of Objective 2 funding by the Projekt Ruhr GmH).
- the *emerging set-up of own competitions for competitive bidding at the local level* for attracting entrepreneurs and so on (as seen in Dortmund).

These trends recognise the increasing importance attached to the local level. The decentralisation of cluster policy and application of competitive bidding increase the

complexity at this governance level and amplify any diverging developments and dynamics amongst different sub-regional settings. The subsequent section discusses these governance dynamics in more detail and identifies some potential enablers and obstacles to achieving a systemic-ness of the business and innovation support.

### ***Enablers and obstacles to the systemic-ness of local innovation and business support***

A common theme in the opinions of the policy-makers and practitioners interviewed is that achieving a common cooperative economic development approach depends very much upon *people*. Other studies have highlighted this aspect (e.g. see Boekholt & Thuriaux, 2000, pp. 7-8 and 55-57; Hassink, 1992, p. 105). The repetitive reference to people as enablers or obstacles means that interinstitutional problems – such as competitive attitudes, opportunism, and antagonism – are, at the core, interpersonal problems. In consequence, it has to be asked what can be done to mitigate the tendency for interinstitutional conflict deriving from the pursuit of partisan interest.

The following *enablers for building governance systemic-ness* for business and innovation support can be identified from the fieldwork findings:

- Severity of economic problems (i.e. ‘pressure from economic suffering’ and the then expected phasing out of Objective 2 funding for the Ruhr area)
- Institutional innovation to the support infrastructure (e.g. by creating a new key organisation such as dortmund-project and Projekt Ruhr leading a new policy approach)
- Engagement and back-up of the political elite (e.g. representation in the Supervisory Board or Steering Committee)
- Concentration upon a cluster strategy narrowly focussed on key strengths (that are to be marketed internally and externally through common trademarks and leitmotifs)

- Clearly allocated responsibilities and tasks (by means of negotiating allocation keys for requests)
- Existence of a (virtual) anonymous umbrella institution acting as a first point of contact (i.e. one-stop-shop) for business and innovation that bundles and channels advisory requests through to individual institutions (e.g. Aachen's start-up region)
- Presence of a lead organisation that integrates and mediates between different stakeholders and acts as information broker and feedback provider
- Inclusive process of strategy development for internalisation and identification (e.g. dortmund-project)
- Lighthouse projects and outside marketing as part of location branding (Düsseldorf's media harbour, Dortmund's MST.factory, Duisburg's logport and so on)
- Involvement of external actors perceived as objective and high-profile in moderating the policy development process towards a consensus
- Available research studies influencing the policy-making process (i.e. diagnostic phase for more evidence-based policy)
- Existence of a critical mass of institutions (presence and embeddedness of a university, funding and so on)
- Quality of staff in terms of interpersonal communication skills and specialisations (as a result of an emphasis on recruitment and budget)

Importantly, the impression gained from the fieldwork findings of this thesis is that systemic-ness can only be achieved if several enablers are present at the same time.

The reverse characteristics of these enablers would represent obstacles to the systemic-ness of the governance for business and innovation support.

The following section outlines the implications for theory and practice that can be drawn from the fieldwork findings.

### **Implications for theory and practice**

Firstly, building upon some of the enabling factors outlined above, certain policy suggestions are presented for the improvement of the governance of innovation and business support systems. Secondly, the theoretical implications are presented that are derived from the fieldwork.

#### ***Policy implications***

The experience of North Rhine-Westphalia indicates that achieving structural change takes a lot of time. It shows that regions facing structural difficulties and lacking an endogenous innovative business base, struggle to build up new strength and competencies that can drive development. It can take decades before the first significant benefits arise from policy approaches. North Rhine-Westphalia and the endeavours of the dortmund-project have shown that this requires substantial financial investment and endurance, and even then success is not guaranteed. Indeed, there is no quick fix to these captured situations but a need to build an institutional capacity which can support new seeds of development.

Nevertheless, the following *core message* can be drawn from the findings of this thesis. They concern the efforts to bring people together, the creation of a common vision and the revival of cooperation and coordination; that is, the building of governance systems for the support of innovation, and economic development in general.

### *Advocating institutional innovation in the meaning of organisation innovation*

The setting-up of new organisations appears to be a radical means applied by policy-makers in order to initiate a paradigm change amongst stakeholders within a certain setting. The examples of the Projekt Ruhr GmbH and the dortmund-project GmbH show that this is, at least to some extent, possible. Both are examples of stipulating this process from the top down, yet a local organisation such as the dortmund-project may find it easier to ‘sell’ this as a common endogenous vision, while a supra-local and sub-*Land* body such as the Projekt Ruhr is likely to be perceived more as a higher level ‘alien’ in charge of funding.

Whilst it is argued here that the creation of new organisations within a system that suffers from archaic institutional structures, can revive interinstitutional dynamics, this is not a panacea. Firstly, in a setting without major interinstitutional problems, these new organisations are unlikely to provide an added value; instead, they may be more likely to contribute to an institutional overlap. Secondly, the creation of such institutions alone is not sufficient in any means. At the very least, they have to be complemented by other efforts, and most importantly funding, to build the capability to change things.

### *Running the business of business support*

The trend towards the ‘externalisation of local economic development support’ is outlined above. The preliminary indication of the success of transferring policy fields and tasks from public administration to newly created private firms, suggests that perhaps a certain type of

organisational set-up is more conducive to inherent dynamism and external acceptance, for example, by the business base. Practitioners repeatedly stated the advantage of having business job titles instead of administrative titles (such as CEO instead of head of unit). These are details, yet details, such as the obligation *first* to fill in a form when accessing a business support service, can be a significant barrier to reaching out to SMEs.<sup>599</sup> Indeed, running business support like a business, and thus having a business-like setting and culture, arguably endows business support organisations with the skill of sensing and raising awareness of such obstacles compared to a predominantly administrative environment. The catch is that this approach comes with a steep price tag for specialised staff, marketing, public relations and so on.<sup>600</sup>

*The importance of mediators and key movers and shakers in driving a common vision and projects – a role for consultancies?*

The importance of mediators in the governance system is something that has been recognised and stressed before. Similarly, it is common sense that institutions need key people as the main drivers, hubs or ‘movers and shakers’ – as practitioners call them – to keep active the dynamics of networks of people. Business support organisations that, for instance, rely heavily upon informal contacts and interaction with businesses know that once one of its staff or partners leaves, informal networks will have to be rebuilt.<sup>601</sup>

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<sup>599</sup> Interview No 45, transcript page 13

<sup>600</sup> Confer aslo Interview No. 44.

<sup>601</sup> Interviews No. 38 and No. 35, transcript page 9



### *Implications for current theoretical conceptualisations*

As can be seen, the fieldwork findings have been analysed according to the research questions outlined in the introduction. Above all, the key question here is whether the regional innovation systems concept (Braczyk et al., 1998b) takes sufficient account of the peculiarities of regional governance. The governance sphere represents one of the two key dimensions constituting a regional innovation system (together with the business superstructure). The governance dimensions have also been termed as a ‘black box’ (den Hertog, Oskam, Smith, & Segers, 2003, p. 25), that is not yet researched well enough.

### *Limitations of the regional innovation systems concept*

This thesis argues that the regional innovation systems model inadequately describes the governance dynamics found by this fieldwork. It is suggested that the complexity of these dynamics needs to be more embedded into the concept. It is reiterated that the regional innovation systems model is a useful analytical methodological tool. However, it is seen here to be rather static and unable to describe what is happening at the sub-regional level. Furthermore, it is argued here that the model lacks operational guidance of how to make innovation systems work in practice. Firstly, while it does outline a potential structure and key nodes between actors, it does not go beyond stressing ‘the importance of inclusiveness and cooperation in the policy steering committee and the interest representation forum’ (Cooke, 1998, Figure 1.1 on p. 18). Therefore the actual process of bringing the different stakeholders together is neglected and it wrongly implies that setting up a regional innovation structure also means that it is functioning.

On this account, the findings highlight that there are obstacles to the proper functioning of such formal structures. Indeed, it is stated here that the extent of interinstitutional conflicts and lack of systemic-ness are underestimated and therefore not adequately addressed by current conceptualisations. For instance, the long experience of North Rhine-Westphalia's so-called 'regionalised structural policy' shows that such inclusive corporatist structures are not self-sufficient in instilling a fruitful dialogue and creating viable strategies. The recent paradigm shift in North Rhine-Westphalia with the turning away from the former bottom-up inclusive policy-making to a top-down process of competitive bidding illustrates the limitations of such participatory and consensus-orientated approaches of institutionalism.

Furthermore, it is argued that the formal structures and elements of the regional innovation systems approach may provide a useful model for building such structures in regional settings where they do not exist. However, at the same time these general blueprints are meaningless for a regional setting such as North Rhine-Westphalia, where an endogenously grown congested institutional structure exists. For the question on how to revive archaic institutional structures, no answer is found in the regional innovation systems model.

*On regional conceptualisations - Towards local innovation systems?*

This thesis investigates multiple sub-regional governance systems within the same regional setting. The findings provide ample evidence that there are substantial difficulties at sub-regional level in providing a systemic-ness of governance, namely due to competitive attitudes amongst actors within the innovation and business support system and because of a lack of coordination and allocated responsibilities. Moreover, significant differences were

found in the extent and degree of these dynamics across the homologous settings of city-regions (see Table 33). In consequence, an alternative conceptualisation of urban or *local innovation systems* may be more suitable in addressing and accounting for these sub-regional dynamics. However, posing such new a model comes with a policy warning. As the pilot case study of Ratingen shows, there is an issue of critical mass of institutional capacity. Therefore, the level of small towns (i.e. municipalities) seems inadequate. Instead, this thesis focused on the level of unitary metropolitan authorities, namely city-regions with critical mass of a university and with a minimum agglomerative scale (for instance, a population of 200,000), in order to gain from the triple helix of university-industry-government relations (Etzkowitz & Leydesdorff, 2000). Nevertheless, the mere agglomerative and knowledge infrastructure asset do not automatically ensure a systemic governance system nor an environment conducive to innovation, let alone the question of a mass for the business superstructure dimension.

Besides the possible proposition of local innovation systems as an alternative model, reference has to be made to the different modes of regional technology transfer as proposed by Cooke & Morgan (1994a), namely grassroots RIS, Network RIS, and Dirigiste RIS (cf. Cooke, 1998, pp. 19-22). Cooke & Morgan group technology transfer action, where the initiation is 'locally organised, at town or district level' under the 'grassroots' regional innovation system. Yet, it remains unclear why regional governance structures that display an 'initiation for systemic coordination coming from within the technology districts' and those with 'distinctive types of localised innovation systems in terms of both governance and business interrelationships' are still subordinate under the heading of a grassroots *regional* innovation systems governance modality (Cooke, 1998, p. 20). Here it is suggested that those governance systems should constitute local innovation systems.

Finally linked to the recognition of increasing importance of the local governance dimension are the trends towards the decentralisation of cluster policy, or, as it was labelled here ‘localised regional cluster policy’, and that of decentralised competitive bidding for funding programmes. This also provides evidence to corroborate the importance of proximity in our globalised world. Indeed, this thesis vividly argues against interregional virtual networks or clusters since potential interpersonal problems become harder to solve and to overcome.

With regards to cluster policy, it is not yet possible to provide a clear message. While some local settings like Dortmund may be in the slow process of succeeding in carrying out a local cluster policy, it is to be evaluated whether it goes beyond the mere notion of micro-cluster networking.

#### *On innovation*

With regards to innovation it seems that many policy measures lack the holistic character of cutting across different policy fields. An innovation imperative in the policy domain has not yet materialised. It is to be seen whether it ever will, particularly in this time of economic crisis. Perhaps the pressure from economic suffering is not strong enough to make this happen. Therefore important synergies are not met and innovation policies remain individual policy elements.

*On systemic-ness*

The research has also shown that creating governance systemic-ness is a difficult task. It has stressed that this is very much an interpersonal undertaking and has identified a number of enablers that can support the process of building functional structures of cooperation and coordination. Most notable are the importance of a mediator, a business-base client orientated approach, and the backing of the political elite in the policy-making process.

Against the proposed possible benefit in using *external* high-profile actors, there stands the risk of a weaker commitment of regional actors due to the negative perception of a consultancy-led process (Boekholt, 1999; Nauwelaers & Morgan, 1999, p. 226). Yet, while this danger is acknowledged, the advantages of having an as objective perceived animator with specialised knowledge and/or experience seem to outweigh this. The use of such external actors might be particularly useful in cases of changing political majorities and an absence of strong political actors.<sup>602</sup>

In addition, the creation of virtual ‘one-stop-shop’ structures as first point of contacts for businesses are advocated. However, this has to be accompanied by a clearly outlined allocation of responsibility. Consequently, it is concluded that the importance of systemic-ness is not at all overrated but rather the opposite, it is hard to achieve.

Whether a more innovative and focused business and innovation support system and systemic governance would have or has made a difference to the economic success or failure of the

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<sup>602</sup> Interview No. 44, transcript page 8.

city-regions analysed here cannot be answered. While governance aspects are implicitly assumed to contribute to the economic performance of city-regions, the extent is not as such analysed and no detailed impact assessments of policies have been undertaken as this was not the aim of this thesis.

Nevertheless, the importance of governance issues has been raised in numerous case studies. Their disadvantage is however that results cannot be easily generalised nor compared to other settings. In this respect, Brenner & Mühlig's (2007) meta-study of 183 case studies that analyse 159 local industrial clusters is useful to better understand the success factors of clusters, which are regarded as important drivers for innovation and growth (cf. European Commission, 2008). These cases were analysed with respect to whether 35 different local conditions and processes were mentioned as an "important" individual factor that may lead to the emergence of the respective cluster.<sup>603</sup>

Brenner & Mühlig's results suggest that the most important "prerequisite" for the emergence of clusters is qualified labour (as mentioned to be important in 105 out of the 159 cases) and strong networks of actors. Regarding networks, great differences in attributed importance can be observed: in 78 case studies networks were an "important" factor; in 37 cases, "unimportant". The existence of renowned universities and public research centres is another prerequisite frequently mentioned as important (70 case studies). Thereafter follow tradition and historical preconditions (66), industrial structure (61) and local policies (56).

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<sup>603</sup> Each case study is classified as either mentioning the individual factor as "important", "unimportant" or as giving "no information".

Concerning “triggering events” and actions that launch the process of making use of the cluster development potential as the second category of factors analysed, the founding of a leading firm (62), special policy measures (53) and historical events such as wars (52) are the three most frequently mentioned important factors which represent a mix of chance and good policies.

The third category of success factors analysed were “self-augmenting processes” such as so-called Marshallian externalities or localisation economies which cause the activity in an industry and a region to increase further once a critical mass has been reached. Among them, the accumulation of human capital (116), the cooperation among firms (87) and the choice of co-location with other firms (83) are the three most important factors identified by the majority of the case studies.<sup>604</sup> Another interesting result of this study is that policy measures are considered to be of high importance and this importance even increased over time.

The overall importance widely attached to networks, cooperation and local policies across the case studies reviewed by Brenner & Mühligh provides support for the investigation of governance aspects here in more detail. The parallel observed high frequency of cases where networks were partly not viewed as an important factor is perhaps an indication that these aspects are still to some extent underestimated and undervalued.

In addition, the existence of renowned universities and public research centres viewed as an important prerequisite is also echoed here by the indicative findings from the pilot case study

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<sup>604</sup> It should be pointed out that intraindustrial and interindustrial spill-overs as well as buyer-supplier relations partly overlap with the cooperation factor which therefore seems to be important as well.

and consequent change of methodology (opting not to analyse non-university cities), and the emphasis on triple helix configurations.



## **CHAPTER 10**

### **CONCLUSIONS**

This thesis has looked at the concept of regional innovation systems and what the practical governance of such systems looks like. This chapter's conclusions start by briefly reiterating the objective of the thesis and presenting a summary of the key findings. Whilst the previous chapter presents the implications for policy and theory, namely the regional innovation systems model, this chapter highlights the originality and importance of the research undertaken terms of its contribution to both academic and policy thinking. Next, the limitations are discussed, and finally issues for future research are presented.

#### **Objectives of thesis**

This thesis aims to contribute to the understanding of how to build a regional policy and business support environment conducive to innovation or, in simpler words, what are the ways to make a regional innovation system work and what important aspects are to be considered for implementing innovation policy – such as cluster policy – successfully. This entails asking the question how and why systemic governance is, or is not, achieved.

#### **Key findings**

This thesis has provided an overview of North Rhine-Westphalia's regional innovation system. It explained its innovation policy approach and presented the main governance actors at the Land level. The reported failure of the consensus-based regionalised structural policy

and the recent paradigm shift in North Rhine–Westphalia, with the turning away from the former bottom-up inclusive policy-making approach to a top-down process of competitive bidding via the (former) quango Projekt Ruhr GmbH, illustrate the limitations of participatory and consensus-orientated approaches of institutionalism.

The thesis presented an overview of the recent main trends in local economic development policy. Whilst Hoppe (2000, pp. 60-62) presents the trends of a widening of measures applied; an emerging customer service orientation; and an increasing reorganisation and externalisation of local economic development agencies, this thesis presents four further trends. The first is aligned to Hoppe's mention of externalisation, but provides a new explanation for it, i.e. the proactive attempt to achieve a paradigm change (as opposed to such a change being a reactive result to budgetary constraints). The second trend identified was the increasing and widening use of the cluster concept, which is labelled here in North Rhine-Westphalia as a 'localised regional cluster policy approach'. The remaining two new trends are the growing relevance and dependence upon funding from competitive bidding as well as the emergence of competitive bidding at the local level.

The findings from the pilot case study of Ratingen show that a certain critical mass in terms of population and presence of a university is needed to constitute regional innovation systems.

The cross-case analysis of the policy-making and governance dynamics at sub-regional level show that there are significant differences between the systemic-ness of governance in the four case-studies of the city-regions of Aachen, Dortmund, Düsseldorf, and Duisburg. Besides these differences amongst the case studies, the analysis also highlighted significant horizontal

differences concerning three important characteristics of governance dynamics. They concern the allocation of responsibilities between actors, the coordination amongst them, and the degree of cooperative attitudes (not) found. The fieldwork findings pointed to a surprisingly high extent of interinstitutional conflict and lack of cooperation and coordination. The comparatively negative characteristics of these important factors indicated that achieving systemic-ness is a thorny task and thus difficult to achieve.

### **Contribution to academic thinking**

The findings of this thesis have shown that within a common geographically defined regional innovation system, diverse sub-regional settings and dynamics can be present that bear little resemblance to what a homogenous regional innovation systems could be expected to constitute. Therefore, it is argued that fully functioning regional innovation systems may be rare to find and that a proposition of any one-size-fits-all best practice model will fail to address the peculiarities of reality and policy practice. Therefore, conceptual models or typologies of an innovation governance system (Cooke, 1998, p. 25) – which labels North Rhine-Westphalia as a globalised network (see Figure 4) – are of little value as they fail to point to the inherent distinct differences in governance dynamics found in the case studies at the sub-regional level.

Therefore, it is argued that conceptualisations of regional innovation systems do not adequately capture the regional and, in particular, the sub-regional governance dynamics – i.e. the structures and relationships between innovation actors – and thus are of little operational

guidance to innovation policy-making. This statement applies even more to the case of innovation systems with an already institutionally congested governance structure. In addition, whilst the concept stresses the governance dimension and the importance of networks and relational space (Capello & Faggian, 2005, p. 79; Morgan, 2001a, p. 26), it provides no indications for how to overcome the obstacles to the success factors.

The way in which a consequent inclusive policy implementation and commitment succeeded in Dortmund to overcome interinstitutional conflict and lack of cooperation provides arguments for the propositions of the 'new institutionalism' that are linked to 'dense social networks' and 'institutional thickness', which play an important role in embedded, collective learning processes and thus in achieving competitiveness. It highlights the importance of institutional capacity and people in driving a region towards becoming a regional innovation system, developing communities of practice and fostering clustering. However, the cases of Duisburg and Aachen have shown that the building of dense social networks is a difficult task.

This thesis proposes a more local conceptualisation of innovation systems since the important systemic factors of the governance dimension are perceived here to be more of urban, city-regional nature. It thereby contests the 'hierarchy of the region' (Hassink, 1992, p. 11), at least in terms of governance. Given the previously stated need for a degree of critical mass (a university and a minimum agglomerative scale), the level of unitary metropolitan authorities is the appropriate minimum level of innovation governance. Due to the fuzziness of the regional definition, these findings have to be seen in the specific context and are not necessary

transferable to another setting. There are lessons learned here but what may work in Dortmund may not necessarily work in Birmingham.

The thesis adds to the understanding of what innovation systems comprise, what systemic-ness constitutes, and which factors can be analysed to judge whether a functioning innovation system is present. Correspondingly, it defines the *systemic-ness* of the institutional governance framework as the strategic and effective governance which encompass a ‘well connected and functioning’ status of the structure and relationships between innovation actors that goes beyond the mere existence of an institutional business support and governance superstructure. Insofar, it is supposed to actively facilitate the clustering or ‘clusteredness’ of the business dimension of a regional innovation system. Certain conditions (or incentives) are assumed to be needed to constitute the ‘well connectedness and functioning’ of an innovation system, such as the general cooperation and coherency in an overall strategic approach which must be present.

A set of intangible *success factors of systemic-ness* was derived from theory in order to characterise and analyse the dynamics and structures of the governance system (cf. also Brosza, 1993, p. 89; European Spatial Planning Observation Network, 2005, p. 73). These factors can also be used as *analytical criteria* in other settings in order to compare the fieldwork results, and explain differences. The factors that are thought to signify evidence of systemic-ness include the following:<sup>605</sup>

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<sup>605</sup> See also the list of *important aspects of governance* as outlined by ESPON (European Spatial Planning Observation Network, 2005, p. 73), which are proposed as a basis for approaches to measure differences in the capacity of governance. They comprise the areas of existing institutional settings including government structures (e.g. satisfaction with actual government, number of public employees, and openness in terms of cross border activities); economic governance (e.g. network activities expressed by the number of regional cluster, e-government, and regulatory burdens); civil society (e.g. participation, trust, and information & communication

1. whether there is a strategic and theory-informed policy orientation;
2. whether there is organisational connectedness, cooperation and coherence;
3. the extent of inclusiveness;
4. the extent of participatory and an open policy-making process, and support for coordination; and finally
5. the extent of opportunism.

Furthermore, the fieldwork identified a theory-practice gap in terms of the role given to innovation within policies, and elucidates the myth behind the innovation focus of policy and governance.

### **Contribution to policy thinking**

The fieldwork findings illustrate that the building of regional innovation systems by means of constructing institutional capacity, a dense social network and implementing a holistic cluster policy are a thorny and difficult task to achieve, but the case of Dortmund shows that it is possible to pursue such strategy at least in terms of conceptualisation and successful implementation at city-region level.

This thesis has identified a number of enablers that are regarded as conducive to building systemic-ness of the governance dimension of innovation systems. These included the clear

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patters, and 'attachment to region' as an indicator of decentralisation); and space (e.g. 'flow' characterising relations and exchange between different regions, interdisciplinarity and multi-level composition of actors involved in governance processes. Furthermore, also consult the 'Explorative Innovation Scoreboard' of the EXIS report (Arundel & Hollanders, 2005), which features data for the governance dimension. Moreover, confer Hoppe's (2000, pp. 232-233) reference criteria for the detection of system immanent strength and weaknesses of implementation procedures of information and support structures.

allocation of responsibilities; the setting-up of a virtual one-stop-shop for signposting business support; the presence of a lead organisation; regular informal contact between stakeholders; involvement of external actors; diagnostic research; the existence of a critical mass of institutions; and the quality of staff. Yet, they should be read in connection with the case-studies. It is believed that, in particular, the case study of Dortmund entails several positive lessons learned in how an implementation capacity can be built and what different pillars a holistic cluster policy can entail at the sub-regional level of city-regions.

Thereby, it can be suggested that the thesis has contributed to the understanding of how to build a regional policy and business support environment conducive to innovation, or in simpler words, how to make a regional or local innovation system work. Inasmuch it has provided a glance into the black box of innovation governance.

Although these conclusions point to a better practice case of Dortmund, this thesis warns of any attempts to copy the examples of others without considering the endogenous strengths of the home region. Therefore, it calls for a more analytical approach in applying cluster strategies by using ex-ante and ex-post evaluations and benchmarking tools (see also Jakoby, 2006) and for the allocation of a sufficient implementation capacity and commitment to make such a strategy work. It further indicates that there is potential added benefit in using external expert advice and studies to inform policy development as their (as 'objective' perceived) input can broaden acceptance of common strategies and policies.

This thesis shares the calls for more strategic policy-making and argues that successful innovation policy is to be based upon the following three main pillars: building an

‘institutional thickness’ (Amin, 1999, p. 368; Amin & Thrift, 1995, p. 53); facilitating cluster development; and ensuring the pre-eminence of innovation in the overall policy-making process.

Regarding the *policy implications*, three further aspects were addressed. Firstly, this concerned the advocacy of institutional innovation (in the meaning of organisational innovation) where governance systems appear to suffer from archaic structures and a lack of systemic-ness. Secondly, some advantages were outlined from running a business support agency like a business. Thirdly, the importance of a mediator and movers & shakers were stressed again, while at the same time pointing out that there is a role for external consultancies to be played in this.

The fieldwork findings also stresses the importance of an active involvement of policy-makers and the open commitment of politicians in developing an effective regional innovation system and in the development of active and working networks around the business community to further innovation. The thesis finishes in recalling the flaws between the transfer of theory and practice. It corroborates that innovation policy-making and governance are meticulous tasks and that the particular suitable policy route to take in practice depends upon individual characteristics and endogenous strengths and path-dependencies. Furthermore, it argues that the regional innovation systems model has little value for the implementation of policy.

In addition, it details possible problem solutions and suggests that policy measures need to consider institutional innovation to ensure coherence and cooperation of governance. It



corroborates the thinking that institutions, and in particular, organisational structures, matter. In consequence, it calls for more attention to be placed upon interpersonal and interorganisational obstacles to cooperation and policy development. Subsequently, as successful innovation policy-making is seen to be based upon competencies and structures of people and organisations, it can be argued that there is a need for sufficient investment to be made on these accounts.

### **Limitations and critical analysis of the thesis**

While this thesis has been able to present the insights gained into the working of the governance dimensions in the different settings, not all aspects and themes that were derived from the fieldwork were possible to cover in the limitations of the PhD programme.

In retrospect, the specific case study design for this research has been particularly valuable in gaining insight into the governance dynamics across homologous settings and at multiple levels of governance, all within the same framework of the German national innovation system and the same wider regional *Land* setting. This meant that national and regional policy approaches and actors were nearly always the same across all case studies, thus allowing a focussed view on differences at the sub-regional level. Although the research methodology that was applied was particularly suited in gaining an in-depth insight into dynamics at multiple levels of governance within the same broader setting, it lacks an international comparative dimension. This was beyond the scope of the thesis but could be addressed within further work.

However the results seem reasonable and are available for further discussion. In any case, the results of this thesis are not simply transferable to other settings but have to be seen within the particular context of this thesis, i.e. the German innovation system, the regional innovation system of North Rhine-Westphalia and the specific context of the individual case studies.

Furthermore, and this is arguably the most crucial limitation of this thesis, an alternative interpretation of the results is possible concerning some aspects of the thesis, if it is argued for a different regional categorisation. This very much is due to the definitional fuzziness of the term 'region'. Therefore, similar to Martin & Sunley's (2001; 2003) cluster critique, this thesis also criticises the fuzziness of the conceptualisation of regional innovation systems.

Firstly, the fuzziness of the definition of what a region is, means that there is uncertainty as to whether North Rhine-Westphalia represents a region. The basic problem with the regional innovation system (as well as the cluster) concept is that it is not possible to define properly the region. Hence, one needs to look at the individual system and see what region it occupies. Indeed, it could be argued that North Rhine-Westphalia may not necessarily correspond to a sufficiently homogenous and self-contained regional system of innovation (cf. Evangelista et al., 2002, p. 176) as it is too extensive and economically heterogeneous, including distinct local sub-systems within them. On the other hand, it can be argued that it does constitute a self-contained 'administrative region', albeit admittedly a large one.

Yet, there also remains a certain degree of ambiguity about whether the sub-regional case studies represent regions themselves. Due to its policy, institutional and functional linkages as described in the case study, Aachen perhaps represented the clearest case of a city-region that comprises its hinterland counties, while the other city-region case studies constitute more

insular metropolitan cities. At the meso level, the wider Ruhr area is also difficult to view as a collective innovation system due to its fragmented policy, institutional and functional polycentric areas. Hence, it is not possible to conclude conclusively whether the findings of the thesis represent an empirical support for posing the alternative conceptualisation of local innovation systems. A simplistic implication would be to state that there is a need to provide a more narrowly defined terminology of a region, which is difficult to achieve without compromising the definitional complexity of the term. A more pragmatic implication is that the level of the innovation system must be analysed thoroughly in each individual case.

Secondly, the term innovation policy is also fuzzy in that it sparks very divergent perceptions and conceptualisations of policy, which in consequence widen the theory-practice gap and make the research analysis a much more complex task. The implications are that attempts ought to be made to fill the theory-practice gap. In order to support this, pre-policy development studies (diagnostic research) and continuous benchmarking are advocated.

Thirdly, the presumed existence of a systemic-ness of governance within a regional innovation system gives the impression that the mere existence of elements is enough, and that there are no obstacles to the policy process. In reality, the presence of an innovation policy within a region does not mean that a (functioning) regional innovation system is present. Innovation systems must be built around the endogenous strengths of a region, largely by firms. In this respect, the implications are that institutional structures matter, and that, if institutions at the city-region level are provided with the implementation capacity, they can actually undertake a holistic cluster policy. However, cluster support ought to be at least partly remain to be also regulated at the national or *Land* level in order to avoid duplication.

One measure to perhaps limit the emergence of too many aspirational cluster types (for fashionable growth sectors irrespective of endogenous strengths) is the organisation of competitive bidding for funding, as discussed before.

The chapter concludes by raising some new questions that have evolved from the research findings and, therefore, proposes some issues and scope for future research to be undertaken.

### **Scope for future research**

As stated above, this thesis was unable to cover all the themes and aspects raised by interviewees. Yet, some may well be worth re-investigating.

For instance, little attention was placed within the analysis on topics concerning the monitoring and evaluation of programmes and projects. However, as this thesis advocates undertaking pre-policy development research (ex-ante evaluation, benchmarking and on), e.g. for cluster development, it would be interesting to investigate in detail the degree of actual monitoring and evaluation, or, to be more precise, the actual effect that monitoring and evaluations have on the policy-development process.

Another interesting aspect worth following up from this research is the question of the policy target group. As the current policy agenda is preoccupied with focussing on strengths and clusters, this means that other less successful sectors or firms lose out. The interesting question is whether policy should focus on the weak, less innovative firms (within a given cluster) or upon innovators (within a given cluster). This question is thus not to be confused with the question of whether to focus upon core sectors or weak sectors.

The core questions of this thesis raise *further questions* that need to be answered. Firstly, as this thesis has found a surprisingly high extent of opportunism and competitive attitudes amongst innovation and business support organisations, it would be interesting to compare this experience with those in different economic, cultural and institutional settings. The question is raised whether these inter-organisational conflicts and overlapping of responsibilities and so on are to be found elsewhere to a similar extent. Secondly, it would also be of interest to carry out some further in-depth research on individual questions such as the underlying sources of inter-organisational differences. This thesis has provided some indications but it is believed that there is more to discover if the focus were solely upon this interesting aspect. One possible option would be to use a more detailed and sophisticated social network analysis involving a questionnaire addressing a higher number of stakeholders including businesses to analyse dynamics between organisational actors within an innovation system also at least partly quantitatively. Similar attempts of capturing and measuring the governance ‘black box’ by ESPON (European Spatial Planning Observation Network, 2005) could also be considered.

Obviously, the issue of the conceptualisation of local innovation systems needs further investigations and more, wider evidence. Firstly, other settings need to be investigated to see whether the governance dimension is seen to be centred around the more local level. Secondly, as this thesis has focussed on the governance dimension, the business superstructure needs now also to be investigated to establish whether the governance dimension and the dimension of the business superstructure are congruent.

Moreover, it would also be interesting to find out how other aspects are appearing, or dealt with, elsewhere. This could concern, for example, the area of funding programmes. A comparative study between the German competency centre approach and other similar programmes would also be worth investigating.

Similarly, the implementation methods employed elsewhere in comparison to the *Land*/Projekt Ruhr GmbH model of Objective 2 funding implementation is another attractive area for research. For instance, the future of the new ‘localised regional cluster policy’ ought to be analysed. Will North Rhine-Westphalia succeed in making paradigm change happen? An early impression indicates that the *Land* managed to depart from its former ‘subsidy mentality’ and providing funding equally like through a watering can. What consequences did the *Land*’s return to a top-down policy approach have, e.g. on the structures of the regionalised structural policy, regarding the conceptualisation of a new type of programmes and so on?

Moreover, the future and/or follow-up of an organisation such as Projekt Ruhr and dortmund-project would be worth examining. The investigative focus could be placed on what happened after the initially proposed limited life-span and dissolution and what was the lasting effect.

Inasmuch as this thesis has been an evolutionary process and some questions have been answered, far more have been raised. It seems that we are only at the beginning of understanding the governance black box. This thesis hopes to be a contribution to a better understanding of governance dynamics and the functioning of regional innovation systems in view of improving their effectiveness.

# APPENDICES

- Appendix I : List of abbreviations and acronyms
- Appendix II: Glossary of German terms
- Appendix III: European initiatives related to clusters
- Appendix IV: Regions in the government hierarchies of Britain and Germany
- Appendix V: List of interviewees
- Appendix VI: Interview questions and supporting tool

## APPENDIX I : LIST OF ABBREVIATIONS AND ACRONYMS

(and their German or English equivalents [and Internet address], if applicable)

[ <i>letter or text</i> ]	altered <i>letter or text</i> section of a ‘quotation’
Σ	sign for the sum total ( <i>Summenzeichen</i> )
§, §§	Index or Paragraph number(s)
24/7	24 hours, 7 days a week (round the clock)
<i>Abb.</i>	<i>Abbildung</i> (illustration)
ABCD	The cities of Aachen, Bonn, Cologne and Düsseldorf
<i>Abs.</i>	<i>Absatz</i> (paragraph)
<i>Abt.</i>	<i>Abteilung</i> (unit)
AG	<i>Aktiengesellschaft</i> (PLC)
AGIT	<i>Aachener Gesellschaft für Innovation und Technologietransfer mbh</i> (Ltd. Company for innovation and technology transfer in Aachen) [ <a href="http://www.agit.de/AGIT2001/index.html">http://www.agit.de/AGIT2001/index.html</a> ]
<i>AiF</i>	<i>Arbeitsgemeinschaft industrieller Forschungsvereinigungen e.V.</i> (Association of Industrial Research Organisations, registered association) [ <a href="http://www.aif.de/en/index.htm">http://www.aif.de/en/index.htm</a> ]
aka	also known as ( <i>alias, anderweitig bekannt als</i> )
Art. (Arts)	Article(s) ( <i>Artikel</i> )
<i>Aufl.</i>	<i>Auflage</i> (Edition)
<i>AvH</i>	<i>Alexander von Humboldt-Stiftung</i> (Alexander von Humboldt Foundation) [ <a href="http://www.avh.de/en/index.htm">http://www.avh.de/en/index.htm</a> ]
<i>AWBF</i>	<i>Ausschuss für Wirtschafts- und Beschäftigungsförderung des rates der Stadt Dortmund</i> (Committee for economic and employment support of the Dortmund City Council)
AWM	Advantage West Midlands (Regional Development Agency) [ <a href="http://www.advantage-westmidlands.co.uk/">http://www.advantage-westmidlands.co.uk/</a> ]
<i>BDA</i>	<i>Bundesvereinigung der Deutschen Arbeitgeberverbände</i> [ <a href="http://www.bda-online.de">http://www.bda-online.de</a> ]
<i>BDI</i>	<i>Bundesverband der Deutschen Industrie</i> [ <a href="http://www.bdi-online.de/">http://www.bdi-online.de/</a> ]
BERD	Business expenditure in Research and Development
BES	Business Enterprise Sector
BIC	Business Innovation Centre
BINGOs	Business International Nongovernmental Organization(s)
<i>BIP</i>	<i>Bruttoinlandsprodukt</i> (Gross Domestic Product, in short: GDP)
<i>BMBF</i>	<i>Bundesministerium für Bildung und Forschung /Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie</i> (German Federal Ministry for Education and Research) [ <a href="http://www.bmbf.de">http://www.bmbf.de</a> ]
<i>BMWA</i>	<i>Bundesministerium für Wirtschaft und Arbeit, entstanden in 2002 durch Zusammenlegung des BMWi mit Teilen des Bundesministeriums für Arbeit und Sozialordnung</i> (German Federal Ministry for Economic Affairs and Labour, set up in 2002 by amalgamation of the BMWi with parts of the Ministry for Labour and Social Order) [ <a href="http://www.bmwa.bund.de/">http://www.bmwa.bund.de/</a> and <a href="http://www.bmwi.de">http://www.bmwi.de</a> ]



<i>BMWi</i>	<i>Bundesministerium für Wirtschaft /Bundesministerium für Wirtschaft und Technologie, bis 2002 Vorgänger des BMWA</i> (German Federal Ministry for Economic Affairs and Technology, until 2002predecessor of the BMWA) [ <a href="http://www.bmwi.de/Homepage/Startseite.jsp">http://www.bmwi.de/Homepage/Startseite.jsp</a> ]
<i>BSP</i>	<i>Bruttosozialprodukt</i>
<i>BTW</i>	<i>Büro Technologietransfer und Wissenschaftliche Entwicklung</i> (university technology transfer and continuing education office)
<i>bzw.</i>	<i>beziehungsweise</i> (respectively)
<i>c.</i>	circa
<i>Calif.</i>	California
<i>Car e.V.</i>	competence center automotive region aachen euregio maas-rhein [ <a href="http://www.car-aachen.de/">http://www.car-aachen.de/</a> ]
<i>CDU</i>	<i>Christlich Demokratische Union Deutschlands</i> (Christian Democratic Union of Germany, comparable to UK's Conservative and Unionist Party)
<i>CEECs</i>	Central and Eastern European Countries ( <i>Staaten aus Mittel- und Osteuropa, kurz MOE</i> )
<i>cf.</i>	confer ( <i>vergleiche</i> )
<i>Chap.</i>	Chapter
<i>CI</i>	Community initiative
<i>CIP</i>	The European Commission's Competitiveness and Innovation Framework Programme [ <a href="http://europa.eu.int/comm/enterprise/enterprise_policy/cip/index_en.htm">http://europa.eu.int/comm/enterprise/enterprise_policy/cip/index_en.htm</a> ]
<i>CIS</i>	Community Innovation Survey [ <a href="http://www.cordis.lu/eims/src/cis.htm">http://www.cordis.lu/eims/src/cis.htm</a> ]
<i>CURS</i>	Centre for Urban and Regional Studies, University of Birmingham [ <a href="http://www.bham.ac.uk/curs/">http://www.bham.ac.uk/curs/</a> ]
<i>CURDS</i>	Centre for Urban & Regional Development Studies, Newcastle [ <a href="http://curdweb1.ncl.ac.uk/curds/Default.asp">http://curdweb1.ncl.ac.uk/curds/Default.asp</a> ]
<i>DAX®</i>	<i>Deutscher Aktienindex</i> (Index of the German Stock Exchange)
<i>DFG</i>	<i>Deutsche Forschungsgemeinschaft</i> (German Research Foundation) [ <a href="http://www.dfg.de/english/index.html">http://www.dfg.de/english/index.html</a> ]
<i>DG</i>	Directorate-General (of the European Commission) [ <a href="http://www.europa.eu.int/comm/dgs_en.htm">http://www.europa.eu.int/comm/dgs_en.htm</a> ]
<i>DGB</i>	<i>Deutscher Gewerkschaftsbund</i> (German Association of Trade Unions) [ <a href="http://www.dgb.de">http://www.dgb.de</a> ]
<i>DM</i>	<i>Deutsche Mark</i> (former German currency)
<i>DTI / dti</i>	Department of Trade and Industry (of the UK government) [ <a href="http://www.dti.gov.uk">http://www.dti.gov.uk</a> ]
<i>DtA</i>	<i>Deutsche Ausgleichsbank</i> (German Settlement Bank) [ <a href="http://www.kfw-mittelstansbank.de">http://www.kfw-mittelstansbank.de</a> ]
€	Euro (currency)
<i>e.g.</i>	exempli gratia = for instance ( <i>zum Beispiel; kurz: z.B.</i> )
<i>e.V.</i>	<i>eingetragener Verein</i> (Registered Association)
<i>EC</i>	1) European Commission ( <i>Europäische Kommission</i> ); or 2) European Community ( <i>Europäische Gemeinschaft, kurz: EG</i> ) [ <a href="http://www.europa.eu.int/index-en.htm">http://www.europa.eu.int/index-en.htm</a> ]
<i>EC-6</i>	see EU-6
<i>EC-9</i>	see EU-9

EC-10	see EU-10
EC-12	see EU-12
ECC	Electronic Commerce Center
ed.	Edition
Ed. / Eds.	Editor(s)
EEC	European Economic Community, now European Community (EC)
EIP	Entrepreneurship and Innovation Programme of the European Commission's Competitiveness and Innovation Programme (CIP)
EIS	European Innovation Scoreboard. See <a href="http://trendchart.cordis.lu/scoreboards/scoreboard2005/index.cfm">http://trendchart.cordis.lu/scoreboards/scoreboard2005/index.cfm</a>
<i>EMR</i>	1) <i>Europäische Metropolregion Rhein-Ruhr</i> (European metropolitan region Rhine-Ruhr) 2) Euregio Meuse-Rhine
EMU	Economic and Monetary Union ( <i>Europäische Wirtschafts- und Währungsunion, kurz: EWU</i> )
<i>EPPD</i>	<i>Einheitliches Programmplanungsdokument (Operatives Programm)</i>
EPRC	European Policies Research Centre, University of Strathclyde, UK [ <a href="http://www.eprc.strath.ac.uk/eprc/default.htm">http://www.eprc.strath.ac.uk/eprc/default.htm</a> ]
EPZs	Export processing zones
ERA	European Research Area ( <i>Europäischer Forschungsraum, kurz EFR</i> )
ERC	European Research Council
ERDF	European Regional Development Fund, one of the EU's four Structural Funds ( <i>EFRE, Europäischer Fonds für regionale Entwicklung, einer der vier EU-Strukturfonds</i> )
ERIS	European Regional Innovation Survey
ERSA	European Regional Science Association
<i>erw.</i>	<i>erweiterte</i> (enlarged)
ESF	European Social Fund one of the EU's four Structural Funds ( <i>Europäischer Sozialfonds, einer der vier EU-Strukturfonds</i> )
ESPON	European Spatial Planning Observation Network [ <a href="http://www.espon.lu">http://www.espon.lu</a> ]
et al.	et alii = and others ( <i>und andere</i> )
etc.	et cetera = and the rest, and so on ( <i>und so weiter, kurz: usw.</i> )
EU	European Union ( <i>Europäische Union</i> ) [ <a href="http://www.europa.eu.int/">http://www.europa.eu.int/</a> ]
EU-6	The first 6 countries of the European Community
EU-9	The first 9 countries of the European Community
EU-10	The first 10 countries of the European Community
EU-12	The first 12 countries of the European Community
EU-15	The 'older' first 15 Member States of the European Union (prior to the EU enlargement in May 2004), namely Belgium Netherlands, Luxembourg, Germany, France, Italy (founding Members since 1952), Denmark, Ireland, the United Kingdom (since 1973), Greece (since 1981), Spain, Portugal (since 1986), Austria, Finland, and Sweden (since 1995).
EU-25	The 25 Member States of the European Union since enlargement in May 2004, comprising the 'old' EU-15 Member States (see above) and ten 'new' Member States, namely Poland, Czech Republic, Hungary, Slovakia, Lithuania, Latvia, Slovenia, Estonia, Cyprus, and Malta

EU-27	The 27 Member States of the European Union since January 2007, comprising the EU-25 Member States (since enlargement in May 2004) plus Romania and Bulgaria (since 2007)
EUR	Euro (currency)
EUR-11	The group of the 11 Member States first participating in the European Monetary Union (EMU) since 01.01.1999; namely the EU-15 except Denmark, the UK, Sweden and Greece (who joined later in 2001 before the issuing of Euro notes on 01.01.2002)
EUR-12	The group of the 12 Member States currently participating in the monetary union (EUR-11 and Greece). The 10 'new' Member States (see EU-25) will first have to meet the so-called Convergence Criteria of Maastricht before joining the EMU.
Euratom	European Atomic Energy Community
Eurofound	European Foundation for the Improvement of Living and Working Conditions [ <a href="http://www.eurofound.eu.int/">http://www.eurofound.eu.int/</a> ]
Eurozone	The group of Members States participating in the European Monetary Union (EMU), in which the Euro is the official currency (see EUR-12).
EXIS	Exploratory Innovation Scoreboard, complementary to the European Innovation Scoreboard (EIS)
FAZ	<i>Frankfurter Allgemeine Zeitung</i> (German nationwide newspaper published in Frankfurt)
FDI	Foreign Direct Investment, inward or outward ( <i>Auslandsdirektinvestitionen, kurz ADI, in ein Land hineinströmend oder herausströmend</i> )
FDP	<i>Freie Demokratische Partei</i> (Free Democratic Party, comparable to UK's Social and Liberal Democrats)
FhG	<i>Fraunhofer-Gesellschaft</i> [ <a href="http://www.fraunhofer.de/english/">http://www.fraunhofer.de/english/</a> ]
Fig.	Figure
foREK	<i>Fortschreibung Regionales Entwicklungskonzept</i> (updated regional development concept)
FP	Framework Programme (see FP5, FP6, or FP7)
FP5, FP6, or FP7	Fifth, Sixth, or Seventh Framework Programme of the European Community for research, technological development and demonstration activities ( <i>Das Fünfte, Sechste, oder Siebte Rahmenprogramm der Europäischen Gemeinschaft für Maßnahmen auf dem Gebiet der Forschung, technologischen Entwicklung und Demonstration, kurz RP5, RP6, oder RP7</i> )
FT	Financial Times ( <a href="http://www.ft.com">http://www.ft.com</a> )
FUA	Functional Urban Areas (of the European urban system) that correspond to the nationally defined Travel to Work Areas (TTWAs)
GA	<i>Gemeinschaftsaufgabe zur Verbesserung der regionalen Wirtschaftsstruktur</i>
GB	Great Britain
GDP	Gross Domestic Product ( <i>Bruttoinlandsprodukt, kurz: BIP</i> )
GEM	Global Entrepreneurship Monitor
GEO	<i>Grundstücksentwicklungs-Gesellschaft Düsseldorf</i> (property development corporation Düsseldorf)
GEP	<i>Gebietsentwicklungsplan</i>

GERD	Gross expenditure in Research and Development
GfdS	<i>Gesellschaft für deutsche Sprache</i> (Society for the German language)
GfW / GFW	<i>Gesellschaft für Wirtschaftsförderung</i> (Economic Development Agency/Corporation/Office)
GG	<i>Grundgesetz der Bundesrepublik Deutschland</i> (Basic constitutional law of the Federal Republic of Germany)
GmbH	<i>Gesellschaft mit beschränkter Haftung</i> (Limited [liability] company; in short: Ltd.)
GO	1) Gründungsoffensive [ <a href="http://www.go-online.nrw.de/">http://www.go-online.nrw.de/</a> ] 2) Government Offices (GO) for the regions
Gr.	Graph
GREMI	<i>Groupe de Recherche Européen sur les Milieux Innovateurs</i> (Group of European Research on Innovative Milieux/Environments)
Grüne	<i>Bündnis 90 / Die Grünen</i> (Alliance 1990 / Green Party)
GTT	<i>Gesellschaft für Technologieförderung und Technologieberatung</i> (corporation for technology support and advice)
GU	<i>Großunternehmen</i> (Large enterprises)
HE	Higher Education
HEI(s)	Higher Education Institution(s)
HGF	<i>Hermann von Helmholtz-Gemeinschaft Deutscher Forschungszentren</i> [ <a href="http://www.helmholtz.de">http://www.helmholtz.de</a> ]
HLEG	High-Level Expert Group
HWK	<i>Handwerkskammer</i> (Chamber of Handicrafts)
i.e.	id est = that is to say ( <i>das heißt, kurz: d.h.</i> )
IAI	<i>IAI - Institut für angewandte Innovationsforschung e.V.</i> [ <a href="http://www.iai-bochum.de/">http://www.iai-bochum.de/</a> ]
IAS	<i>Integriertes Auslandsstudium</i> (Integrated foreign studies programme)
IAT	<i>Institut Arbeit und Technik, Gelsenkirchen</i> (Institute for Employment and Technology, Gelsenkirchen) [ <a href="http://iat-info.iatge.de/">http://iat-info.iatge.de/</a> ]
IBA	<i>Internationale Bauausstellung Emscher Park</i>
ibid.	ibidem = in the same place ( <i>ebenda, kurz: ebd.</i> )
ICT	Information and Communication Technologies ( <i>Informations- und Kommunikationstechnologien, kurz: IuK-Technologien</i> )
IDB	Northern Ireland's Industrial Development Board
IDR	<i>Industrieterrains Düsseldorf-Reizholz</i> (city subsidiary firm for the industrial site Düsseldorf-Reizholz)
IfW	<i>Institut für Weltwirtschaft, Kiel</i> (Institute for the World Economy, Kiel) [ <a href="http://www.uni-kiel.de:8080/IfW/">http://www.uni-kiel.de:8080/IfW/</a> ]
IGM	<i>Industriegewerkschaft Metall</i> (Trade Union for the Metall Industry)
IHK	<i>Industrie- und Handelskammer</i> (German Chamber of Industry and Commerce) [ <a href="http://www.ihk.de">http://www.ihk.de</a> ]
ILO	International Labour Organization ( <i>Internationale Arbeitsorganisation</i> )
ILS	<i>Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen</i> [ <a href="http://www.ils.nrw.de/">http://www.ils.nrw.de/</a> ]
IMF	International Monetary Fund ( <i>Internationaler Währungsfonds, kurz: IWF</i> )

<i>INEF</i>	<i>Institut für Entwicklung und Frieden der Gerhard-Mercator-Universität - Gesamthochschule Duisburg</i> (Institute for Development and Peace at the Gerhard-Mercator-University Duisburg) [ <a href="http://www.inef.de/">http://www.inef.de/</a> ]
INGOs	International Nongovernmental Organizations
<i>IÖW</i>	<i>Institut für Ökologische Wirtschaftsforschung, Berlin</i> (Institute for Ecological and Economic Research, Berlin)
INTERREG	Interregional Community Initiative concerning border areas
IPR	Intellectual Property Rights
IRE	Innovating Regions in Europe [ <a href="http://www.innovating-regions.org">http://www.innovating-regions.org</a> ]
<i>IRPUD</i>	<i>Institut für Raumplanung, Universität Dortmund</i> (Institute for Spatial Planning at the University of Dortmund) [ <a href="http://irpud.raumplanung.uni-dortmund.de/irpud/">http://irpud.raumplanung.uni-dortmund.de/irpud/</a> ]
<i>ISA-Consult</i>	<i>Beratungsgesellschaft für Innovation, Strukturpolitik und Arbeit GmbH, Bochum</i>
IRTU	Northern Ireland's Industrial Research and Technology Unit
ISI	1) <i>Fraunhofer-Institut für Systemtechnik und Innovationsforschung, Karlsruhe</i> (Fraunhofer Institute for System Technology and Innovation Research, Karlsruhe) [ <a href="http://www.isi.fhg.de/">http://www.isi.fhg.de/</a> ] 2) Innovation Sector Index (of the European Innovation Scoreboard)
IT	Information Technologies
ITT	Innovation & Technology Transfer (periodical publication by the European Commission)
<i>IVAM NRW e.V.</i>	<i>Interessengemeinschaft zur Verbreitung von Anwendungen der Mikrostrukturtechniken NRW e.V., Dortmund</i> (Interest Group for the Application of Microstructure Technologies NRW, Dortmund)
<i>IWS</i>	<i>Institut für Wirtschafts- und Sozialforschung</i> (Institute for Economic and Social Research)
JEL	Journal of Economic Literature [for their classification see for example <a href="http://netec.mcc.ac.uk/WoPEc/data/JEL/">http://netec.mcc.ac.uk/WoPEc/data/JEL/</a> ]
JETRO	Japanese Foreign Trade Centre
<i>KCL</i>	<i>Kompetenz-Centrum Logistik</i> (Logistics Competence Centre)
<i>KMU</i>	<i>Klein- und Mittelunternehmen</i> (SMEs)
<i>KPD</i>	<i>Kommunistische Partei Deutschlands</i> (Communist Party of Germany)
<i>KVR</i>	The former <i>Kommunalverband Ruhrgebiet</i> (Local Association for the Ruhr Area), which is now the <i>Regionalverband Ruhr</i> (Regional Association Ruhr) [ <a href="http://www.rvr-online.de">http://www.rvr-online.de</a> ]
LDA	Local Development Agency
LDCs	Least-Developed Countries
<i>LDS</i>	<i>Landesamt für Datenverarbeitung und Statistik Nordrhein-Westfalen</i> (Regional Office for data processing and statistics) [ <a href="http://www.lds.nrw.de/">http://www.lds.nrw.de/</a> ]
<i>LEG</i>	<i>Landesentwicklungsgesellschaft</i> (property development corporation of the <i>Land</i> )
LEDU	Northern Ireland's Local Economic Development Unit, formerly known as Local Enterprise Development Unit
<i>LEP</i>	<i>Landesentwicklungsprogramm</i> (development programme of the <i>Land</i> )
LFR	Less Favoured Region(s)
LPSs	Local Production Systems

LSC	Life Science Center Düsseldorf
Ltd.	Limited (Liability Company)
LV	<i>Lippeverband</i>
MA / Mass.	Massachusetts
MASQT	<i>Ministerium für Arbeit und Soziales, Qualifikation und Technologie des Landes Nordrhein-Westfalen</i> (Ministry for Labour, Social Affairs, Qualification and Technology of North Rhine-Westphalia) [ <a href="http://www.masqt.nrw.de/home.html">http://www.masqt.nrw.de/home.html</a> ]
MBA	1) Multinational business activity 2) Master of Business Administration
mbH	<i>mit beschränkter Haftung</i> (with limited liability), see GmbH
MdB	<i>Mitglied des Bundestages / Bundestagsabgeordnete(r)</i> (Member of the German National Parliament, in short MP)
MdL	<i>Mitglied des Landtages / Landtagsabgeordnete(r)</i> (Member of a Federal / Regional Parliament)
MEGAs	Metropolitan European Growth Areas
MIT	Massachusetts Institute of Technology
MNC	Multi-National Corporation
MNE	Multi-National Enterprise
Mo.	Missouri
MPG	<i>Max-Planck-Gesellschaft</i> ( <a href="http://www.mpg.de/english/">http://www.mpg.de/english/</a> )
MRR	<i>Metropolregion Rhein-Ruhr</i>
MS	Member States [of the EU] ( <i>Mitgliedstaaten [der EU]</i> )
MST	<i>Mikrosystemtechnologie</i> (microsystems technology or MEMS)
MWA	<i>Ministerium für Wirtschaft und Arbeit des Landes Nordrhein-Westfalen</i> (Ministry for Economic Affairs and Labour of North Rhine-Westphalia) [ <a href="http://www.mwa.nrw.de/">http://www.mwa.nrw.de/</a> ]
MWMEV	<i>Ministerium für Wirtschaft und Mittelstand, Energie und Verkehr des Landes Nordrhein-Westfalen</i> (Ministry for Economic Affairs, Technology and Transport of North Rhine-Westphalia) [ <a href="http://www.mwmev.nrw.de/cgi-bin/mwmev/custom/pub/visit.cgi">http://www.mwmev.nrw.de/cgi-bin/mwmev/custom/pub/visit.cgi</a> ]
MWMTV	<i>Ministerium für Wirtschaft und Mittelstand, Technologie und Verkehr des Landes Nordrhein-Westfalen</i> (Ministry for Economic Affairs, Technology and Transport of North Rhine-Westphalia)
n. d.	no date
n. p.	no place (of publication)
n. pub.	no publisher
NAFTA	North American Free Trade Agreement ( <i>Nordamerikanisches Freihandelsabkommen</i> )
NE	North East
neuberab.	<i>neubearbeitete</i> (revised)
NGO(s)	Nongovernmental Organization(s) ( <i>Nichtregierungs-Organisation(en)</i> )
NGT	New Growth Theory, also known as endogenous growth theory ( <i>Neue Wachstumstheorie, abgekürzt NWT</i> )
NICs	Newly industrialized countries
NIS	New Industrial Spaces [if used]
NISys	National Innovation System [sometimes also abbreviated as NIS or NSI for National Systems of Innovation]

No.	Numero, number
Nr.	<i>Nummer</i> (number)
NRP	National Reform Programmes
NRW	<i>Nordrhein-Westfalen</i> (North Rhine-Westphalia, one of Germany's 16 Federal States)
NUTS	Nomenclature of territorial units for statistics (of the EU) - from the French 'Nomenclature des Unités Territoriales Statistiques' ( <i>Nomenklatura/ Systematik der Gebietseinheiten für die Statistik der EU-Regionen</i> )
N.Y.	New York
ODPM	Office of the Deputy Prime Minister
OECD	Organisation for Economic Co-operation and Development [ <a href="http://www.oecd.org">http://www.oecd.org</a> ]
OMC	The 'Open Method of Coordination' of policies between the Member States of the EU, mainly used where the EU has little or shared competence. It is based upon the following five principles (cf. Baneth & Cserey, 2005, p. 267): subsidiarity, convergence, management by objectives, country surveillance, and integrated approach.
<i>OpTech-Net</i>	<i>Netzwerk für optische und optoelektronische Technologien und Systeme e.V., Duisburg</i> (Network for optical and optoelectronic technologies and systems, Duisburg)
p.	Pagina, page ( <i>Seite</i> )
Pa.	Pennsylvania
para.	paragraph
PAXIS	Pilot Action of Excellence on Innovative Start-ups (of FP6)
PDF	format
<i>PDS</i>	<i>Partei des Demokratischen Sozialismus</i> (Democratic Socialism Party, successor of the former East German Socialistic Unity Party 'SED', the <i>Sozialistische Einheitspartei Deutschlands</i> )
PISA	OECD Programme for International Student Assessment (The PISA-study)
PLC	Public Limited Company
pp.	Pages ( <i>Seiten</i> )
PPP	1) Purchasing Power Parity 2) Public-Private Partnership
PPS	Purchasing Power Standards
Quango	Quasi-autonomous nongovernmental organization ( <i>Regierungsunabhängige Kommission oder Körperschaft</i> )
R&D	Research and Development ( <i>Forschung &amp; Entwicklung, kurz: F&amp;E</i> )
RDA	Regional Development Agency
<i>REGINA</i>	<i>Regionaler Industrie-Club Informatik Aachen e.V.</i> (regional industry club IT of Aachen)
<i>REK</i>	<i>Regionale Entwicklungskonzept</i> (regional development concept)
RES	Regional Economic Strategy
RIS	1) Regional Innovation Strategy (programme of the EU) 2) Regional Innovation System
RITTS	Regional Technology Transfer Strategies and Infrastructures (programme of the EU)

RP	<i>Rheinische Post</i> (Regional Newspaper in North Rhine-Westphalia)
RSA	Regional Studies Association [ <a href="http://www.regional-studies-assoc.ac.uk/">http://www.regional-studies-assoc.ac.uk/</a> ]
RSAI	Regional Science Association International
RTD	Research and Technological Development ( <i>Forschung und technologische Entwicklung, kurz FTE</i> )
RVR	<i>Regionalverband Ruhr</i> (Regional Association Ruhr) [ <a href="http://www.rvr-online.de">http://www.rvr-online.de</a> ]
RWI	<i>Rheinisch-Westfälisches Institut für Wirtschaftsforschung, Essen</i> (Rhine-Westphalia Institute for Economic Research, Essen) [ <a href="http://www.rwi-essen.de/">http://www.rwi-essen.de/</a> ]
RWTH	<i>Rheinisch-Westfälische Technische Hochschule Aachen</i> (RWTH University of Aachen) [ <a href="http://www.rwth-aachen.de/">http://www.rwth-aachen.de/</a> ]
SFB	<i>Sonderforschungsbereich</i> (Special research area)
SIBU	Strathclyde International Business Unit, University of Strathclyde
SIC	Standard Industry Classification
SII	Summary Innovation Index (of the European Innovation Scoreboard)
SMEs	Small and medium-sized enterprises ( <i>Kleine und mittlere Unternehmen, kurz: KMU</i> )
SPD	<i>Sozialdemokratische Partei Deutschlands</i> (Social Democratic Party of Germany, comparable to UK's Labour Party)
STRIDE	Science and technology for regional development (Community Initiative financed by the EU's Structural Funds between 1990 and 1993).
SVR	<i>Siedlungsverband Ruhrkohlenbezirk</i>
SWOT	Strength, Weaknesses, Opportunities, and Threats (analysis)
SZ	<i>Süddeutsche Zeitung</i> (nationwide newspaper from South-Germany, published in Munich)
Tab.	Table
TFP	Total (or multifactor) productivity
TIM	Territorial Innovation Models (coined by Moulaert & Sekia, 2003)
TNC	Transnational corporations
TPP	Technological product and process
TQM	Total Quality Management
Trans.	Translator
TTWAs	Travel to Work Areas
TZ	<i>Technologiezentrum</i> (technology centre)
u.	und (and)
u.a.	und andere (et al. = and others)
UK	United Kingdom of Great Britain and Northern Ireland
UN / UNO	United Nations ( <i>Vereinte Nationen</i> ) / United Nations Organization ( <i>Organisation der Vereinten Nationen</i> )
UNICE	Union of Industrial and Employer's Confederations of Europe [ <a href="http://www.unice.org/">http://www.unice.org/</a> ]
UNIDO	United Nations Industrial Development Organization ( <i>Organisation der Vereinten Nationen für industrielle Entwicklung</i> ) [ <a href="http://www.unido.org/">http://www.unido.org/</a> ]
US/USA	United States (of America)



<i>UVR</i>	<i>Unternehmensverband Ratingen e.V.</i> (Association of Enterprises in Ratingen)
<i>v. / vs.</i>	versus ( <i>contra, gegen</i> )
<i>VDI</i>	<i>Verein Deutscher Ingenieure e.V.</i> (Association of German Engineers)
<i>verb.</i>	<i>verbesserte</i> (improved)
<i>viz.</i>	videlicet = namely ( <i>nämlich</i> )
<i>Vol.</i>	Volume ( <i>Bd. = Band</i> )
<i>VRR</i>	<i>Verkehrsverbund Rhein Ruhr</i>
<i>Vt.</i>	Vermont
<i>VW</i>	Volkswagen
<i>WASG</i>	<i>Arbeit &amp; soziale Gerechtigkeit – Die Wahlalternative</i> (The ‘Election Alternative’ Party for ‘Labour & Social Justice’)
<i>WAZ</i>	<i>Westdeutsche Allgemeine Zeitung</i> ( <i>regional newspaper for North Rhine-Westphalia</i> )
<i>WBF-DO</i>	<i>Wirtschafts- und Beschäftigungsförderung der Stadt Dortmund</i> (Dortmund’s business and employment promotion agency)
<i>WGL</i>	<i>Wissensgemeinschaft Gottfried Wilhelm Leibnitz</i> [ <a href="http://www.wgl.de">http://www.wgl.de</a> ]
<i>WSI</i>	<i>Wirtschafts- und Sozialwissenschaftliches Institut des Deutschen Gewerkschaftsbundes</i> (Economic and Social Research Institute of the German Federation of Trade Unions)
<i>WTO</i>	<i>World Trade Organisation</i> ( <i>Welthandelsorganisation</i> )
<i>WTZ</i>	<i>Wissenschafts- und Technologiezentrum</i> (science and technology centre)
<i>ZENIT</i>	<i>Zentrum in Nordrhein-Westfalen für Innovation und Technik, Mülheim an der Ruhr</i> (Centre for Innovation and Technology in North Rhine-Westphalia, Mülheim an der Ruhr) [ <a href="http://www.zenit.de/">http://www.zenit.de/</a> and <a href="http://www.traegerverein.zenit.de/home.htm">http://www.traegerverein.zenit.de/home.htm</a> ]
<i>Zentrum</i>	<i>Zentrumspartei</i> (Centre Party)
<i>ZEW</i>	<i>Zentrum für Europäische Wirtschaftsforschung, Mannheim</i> (Centre for European Economic Research, Mannheim) [ <a href="http://www.zew.de/">http://www.zew.de/</a> ]
<i>ZIKON</i>	<i>Zukunftsinitiative Kompetenzregion NiederRhein</i> (Initiative for the future of the competence region of the Lower Rhine area)
<i>ZIM</i>	<i>Zukunftsinitiative Montanregionen</i> (Initiative for the future of coal and steel regions)
<i>ZIN</i>	<i>Zukunftsinitiative Nordrhein-Westfalen</i> (Initiative for the future of North Rhine-Westphalia)

For *statistical symbols and abbreviations*, confer section 4 of Annex 3 to the Publications Office’s Interinstitutional style guide at <http://publications.eu.int/code/en/en-5000300.htm>  
For *country and currency abbreviations*, confer EU-25 preparation document for point 7 of the Publications Office’s Interinstitutional style guide at <http://publications.eu.int/code/pdf/370000en.htm>

## APPENDIX II : GLOSSARY OF GERMAN TERMS

German	English
Abteilung	Department, Group
Agentur für Arbeit, Arbeitsamt	Job Agency (Job Centre)
Aktiengesellschaft (AG)	Public limited company (PLC)
Amt/Ämter der Stadt	City/town authority offices
Amt für Wirtschaftsförderung	Office for Economic Development
Angewandte Forschung	Applied research
Ausschuss	Committee
Band	Volume
Bezirk (Verwaltungseinheit einer Stadt)	Borough, (City) District <i>(different to Regierungsbezirk)</i>
Bruttoinlandsprodukt (BIP)	Gross Domestic Product (GDP)
Bundes...	Federal...
Bundeskanzler/-in der Bundesrepublik Deutschland	Chancellor of the Federal Republic of Germany <i>(i.e. head of government, Prime Minister)</i>
Bundesland/-länder	Federal State(s), see <i>Land, Länder</i>
Bundesminister/-in	Federal Minister
Bundesministerium	Federal Ministry, Federal Department
Bundespräsident/-in der Bundesrepublik Deutschland	Federal President of the Federal Republic of Germany <i>(i.e. head of state with the main task of representing Germany at home and abroad)</i>
Bundesrat	Upper House of the German Parliament, Bundesrat <i>(i.e. the second chamber of the Federal Republic of Germany representing the 'Länder', consisting of delegates by the 16 Land governments)</i>
Bundesregierung	Federal (i.e. national) government
Bundestag	Lower House of the German Parliament, Bundestag <i>(i.e. the representative body of the Federal Republic of Germany, which representatives are elected half by direct vote [Erststimme] and half taken from the regional party lists according to the second party vote [Zweitstimme])</i>
Bundestagsabgeordnete/-r, Mitglied des Bundestages (MdB)	(German) Member of Parliament (MP)
Bundestagswahl	General, national (i.e. federal) parliamentary elections
Bürgermeister/-in, Oberbürgermeister/-in	Mayor, Lord Mayor
Dekan	Dean

Dezentralisierung ( <i>Delegation von administrativen Aufgaben an eine niedrigere Ebene, z.B. an Regionale Entwicklungsagenturen</i> )	Decentralisation ( <i>i.e. delegation of administrative tasks to a lower level, e.g. to Regional Development Agencies in England</i> )
Drittmittel	Private or alternative funding
Existenzgründung	Start-up
Exportbasistheorie	Economic base theory
Fachhochschule	(Former) Polytechnic, Technical College, University of Applied Sciences
Gebietskörperschaft	Territorial body
Gemeinde, Kommune	Municipality ( <i>subdivision of a district; smallest administrative unit in Germany</i> )
Gemeinsamer Binnenmarkt	Single Market (alternatively Internal Market or Common Market)
Gesellschaft für Wirtschaftsförderung	Economic Development Agency, government appointed quango to promote regional economies, e.g. Regional Development Agency (RDA)
Gesellschaft mit beschränkter Haftung (GmbH)	Limited Liability Company (Ltd./Limited)
Gewerkschaft	Union (trade union)
Gremium	Body
Grenz...	Marginal...
Grünbuch	Green Paper <sup>606</sup>
Gründerzentrum	Start-up centre, incubator, primarily serving young enterprises
Grundgesetz (GG)	Basic (constitutional) law (of the Federal Republic of Germany)
Grundlagenforschung	Basic research
Handwerkskammer (HWK)	Chamber of Handicrafts ( <i>Self-governing bodies which represents craft interest</i> )
Heft	Issue
Industriedistrikte	Industrial districts
Industrie- und Handelskammer (IHK)	(German) Chamber of Industry and Commerce ( <i>Regional associations of industrial, commercial, banking, insurance, transport firms; their tasks: rationalization, foreign trade, professional training, credit, pricing, legal and tax questions, economic surveys and statistics</i> )
Innovationszentrum	Innovation centre (generic term for technology centre, incubator, business park)

<sup>606</sup> *Green Papers* are discussion documents published by the European Commission on a specific policy area that present a range of ideas for public debate and consultation. It is sometimes (but not necessarily) followed by a *White Paper* and can provide an impetus for subsequent legislation. For a list of Green papers see [http://europa.eu.int/comm/off/green/index\\_en.htm](http://europa.eu.int/comm/off/green/index_en.htm)

	with support services)
Klein- und Mittelunternehmen (KMU)	Small and medium-sized enterprises (SMEs)
Kohäsionfonds der EU	Cohesion Fund of the EU
Kommunalbehörde	Local Authority
Kommunale Entwicklungsschwerpunkte (im Ruhrgebiet)	Municipal Priority Development Areas (in the Ruhr District)
Kommunalwahlen, Wahl der Gemeindevertretungen (z.B. des Stadtrates)	Local elections
Kommune/-n	Local Authority (District), District Councils ( <i>i.e. rural communities and small towns</i> )
Kompetenzzentrum, Kompetenzfeld, Cluster	Cluster
Kooperation, Zusammenarbeit	Cooperation, collaboration
Körperschaft des öffentlichen Rechts	Public body
Kostenvorteile durch flexible Produktionsorganisation	Economies of scope
Kostenvorteile durch Skalenerträge	Economies of scale
Kreis/-e ( <i>Verwaltungseinheit der Regionen</i> )	County, Administrative district(s), ( <i>a subdivision of an administrative region, thus an intermediate level of administration between the Länder and the local / municipal levels (Gemeinden)</i> )
Kreisfreie Stadt/Städte, Stadtkreis(e)	Administrative urban district(s), urban unitary authority/authorities, or metropolitan districts(s), usually a city/cities with more than 100,000 inhabitants ( <i>subdivision of an administrative region</i> )
Kuratorium (Ausschuss) / Aufsichtsgremium z.B. einer Stiftung	Board of trustees (committee) e.g. of a foundation
(Bundes-) Land	Region(s), State(s), Province(s), or Land (plural: Länder) ( <i>The Federal Republic of Germany consists of 16 Federal States, called 'Länder'. Each Land has also its own regional parliament and constitution, and is represented at the federal level in the Federal Council 'Bundesrat'. The Länder are most commonly referred to as 'States' due to American English influence, but this term is to some slightly ambiguous as it can be wrongly interpreted to mean a sovereign nation. (See <a href="http://europa.eu.int/eurodicautom/Controller">http://europa.eu.int/eurodicautom/Controller</a>)</i> )
Landkreis	Rural District ( <i>Kreis, i.e. subdivision of an administrative region</i> )
Landschaftsverbände	Area associations (with little power)
Landtag	<i>Landtag</i> , Regional (State) Parliament ( <i>with elected Members and more rights/powerful than, for example, a Regional</i>

	<i>Assembly of an English Region)</i>
Landtagsabgeordnete/-r, Mitglied des Landtages (MdL)	Member of State (Regional) Parliament
Landtagswahl, bzw. Wahl des Berliner Abgeordnetenhauses, und der Bürgerschaft in Hamburg und Bremen	Regional elections
Lenkungsausschuss	Steering Committee
(Lokale) Wirtschaftsförderungsagentur (einer Stadt, Gemeinde oder Kommune)	Local Development Agency (LDA)
Ministerialbeamte(r)/Ministerialbeamtin(nen)	Ministry official(s)
Ministerialdirektor/-in	Head of a government department, permanent secretary
Ministerialrat/-rätin	Assistant head of a government department, assistant secretary
Ministerium	Ministry, department
Ministerpräsident des Landes	Prime Minister (or elected Leader) of a Federal German State such as North Rhine-Westphalia
Neue Ökonomische Geographie	New Economic Geography
Nordrhein-Westfalen	North Rhine-Westphalia ( <i>one of the 16 Länder/States of the Federal Republic of Germany</i> )
Oberbürgermeister/-in	Lord Mayor
Rat	Council (body of representatives)
Ratsmitglied	Councillor
Referat	Unit / Section
Rektor/-in	Vice-chancellor / rector
Regierung	Government
Regierungsbezirk ( <i>Verwaltungseinheit eines Bundeslandes bestehend aus Stadt- und Landkreisen</i> )	Administrative regional unit, regional administrative district, i.e. primary administrative subdivisions of certain federal states ( <i>Länder</i> ) that are themselves further divided into districts ( <i>Kreise</i> ).
Regierungspräsident/-in	Chief administrator of a <i>Regierungsbezirk</i> (chairman/-woman of the regional council, administrative district)
Regierungsrat	Senior civil servant
Regierungsunabhängige Kommission oder Körperschaft	Quasi-autonomous nongovernmental organization, in short: quango ( <i>body created by the government but which is not under its control. It may execute governmental functions or just have consultative functions</i> ) (Terrell, Schnorr, Morris, & Breitsprecher, 1999, p. 1699)
(Regionale) Wirtschaftsförderungsagentur	Regional Development Agency (RDA)
Ruhrgebiet	Ruhr area

Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung ( <i>Gremium aus fünf Experten der Wirtschaftswissenschaften, die umgangssprachlich auch als „Fünf Weise“ bezeichnet werden</i> [ <a href="http://www.sachverstaendigenrat-wirtschaft.de/">http://www.sachverstaendigenrat-wirtschaft.de/</a> ])	German Council of Economic Experts ( <i>official advisory body to the German Government consisting of five Economic experts that are colloquially called the ‘Five Wise Man’</i> )
Skalenerträge ( <i>Kostenvorteile durch erhöhte Produktion</i> )	Economies of scale
Stadt (Kleinstadt / Großstadt)	City (Small city or town / large metropolitan city)
Stadtverwaltung	Council offices
Strukturwandel	Economic change / structural change
Stadtrat	City/town council
Strukturfonds der Europäischen Union ( <i>Europäischer Fonds für regionale Entwicklung, Europäischer Sozialfonds, Europäischer Ausrichtungs- und Garantiefonds für die Landwirtschaft, Finanzinstrument für die Ausrichtung der Fischerei</i> )	Structural Funds of the European Union ( <i>comprising the European Regional Development Fund, the European Social Fund, the European Agricultural Guidance and Guarantee Fund, and the Financial Instrument for Fisheries Guidance<sup>607</sup></i> )
Strukturpolitik /Strukturförderung	Structural policy / Structural development
Technologiezentrum	Technology centre, innovation centre, incubator, business park with support services for technological orientated start-ups (cf. Dressel, in: Asche, 2004)
(Technologie-) Transferstelle (einer Universität)	(Technology) Transfer Unit, Industrial liaison office (ILO), within a university or large public research institution ( <i>e.g. Research and Enterprise Services</i> )
Träger (Organisation, Institution)	Responsible body
Transferstelle	Transfer Unit, Liaison office
Unternehmensverband	Employer’s association
Verein	Association, organization
Verlag	Publisher
Verwaltungsbehörde, Amt	Administrative Authority
Wirtschaftsförderungsagentur einer Stadt, Gemeinde oder Kommune	Local Development Agency (LDA) or Regional Development Agency (RDA)
Wirtschaftspolitik / Wirtschaftsförderung	Economic development policy
Weißbuch	White Paper <sup>608</sup>

Source: Own creation, compilation partly based upon Collins German Dictionary (Terrell et al., 1999).

<sup>607</sup> The Financial Instrument for Fisheries Guidance will be replaced by the European Fishery Fund in 2007.

<sup>608</sup> *White Papers* are documents published by the European Commission containing an official set of proposals for Community action in specific policy areas - that sometimes (but not necessarily) follow upon consultations and debate of a Green Paper. For a list of White Papers see [http://europa.eu.int/comm/off/white/index\\_en.htm](http://europa.eu.int/comm/off/white/index_en.htm)

## APPENDIX III : EUROPEAN INITIATIVES RELATED TO CLUSTERS

### Chronological overview of selected Community initiatives related to clusters

Year	Initiatives from the European Community	Reference
December 1999	Publication of a study on 'Cluster Building and Networking:- Analysis of transnational technology networking between existing clusters of SMEs and one or more technology poles' <sup>609</sup>	Study
April 2002	Publication of a study on 'Creating Smart Systems - A guide to cluster strategies in less favoured regions'. <sup>610</sup>	Study
May 2002	Publication of the study on 'Regional Clusters in Europe'. <sup>611</sup>	Study
April 2003	Publication of the thematic TrendChart report on 'cluster policies' under the European Trend Chart on Innovation. <sup>612</sup>	Study
May 2003	Final Report of the Expert Group on Enterprise Clusters and Networks <sup>613</sup>	Study
April 2004	Selection of 14 pilot projects under the 'Regions of Knowledge' initiative supporting the development of research-driven clusters. <sup>614</sup>	Milestone
October 2005	Launch of the Europe INNOVA initiative including 11 sectoral cluster networks facilitating trans-national cooperation. <sup>615</sup>	FP6 projects
October 2005	Communication 'More Research and Innovation – Investing for Growth and Employment: A Common Approach'. <sup>616</sup>	COM(2005)488
May 2006	The discussion on cluster policy at Community level started at the Informal Competitiveness Council in May 2006 in Graz, Austria	Milestone
June 2006	INTERREG IIIC "Clusters linked Over Europe" (CLOE) project selected as "fast-track" pilot project of the "Regions For Economic Change" initiative. <sup>617</sup>	Milestone
June 2006	Publication of the study on 'Innovation Clusters in the 10 new Member States of the European Union'. <sup>618</sup>	Study
July 2006	Publication of the Innobarometer 2006 report on 'Cluster's role in facilitating innovation'. <sup>619</sup>	Study
September 2006	The European Cluster Alliance is created based on 4 INNO-Net cluster projects under PRO INNO Europe. <sup>620</sup>	FP6 projects
September 2006	Establishment of the European Cluster Observatory. <sup>621</sup>	FP6 project

<sup>609</sup> The report prepared by agiplan was published by the Directorate General for Enterprise and Industry.

<sup>610</sup> The report published by the Directorate-General for Regional Policy and Cohesion is available at <http://www.innovating-regions.org/download/GuideRosenfeldfinal.pdf>

<sup>611</sup> The report of the Observatory of European SMEs (2002/No.3) published by Directorate-General Enterprise and Industry is available at [http://ec.europa.eu/enterprise/enterprise\\_policy/analysis/observatory\\_en.htm](http://ec.europa.eu/enterprise/enterprise_policy/analysis/observatory_en.htm)

<sup>612</sup> The report is available at [http://www.proinno-europe.eu/docs/reports/documents/TR\\_clusters\\_03\\_1.pdf](http://www.proinno-europe.eu/docs/reports/documents/TR_clusters_03_1.pdf)

<sup>613</sup> See [http://ec.europa.eu/enterprise/entrepreneurship/support\\_measures/cluster/map\\_project.htm](http://ec.europa.eu/enterprise/entrepreneurship/support_measures/cluster/map_project.htm) and [http://ec.europa.eu/enterprise/entrepreneurship/support\\_measures/cluster/final\\_report\\_clusters\\_en.pdf](http://ec.europa.eu/enterprise/entrepreneurship/support_measures/cluster/final_report_clusters_en.pdf)

<sup>614</sup> See the Commission Press Release IP/04/548, available at

<http://europa.eu/rapid/setLanguage.do?language=en> and for more information on the initiative see [http://cordis.europa.eu/fp7/capacities/regions-knowledge\\_en.html](http://cordis.europa.eu/fp7/capacities/regions-knowledge_en.html)

<sup>615</sup> More information on the cluster networks can be found at <http://www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=4961&classificationName=Cluster%20Networks&cid=5104>

<sup>616</sup> The text is available at [http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005\\_0488en01.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0488en01.pdf)

<sup>617</sup> More information on CLOE, originally launched in 2004, can be found at <http://www.clusterforum.org/>

<sup>618</sup> The Europe INNOVA paper N° 1 published by the Directorate-General Enterprise and Industry is available at <http://www.europe-innova.org/servlet/Doc?cid=7752&lg=EN>

<sup>619</sup> The report is available at [http://ec.europa.eu/public\\_opinion/flash/fl\\_187\\_en.pdf](http://ec.europa.eu/public_opinion/flash/fl_187_en.pdf)

<sup>620</sup> More information on the European Cluster Alliance, and how to join it, is available at <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=223&parentID=0>

<sup>621</sup> The analysis and cluster mapping is available at [www.clusterobservatory.eu](http://www.clusterobservatory.eu) and [www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=5967&classificationName=Cluster%20Mapping&cid=5981](http://www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=5967&classificationName=Cluster%20Mapping&cid=5981)

September 2006	Communication 'Putting knowledge into practice: A broad-based innovation strategy for the EU'. <sup>622</sup> The development of competitive clusters in Europe is an integral part of the Community agenda for innovation.	COM(2006)502
November 2006	Communication 'Regions of Economic Change'. <sup>623</sup>	COM(2006)675
December 2006	The Competitiveness Council included cluster development among the 9 strategic priorities for innovation. <sup>624</sup>	Council Conclusions
Dec. 2006	Establishment of the High Level Advisory Group on under Europe INNOVA. <sup>625</sup>	Milestone
December 2006	'Community Framework for State Aid for Research, Development and Innovation', including section 5.8 on 'Aid for innovation clusters'. <sup>626</sup>	Official Journal 2006/C 323/01
April 2007	Green Paper - The European Research Area: New Perspectives <sup>627</sup>	COM(2007)161
June 2007	The European Cluster Observatory delivered the first results: database and mapping of clusters and cluster policies. <sup>621</sup>	Milestone
August 2007	Communication 'Competitive European Regions through Research and Innovation - A contribution to more growth and more and better jobs'	COM(2007)474
September 2007	Publication of the report on 'Regional Research Intensive Clusters and Science Parks'. <sup>628</sup>	Study
October 2007	Publication of a report on 'Innovation Clusters in Europe: A statistical analysis and overview of current policy support'. <sup>629</sup>	Study
October 2007	Commission Staff Working Document on Maritime Clusters. <sup>630</sup>	SEC(2007)1406
November 2007	The European Cluster Memorandum prepared by the High Level Group of experts on clusters was sent to regional governments and innovation agencies. <sup>631</sup>	Milestone
December 2007	Communication 'A lead market initiative for Europe'. <sup>632</sup>	COM(2007)860
January 2008	European Presidency Conference on Innovation and Clusters held in Stockholm organised by the Swedish government under the Slovenian presidency. <sup>633</sup>	Conference
Jan. 2008	Publication of the report 'Cluster policy in Europe'. <sup>634</sup>	Study
March 2008	The Brussels European Council in March 2008 urged to better coordinate efforts in support of clusters and to facilitate the participation of innovative	Presidency Conclusions

<sup>622</sup> The text is available at [http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006\\_0502en01.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0502en01.pdf)

<sup>623</sup> More information about the Regions for Economic Change initiative and the text of the Communication can be found at [http://ec.europa.eu/regional\\_policy/cooperation/interregional/ecochange/index\\_en.cfm](http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/index_en.cfm)

<sup>624</sup> The Council Press Release 15717/06 (Presse 337) on the conclusions of the 2769th Council meeting can be found at [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/intm/92107.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/intm/92107.pdf)

<sup>625</sup> Information on the High Level Group is available at [www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=7155&classificationName=High%20Level%20Advisory%20Group%20on%20Clusters&cid=7160](http://www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=7155&classificationName=High%20Level%20Advisory%20Group%20on%20Clusters&cid=7160)

<sup>626</sup> The text of the 'Community Framework for State Aid for Research, Development and Innovation' is available at [http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/c\\_323/c\\_32320061230en00010026.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/c_323/c_32320061230en00010026.pdf)

<sup>627</sup> The Green Paper and its Annex are available at [http://ec.europa.eu/research/era/consultation-era\\_en.html](http://ec.europa.eu/research/era/consultation-era_en.html)

<sup>628</sup> Third report prepared by an independent expert group was published by the Directorate-General for Research.

<sup>629</sup> The Europe INNOVA / PRO INNO Europe paper N° 5 by the Directorate-General Enterprise and Industry is available at <http://www.europe-innova.org/index.jsp?type=page&cid=8702&lg=en>

<sup>630</sup> The document is available at [http://ec.europa.eu/maritimeaffairs/pdf/Maritime\\_clusters\\_SEC\\_2007\\_1406.pdf](http://ec.europa.eu/maritimeaffairs/pdf/Maritime_clusters_SEC_2007_1406.pdf)

<sup>631</sup> The European Cluster Memorandum is available [http://www.proinno-europe.eu/NWEV/uploaded\\_documents/European\\_Cluster\\_Memorandum.pdf](http://www.proinno-europe.eu/NWEV/uploaded_documents/European_Cluster_Memorandum.pdf)

<sup>632</sup> More information on the Lead Market Initiative and the text of the Communication can be found at <http://ec.europa.eu/enterprise/leadmarket/leadmarket.htm>

<sup>633</sup> More information on the conference which was organised on 22-23 January 2008 with support of the PRO INNO Europe initiative is available at <http://www.VINNOVA.se/innovationandclusters> and <http://www.proinno-europe.eu/index.cfm?fuseaction=nwev.NewsReader&news=2072&lang=EN&ParentID=0&topicID=90>

<sup>634</sup> As part of the Europe INNOVA Cluster Mapping project, this report provides a brief summary of cluster policies in 31 European countries. It is available at the European Cluster Observatory at [http://www.clusterobservatory.eu/upload/Synthesis\\_report\\_cluster\\_mapping.pdf](http://www.clusterobservatory.eu/upload/Synthesis_report_cluster_mapping.pdf)



	SMEs in clusters. <sup>635</sup>	
May 2008	The Competitiveness Council recognised the importance of cluster policy in terms of fostering innovation and excellence and addressing the specific needs of SMEs and invited Member States, the European Commission and regions to coordinate their efforts to improve framework conditions for innovation. <sup>636</sup>	Council Conclusions
June 2008	Opinion of the Committee of the Regions on 'Clusters and cluster policy'. <sup>637</sup>	Opinion
October 2008	Communication 'Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy' aiming to contribute to creating a more efficient policy framework for cluster support in the EU in order to facilitate the development of more world-class clusters in the EU. Annexed by a Commission Staff Working Document on 'The concept of clusters and cluster policies and their role for competitiveness and innovation: Main statistical results and lessons learned', which provides available evidence for the economic impact that clusters have on competitiveness and innovation, an overview of the different Community initiatives in support of clusters, and a more detailed description of the challenges addressed by the Communication. <sup>638</sup>	COM(2008)652  SEC(2008)2637
October 2008	Commission Decision of 22/10/2008 setting up a high-level 'European Cluster Policy Group'. <sup>639</sup>	Decision
November 2008	European Presidency Conference on Clusters held under the French Presidency in Sophia-Antipolis on 13-14 November 2008. <sup>640</sup>	Conference
December 2008	The Competitiveness Council welcomes the October 2008 Commission Communication on clusters. <sup>641</sup>	Council Conclusions
April 2009	The high-level European Cluster Policy Group meets for the first time with a view to further explore how to better assist Member States in supporting the emergence of world-class clusters in the EU. <sup>639</sup>	Milestone
Mid 2009	Launch of the new generation of cluster activities under the Europe INNNOVA and PRO INNO Europe® initiatives selected through a call for proposals. <sup>642</sup>	CIP-EIP projects

Source: Own creation, but the author wishes to acknowledge having benefitted from the research undertaken for the Commission Staff Working Document (2008a) that accompanied the Commission Communication (2008b) on clusters. The selection for this table expresses however the opinion of the author alone and not necessarily those of the European Commission. More information about European initiatives in support of clusters is available at <http://ec.europa.eu/enterprise/policies/innovation/policy/clusters>

<sup>635</sup> Presidency Conclusions of the Brussels European Council (13/14 March 2008) available at [http://www.consilium.europa.eu/ueDocs/cms\\_Data/docs/pressData/en/ec/99410.pdf](http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/99410.pdf)

<sup>636</sup> The 2871st meeting of the Competitiveness Council of 29-30 May 2008 adopted the Council Conclusions 10174/08 on the competitiveness and innovation of the European industry that are available at <http://register.consilium.europa.eu/pdf/en/08/st10/st10174.en08.pdf>

<sup>637</sup> The Opinion prepared by the rapporteur Antonio GONZÁLEZ TEROL (ES/EPP), Director-General for European affairs from the Autonomous Community of Madrid, and adopted by the Committee of the Regions on 19 June 2008 was published in the Official Journal of the European Union on 09.10.2008 (C 257) and is available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:257:0076:0082:EN:PDF>

<sup>638</sup> The Communication and Annex are available at <http://ec.europa.eu/enterprise/policies/innovation/policy/clusters>

<sup>639</sup> The Commission Decision has been published together with the Terms of Reference and a Call for Applications in the Official Journal of the European Union on 30/10/2008, available via the EUR-Lex website at <http://eur-lex.europa.eu/en/index.htm> (see OJ versions L288 and C 275).

<sup>640</sup> More information on the conference, which was organised with support from the European Commission is available at [www.sophia-antipolis.org/ue2008](http://www.sophia-antipolis.org/ue2008)

<sup>641</sup> The 2910th meeting of the Competitiveness Council of 1-2 December 2008 adopted the Council Conclusions 14679/08 on the Commission communication "Towards world-class clusters in the European Union: implementing the broad-based innovation strategy" that are available at <http://register.consilium.europa.eu/pdf/en/08/st14/st14679.en08.pdf>

<sup>642</sup> For more information about the calls for proposals under PRO INNO Europe ® and Europe INNNOVA published on 12.11.2008 see the respective guides for applicants that are available at [http://ec.europa.eu/enterprise/funding/files/themes\\_2008/calls\\_prop.htm](http://ec.europa.eu/enterprise/funding/files/themes_2008/calls_prop.htm)

**APPENDIX IV : REGIONS IN THE GOVERNMENT HIERARCHIES OF  
BRITAIN AND GERMANY**

<b>BRITAIN</b>	<b>GERMANY</b>
<b>CENTRAL GOVERNMENT SPHERE</b>	
<b>NATIONAL GOVERNMENT</b> executes central control over local government	<b>FEDERAL GOVERNMENT (NATIONAL)</b> no direct link with local government
<b>COMPONENTS OF THE UK</b> Devolution of powers to Scotland, Wales and Northern Ireland with own parliament/assemblies. England without separate representation	<b>LÄNDER (STATE) GOVERNMENTS (16)</b> execute supervisory role as central government for municipalities ( <i>Kommunen</i> )
<b>REGION: SPHERE OF COMPETITIVE INFLUENCE BY CENTRAL AND LOCAL GOVERNMENT</b>	
<b>A. Central Government-Led Regions</b>	
<b>Government Offices</b> as joint regional representation of national government departments, established to enhance communication with local govt., primarily for more effective implementation of central policies.  <b>Regional Development Agencies</b> as government appointed quangos to promote regional economies	<b>Regierungsbezirke</b> (Administrative regions): regional representation of <i>Land</i> governments (varies between <i>Länder</i> ) to control and supervise legality of local administration, and facilitate central ( <i>Land</i> ) government policies. They also help to convey local governments up to the centre (similar role to GOs in England)  <b>Planning Regions</b> : established by <i>Land</i> government to implement regional planning (local definition in some <i>Länder</i> )
<b>B. Local Government-Led Regions</b>	
<b>A. Regional Assemblies, Regional Chambers</b> as (democratic) regional representations.  <b>B. Shire Counties</b> (non-metropolitan county councils): statutory body with democratic representative councils.  <b>C. Unitary Metropolitan Authorities</b> (since 1986), combine local and county functions (similar to unitary urban authorities in Germany).	<b>A. Planning Regions</b> , locally defined by group or municipalities.  <b>B. Kreise</b> (non-metropolitan). Statutory bodies as group of municipalities, legitimated through local councillors delegated to assemblies (similar to regional assemblies in England). <i>Kreise</i> provide local service of higher centrality for a group of municipalities.  <b>C. Kreisfreie Städte</b> (unitary urban authorities): Kreis function combined with local function in larger cities (here focus on subregional <i>Kreis</i> functions).
<b>LOCAL GOVERNMENT SPHERE</b>	
<b>A. Metropolitan Districts</b> (incl. London Boroughs).  <b>B. District Councils</b> (rural communities and small towns) incl. subdivision into 'neighbourhood'-based representational bodies of parish councils.	<b>A. Kreisfreie Städte</b> (here: local function) (see above). Compulsory creation of neighbourhood-based representation ( <i>Bezirksvertretungen</i> ) with no governmental function.  <b>B. Kommunen</b> (rural communities and small towns).

## APPENDIX V : LIST OF INTERVIEWEES

This appendix contains the list of interviewed policy-makers, practitioners and academic experts from North Rhine-Westphalia during the period of January 2001 and January 2003. The listing is always headed by the date the interview took place, followed in the next line by the name of the interviewee, their organisation's position and/or unit – where citable -, the organisation and finally the city where the organisation is based. If necessary and applicable, the next line in brackets and in italic provides an English translation of the interviewee's position and/or unit and the organisation name only. In the few case where the city of the organisation's base differs from the place where the interview took place, the latter is added below in square brackets.

### Interviewees from North Rhine-Westphalia

08 February 2001

Mr. Reiner Heinz, Amt für Wirtschaftsförderung der Stadt Ratingen, Ratingen  
*(Economic Development Office of the City of Ratingen)*

14 February 2001

Mr. Dr. Herbert Jakoby, Ministerialrat (MR), Leiter des Referates II A 2 (EU-Angelegenheiten; EU-Strukturfonds; Verwaltungsbehörde für das NRW-Ziel 2-Programm; Zusammenarbeit mit Regionen in Europa), Abteilung II (Wirtschafts- und Strukturentwicklung; Mittelstand), Ministerium für Wirtschaft und Mittelstand, Technologie und Verkehr des Landes Nordrhein-Westfalen (MWM-TV), Düsseldorf  
*(Head of Section II A 2 (EU Affairs; Structural Funds; Administrative authority for the Objective 2-programme, cooperation with European Regions), Department II (Economic and Structural Development), Ministry for Economic Affairs, Technology and Transport of North Rhine-Westphalia)*

[First short discussion during RETI General Assembly 13 November 2000, Brussels]

15 February 2001

Mr. Siegfried Stillings, Unternehmen in der Krise, Regionalsekretariat, Düsseldorf  
*(Initiative for 'Enterprises in crisis')*

[Telephone interview]

20 February 2001

Mr. Burkhard J. Marcinkowski, Geschäftsführer, Unternehmensverband Ratingen e.V. (UVR)<sup>643</sup>, Ratingen  
(*Managing Director, Association of Enterprises in Ratingen*)

23 February 2001

Mr. Reinhard Theimann, Arbeitsamt Düsseldorf Zweigstelle Ratingen, Ratingen  
(*Job Centre of Düsseldorf, Ratingen branch*)

01 March 2001

Mr. Reiner Schröteler, Prokurist, Förderberatung, Investitions-Bank NRW (IB), Zentralbereich der WestLB, Düsseldorf  
(*Executive Director, Business Support Advisory Unit, Regional Investment-Bank NRW (IB) Central Unit of WestLB*)

01 March 2001

Ms. Carola Kindermann, Business Information Center (BIC), ZENIT GmbH (Zentrum in Nordrhein-Westfalen für Innovation und Technik), Mühlheim an der Ruhr  
[Meeting following the Bio-Gen-Tec Forum NRW, Köln Messe, Cologne]

01 March 2001

Mr. Michael Nolden, ZENIT GmbH (Zentrum in Nordrhein-Westfalen für Innovation und Technik), Mühlheim an der Ruhr  
(*ZENIT Ltd, the Centre in North Rhine-Westphalia for Innovation and Technology.*)  
[Meeting following the Bio-Gen-Tec Forum NRW, Köln Messe, Cologne]

06 March 2001

Mr. Konrad Hachmeyer-Isphording, Project Manager, dortmund project, Dortmund

07 March 2001

Mr. Wolf-Thomas Nußbruch, Leiter der Transferstelle Hochschule – Praxis, Gerhard-Mercator-Universität Duisburg, Duisburg  
(*Head of Transfer Unit University - Practice, Gerhard-Mercator-University of Duisburg*)

08 March 2001

Mr. Rainer Hornig, Prokurist/Geschäftsbereichsleiter, Gesellschaft für Wirtschaftsförderung Nordrhein-Westfalen mbH (GfW), Düsseldorf  
(*Executive Director, Economic Development Corporation for North Rhine-Westphalia Ltd*)

14 March 2001

Mr. Dr. Wulfhard Hischebeth, Stv. Hauptgeschäftsführer, Industrie- und Handelskammer zu Düsseldorf, Zweigstelle Velbert, Velbert  
(*Assistant Executive Director, Chamber of Commerce and Industry of Düsseldorf, Velbert branch*)

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<sup>643</sup> In 2005, Dr. Axel Mauersberger succeeded Mr. Burkhard J. Marcinkowski in the role as Managing Director.

15 March 2001

Mr. Wulf Noll, Ministerialrat (MR), Referat II A 1 (Strukturpolitische Konzeptionen und Regionalentwicklung; Logistik; Konversion; Geschäftsstelle, HRK und PROFIS), Abteilung II (Wirtschafts- und Strukturentwicklung; Mittelstand), Ministerium für Wirtschaft und Mittelstand, Energie und Verkehr des Landes Nordrhein-Westfalen (MWMEV), Düsseldorf  
*(Section II A 1 (Structural policy conception and regional development; logistics; conversion; office for HRK and PROFIS), Department II (Economic and Structural Development), Ministry for Economic Affairs, Technology and Transport of North Rhine-Westphalia)*

20 March 2001

Ms. Dr. Andrea Hoppe, Projektmanagement, Projekt Ruhr GmbH, Essen  
*(Project Management, Project Ruhr Ltd)*

05 April 2001

Mr. Dr. Gros, Referat Mittelstandsförderung, Bundeswirtschaftsministerium (BMWi), Bonn  
*(SME Support Unit, German Ministry of Economic Affairs)*

13 December 2001

Mr. Siegfried Stillings, Unternehmen in der Krise, Regionalsekretariat, Düsseldorf  
[Telefoninterview]  
*(Initiative for 'Enterprises in crisis')* [Telephone interview; follow-up from 15.02.2001]

15 February 2002

Mr. Michael Nolden, ZENIT GmbH (Zentrum in Nordrhein-Westfalen für Innovation und Technik), Mühlheim an der Ruhr  
*(ZENIT Ltd, the Centre in North Rhine-Westphalia for Innovation and Technology.)*

20 February 2002

Mr. Dr. Wolf-Eberhard Reiff, Geschäftsführer des Geschäftsbereiches Bildung und Technologie, Niederrheinische Industrie- und Handelskammer für Duisburg, Wesel und Kleve, Duisburg  
*(Executive Director of the Education and Technology Unit, Chamber of Commerce and Industry of Duisburg, Wesel und Kleve, Duisburg branch)*

26 February 2002

Mr. Werner Glock, Leiter der Transferstelle, Fachhochschule Dortmund und Vorstand der Geminus e.G. (Gesellschaft für Management, Innovationsförderung und Sonderprojekte), Dortmund  
*(Head of Transfer Unit, University of Applied Sciences of Dortmund [Polytechnic] and Managing Director of Geminus e.G. [Registered company for management Innovation support and special projects], Dortmund)*

28 February 2002

Mr. Klaus Zimmermann, Industrie- und Handelskammer zu Düsseldorf (IHK)  
*(Chamber of Commerce and Industry of Düsseldorf)*

28 February 2002

Ms. Renate Orywa, Projektmanagerin, Gesellschaft für Wirtschaftsförderung Duisburg mbH (GFW Duisburg – die Wirtschaftsförderung), Duisburg  
*(Project Manager, Economic Development Corporation for Duisburg Ltd.)*

01 March 2002

Mr. Dr. Manfred Sicking, Fachbereichsleiter, Fachbereich Wirtschaftsförderung / Europäische Angelegenheiten, Stadt Aachen  
*(Head of Unit, Economic Development and European Affairs, City of Aachen)*

01 March 2002

Mr. Ralf P. Meyer, EuREGIONALE 2008, Leiter der Geschäftsstelle bei der AGIT (Aachener Gesellschaft für Innovation und Technologietransfer) mbH  
*(Head of Unit, EuREGIONALE 2008, AGIT Ltd. – the company for innovation and technology transfer in Aachen)*

06 March 2002

Mr. Dr. Peter Jonk, Leiter der Transferstelle, Mr. Dr. Hans Koeppke, bizeps-Projektkoordination, Bergische Universität-Gesamthochschule Wuppertal (BUGH), Wuppertal  
*(Dr. Peter Jonk, Head of Transfer Unit; and Mr. Dr. Hans Koeppke, the bizeps-Project Manager, University of Wuppertal, Wuppertal)*

06 March 2002

Mr. Professor Dr. Lambert T. Koch and Mr. Marc Grünhagen, Unternehmensgründung und Wirtschaftsentwicklung, Fachbereich Wirtschaftswissenschaft, Bergische Universität-Gesamthochschule Wuppertal (BUGH), Wuppertal  
*(Professor and Senior Lecturer, Business Start-ups and Economic Development, Department of Commerce, University of Wuppertal, Wuppertal)*

07 March 2002

Mr. Dr. rer. pol. Stefan Röllinghof, Fachreferent, Wirtschafts- und Beschäftigungsförderung Dortmund, Stadt Dortmund  
*(Economic and Employment Development Agency for the City of Dortmund, Dortmund)*

08 March 2002

Mr. Univ.-Professor Dr. Dr. Werner Gocht, Forschungsinstitut für Internationale Technische und Wirtschaftliche Zusammenarbeit (FIZ), Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen, Aachen  
*(Institute Director and Senior Lecturer, Research Institute for International Technological and Economic Collaboration, RWTH University of Aachen)*

11 March 2002

Ms. Margarete Beye, Abteilungsleiterin, Technologie- und Innovationstransfer, Büro Technologietransfer und Wiss. Weiterbildung (BTW), Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen, Aachen  
*(Head of Division, Innovation and Technology Transfer, Technology Transfer and Continuing Education Office (BTW), RWTH Aachen University)*

11 March 2002

Ms. Claudia Horch, Kommunalverband Ruhrgebiet (KVR), Essen [Telefoninterview]  
*(Local Association Ruhr Area (KVR), Essen) [Telephone interview]*

13 March 2002

Mr. Asche, Leiter der Transferstelle, Universität Dortmund, Dortmund  
*(Head of Transfer Unit, University of Dortmund)*

13 March 2002

Mr. Professor Dr. Bernd Kriegesmann, Institut für Angewandte Innovationsforschung, Bochum [Telefoninterview]  
*(Professor, Institute for Applied Innovation, Bochum) [Telephone interview]*

14 March 2002

Ms. Gabrielle Pirstadt, Ltd. Ministerialrätin (LMR), Arbeitsbereich: Innovation /Technologie- und Innovationspolitik in NRW (Gruppe III A) und Mr. Dr.-Ing. Ulrich Steger, Ministerialrat (MR), Leiter des Referates III A 3 (Biotechnologie; Gesundheits- und Ernährungswirtschaft), Abteilung III (Innovation; Außenwirtschaft), Ministerium für Wirtschaft und Mittelstand, Energie und Verkehr des Landes Nordrhein-Westfalen (MWMEV), Düsseldorf  
*(Ministry official in charge, Innovation Group (III A) / Technological and Innovation policies in NRW, and, Head of Section III A 3 (Biotechnology, Medical Technology, Life Science), Ministry for Economic Affairs, Energy and Transport of North Rhine-Westphalia)*

15 March 2002

Mr. PD Dr. Dieter Rehfeld, Abteilung Industrieentwicklung, Institut Arbeit und Technik (IAT), Wissenschaftszentrum Nordrhein-Westfalen, Gelsenkirchen  
*(Unit for Industry Development, Employment and Technology Institute, Science Centre North-Rhine Westphalia, Gelsenkirchen)*

15 March 2002

Mr. Joachim (Jochen) Odenell, Wirtschafts- und Strukturförderung, Industrie- und Handelskammer zu Dortmund, Dortmund  
*(Economic and Structural Development, Chamber of Commerce and Industry, Dortmund)*

15 March 2002

Mr. Patrick Dufour, Chief Information Officer, dortmund-project, Dortmund

18 March 2002

Mr. Michael Bayer, Innovationsberater und Mitglied der Geschäftsführung, Arbeitsbereich Industrie, Technologie und Umweltschutz, Industrie- und Handelskammer zu Aachen, Aachen  
*(Innovation Adviser and Member of Management, Unit for Industry, Technology and Environmental Protection, Chamber of Commerce and Industry, Aachen)*

18 March 2002

Mr. Jörg Meyer-Stamer und Michael Geyer, Institut für Entwicklung und Frieden der Gerhard-Mercator-Universität Duisburg, Duisburg  
*(Institute for Development and Peace, Gerhard-Mercator-University of Duisburg, Duisburg)*

19 March 2002

Mr. Ferdinand Nett, Arbeitsbereich Technologietransfer, Existenzgründung und Fördermittelberatung, Wirtschaftsförderungsamt Landeshauptstadt Düsseldorf, Düsseldorf  
*(Unit for Technology Transfer, Start-up Support and Subsidy Consulting, office for Economic Development Office of the City of Düsseldorf, Düsseldorf)*

20 March 2002

Mr. Dr. Hermann Bömer, Fachbereich Raumplanung, Uni Dortmund, Dortmund  
*(Researcher, University of Dortmund, Dortmund)*

20 March 2002

Mr. Professor Rolf G. Heinze, Ruhr-Uni Bochum, Bochum  
*(Professor and Senior Lecturer, Ruhr University of Bochum, Bochum)*

20 March 2002

Ms. Dr. Andrea Hoppe, Projektmanagement, Projekt Ruhr GmbH, Essen  
*(Project Management, Project Ruhr Ltd)*

22 March 2002

Mr. Professor Dr. Rolf Sternberg  
Universität zu Köln, Wirtschafts- und Sozialgeographisches Institut, Köln  
*(Professor at the Institute for Economic and Social Geography, University of Cologne)*

04 April 2002

Ms. Lilia Monika Hirsch, Forschungs- und Technologie-Transfer, Heinrich-Heine-Universität Düsseldorf, Düsseldorf  
*(Research and Technology Transfer, Heinrich-Heine-University of Düsseldorf)*

27 September 2002

Mr. Dr. Karl Grosse, Geschäftsführer, rubitec Gesellschaft für Innovation und Technologie der Ruhr-Universität Bochum mbH, Bochum  
*(Chief Executive Officer, rubitec limited company for Innovation and technology of the Ruhr University Bochum, Bochum)*

27 September 2002

Mr. Dr. Heinz Brückelmann, Leiter Firmenbetreuung, MST.factory dortmund, Dortmund  
*(Head of Business Support, MST.factory dortmund, Dortmund)*  
[Meeting during START, the Start-up and Entrepreneur Fair for Germany, Messe Essen]

30 September 2002

Mr. Dr Thomas Heck, Center Manager, Life Science Center, Düsseldorf

30 September 2002

Ms. Dr. Christine Neuy, Geschäftsführerin, IVAM NRW e.V. (Interessengemeinschaft zur Verbreitung von Anwendungen der Mikrostrukturtechniken NRW e.V.), Dortmund  
*(Managing Director, IVAM NRW e.V. (Interest Group for the Application of Microstructure Technologies NRW), Dortmund)*



04 October 2002

Mr. Dirk Kalinkowski, Geschäftsführer, OpTech-Net (Netzwerk für optische und optoelektronische Technologien und Systeme e.V., Duisburg)  
*(Managing Director, OpTech-Net (Network for optical and optoelectronic technologies and systems, Duisburg))*

09 January 2003

Mr. Dr. Jochen Otzipka, Geschäftsführender Vorstand, car e.V. (competence center automotive region aachen euregio maas-rhein), Aachen  
*(Managing Director, car e.V. (competence center automotive region aachen euregio maas-rhein), Aachen)*

10 January 2003

Mr. Christian Scheffs, Technisches Projektmanagement, Logport Logistic Center Duisburg GmbH, Duisburg  
*(Technical project management, Logport Logistic Center Duisburg Limited, Duisburg)*

Total number: 50 interviews with 47 interviewees (of which 3 were interviewed twice)

### **Supplementary interviewees from the West Midlands, Great Britain**

09 March 1999

Mr. Jonathan Lloyd, Economic Development Manager, Telford & Wrekin Council, Telford;  
Mr. Mike Duckett, Representation Manager, Shropshire Chamber of Commerce, Training & Enterprise, Telford

[As part of research for a MBA dissertation (Schierenbeck, 1999) on the competitive advantage of a New Town 'Telford' in the West Midlands]

10 December 1999

Mr. Michael J. Thompson, Economic Strategy Unit, Advantage West Midlands - The Regional Development Agency, Birmingham

19 June 2000

Mr. John Cornbill, Director, The European Programmes Integration Centre (EPI), Coventry University TechnoCentre, Coventry

Note that this study has been also fuelled by insights from further interviews regarding research on a centre of competence for medical technology (MITT) in Baden-Württemberg (Burfitt et al., 2002).

## **APPENDIX VI : INTERVIEW QUESTIONS AND SUPPORTING TOOL**

This appendix contains the two standard sets of broad themes and questions that guided the semi-structured open-ended interviews for both policy-makers and practitioners, and academics. They are attached in both, English and German, together with the supporting interview tool of an institutional mapping matrix (show card) for policy-makers and practitioners.

The presented structure here corresponds to the sequencing of questions in the interviews. Although the set of questions was consistently followed, not every interviewee was asked exactly the same questions. First, a different set of questions was used for the two groups of policy-makers and practitioners, on the one side, and pure academics on the other. Secondly, some questions were slightly altered or omitted, if necessary, depending upon the expertise of interviewees, the nature of their organisations, and individual constraints of interviewees. For instance, in case of time limitations, the first broad opening question regarding the economic and social milieu was omitted. Furthermore, certain probing questions were added at relevant points, when appropriate.

**English version**

*Set of interview themes and for policy-makers and practitioners*

<b>Topic</b>	<b>Guiding questions</b>
Economic and social environment	Within which institutional and economic environment is your organisation operating (cultural issues, size of region, economic situation)?
Objectives and aims of organisation and its business support initiatives	What support does your organisation offer to businesses in particular to foster their innovativeness? How does the support get delivered and which form does it take (financial, technical, informative)? What are the main objectives and aims of initiative(s) and support offered?
Selection, conception and setting objectives for initiatives	How were support initiatives selected and how were they developed? In setting up initiatives, was there a practical or theoretical focus (reactive or proactive)? Did any theoretical or best practice models inspire your initiatives?
Individual perspective on regional innovation policy	What in your opinion and your experience epitomises successful support for businesses innovation? How should it be organised?
Targeted businesses	Which businesses are targeted with those initiatives?
Embeddedness of initiatives (Integration and financial links)	Are initiatives linked, partly financed, cross-financed or incorporated in/by other programmes such as EU Structural Funds, national programme, inter regional (Ruhr), and so on? Where does the funding for the initiatives and for your organisation come from? How are the relationships to the following actors and how do they fit into the innovation promotion system (what role): universities, governmental bodies and, local administration, politicians, businesses, businesses networks and associations, and so on?

Implementation	Which organisation(s) or key actor(s) were involved in implementing and promoting the initiatives?
Business networks	Do some networks of companies or organisations exist who facilitate or hinder the appliance for support?
Results, assessment and encountered problems	<p>What is your assessment of the initiative or programme? Has it achieved the aims? What opportunities and problems derived from it for businesses and your organisation? Was it necessary to make changes to the initiative or programme? Which companies took advantage of the support offered</p> <p>Who asks, applies for help/support/ funding and which companies receive help/support/ funding? How can those companies be described (according to innovativeness, size, industry, success, location and so on)? Did any specific sectors or companies do particular well? What was the specific innovation output?</p>
Monitoring, evaluation and dissemination of best practice examples	What is the monitoring and evaluation process? Is the above monitored and evaluated? Do you have identified best practice cases? Have you taken steps towards their dissemination?
Institutional network and regional system	With which organisations do you have regular contacts and exchange of information and experiences (informal or formal)?
Institutional network and regional system institutional mapping	Please describe the relationship of your organisation with the various organisations within the innovation and business support system. If possible, please distinguish between the type of these relationships according to competition, collaborative, a mixture of both, or non-existent. How would you describe the role of your organisation within the regional network of economic development and business support agencies? Do you regard your organisation as being part of a system and is it legitimate to speak overall of a regional network?

***Supporting interview tool: institutional matrix mapping exercise (show card) for policy-makers and practitioners***

For your information:

Please fill in the following matrix card by entering the various active organisations of the innovation and business support system in North Rhine-Westphalia. If possible, please also distinguish between the type of relationships that you have with these organisations according to competition, collaborative, a mixture of both, or non-existence.

The aim of this exercise is to analyse the coherence of the overall system as a whole, how it works and how it is organised together. Hence, the success, or capabilities, of single parts or individual organisations within the system is not assessed.

*The relationship to other important organisations within the regional business and innovation support system and the level of their involvement. (Please also make a circle around the level of involvement of your organisation)*

Level of involvement/	<b>Local</b>	<b>Regional</b>	<b>National</b>	<b>EU / International</b>
Relationship to other organisations				
<b>Competitive</b>				
<b>Mixture of competitive and collaborative</b>				
<b>Collaborative</b>				
<b>None of the above or no connections</b>				

*Set of interview themes and questions for academics*

<b>Topic</b>	<b>Guiding questions</b>
Role of Innovation	Which part does Innovation play in the business environment and how important is it for economic success of regions?
Form	What support should organisations within the regional system offer to businesses in particular in order to foster innovation? How should the support get delivered and which form should it take (financial, technical, informative)?
Organisation	In your opinion, what are the characteristics of successful innovation policy and support? How should it be organised (organisational level, actors, form of cooperation and so on)?
Initiatives	Can you identify a reactive or a proactive direction in contemporary policy and support initiatives and programmes?
Networks	What is the role of networks in the regions?
Best practice	What are the best practice models for innovation policy and support, and which do you favour?
Target group	Which firms and sector should be targeted by initiatives (size, innovativeness, economic situation)?
Cluster-Analyse	Do you regard a cluster analysis as important for the development of economic development policies? If yes, how should a cluster approach be conceptualised (geographical focus, sectoral focus, minimum scale / critical mass, top-down/bottom-up and so on)? Which other analytical concepts do you perceive as important for the implementation of an effective and efficient economic and innovation development policy?
Problems	In your opinion, what are the main reasons leading to failures of policies and initiatives?
Literature recommendations	Recommended literature and further interviewees

**German version**

***Interviewleitfaden für Akteure der Innovations- und Wirtschaftsförderung***

<b>Thema</b>	<b>Mögliche Fragen</b>
Wirtschaftliches und soziales Milieu	In welchem institutionellen und wirtschaftlichen Umfeld operiert ihre Organisation (kulturelle Eigenschaften, Größe der Region, Wirtschaftliche Situation)?
Absicht und Zielvorstellung ihrer Organisation sowie der angebotenen Förderprogrammen	Welche Fördermaßnahme(n) bieten/t ihre Organisation den Unternehmen zur Innovationsförderung an? Welche Form hat diese Unterstützung (finanziell, technisch oder informativ)? Was sind die Absichten und Zielvorstellungen der Initiative(n), ihrer Organisation und der Region?
Auswahl, Konzeption und Zielsetzung der Unterstützung	Wie wurde(n) die Initiative(n) ausgewählt und wie wurden sie entwickelt? Gab es einen reaktiven oder proaktiven Ansatz in der Konzeption (praktischer oder theoretischer Art)? Gab es Vorbilder für ihre Initiative(n)?
Ihre persönliche Meinung über Regionale Innovationspolitik	Wie hat ihrer Meinung nach eine erfolgreiche Innovationsförderung für Unternehmen auszusehen und wie sollte sie organisiert sein?
Zielgruppe für Initiative(n)	Welche Unternehmen versuchen sie durch ihre Initiative(n) zu erreichen und zu fördern?
Integration der Initiative(n) und deren Finanzierung	Sind die angebotene(n) Initiative(n) und die Unterstützung mit anderen Programmen verknüpft oder eingebunden? Erhält ihre Initiative und Organisation finanzielle Unterstützung von anderen Organisationen oder Programmen, z. B. EU-Regionalförderung? Wie finanzieren Sie die Initiative und ihre Organisation? Wie sehen die Beziehungen aus zu den folgenden Akteuren und wie würden sie deren Rolle beschreiben: Universitäten, Regierungsbehörden, Politiker, Unternehmensverbände und -netzwerke etc.?

Einführung und Durchführung	Welche Organisationen und Schlüsselpersonen waren an der Einführung und Werbemaßnahmen beteiligt?
Netzwerke von Unternehmen	Existieren Unternehmensnetzwerke, die eine Innovationsförderung erleichtern oder erschweren?
Ergebnisse, Beurteilung und Probleme	Wie sieht die allgemeine Beurteilung der Initiative(n) aus? Hat die Initiative ihre Ziele erfüllt? Welche Möglichkeiten und Probleme haben sich durch die Initiative für Unternehmen und ihre Organisation ergeben? Waren Änderungen am Programm während der Durchführung notwendig? Welche Unternehmen haben Ihre Unterstützung in Anspruch genommen (Innovationsreichtum, Größe, Industriezweig, Erfolg, Niederlassung)? Gab es spezielle Unternehmen, die sehr erfolgreich waren? Was war die wesentliche Innovationsleistung und -ergebnis?
Evaluierung und Verbreitung von guten Praxisbeispielen	Wie sieht der Kontroll- und Auswertungsprozess aus? Haben Sie gute Praxisbeispiele identifiziert und wurden Maßnahmen zu deren Verbreitung getätigt?
Institutionelles Netzwerk und regionales System	Mit welchen Organisationen pflegen sie regelmäßigen Kontakt und Austausch (informell, formell)? Können Sie die Beziehungen zu anderen wichtigen Förderungseinrichtungen jeweils bezüglich der folgen Unterscheidung einteilen: Konkurrenz, Mischung aus Konkurrenz und Zusammenarbeit, Zusammenarbeit oder trifft keines der genannten zu? Wie würden Sie die Rolle ihrer Organisation im regionalen Netzwerk der Wirtschaftsförderer beschreiben? Sehen Sie ihre Organisation als Teil eines Systems und würden sie von einem regionalem Netzwerk sprechen?



***Matrix-Hilfsmittel zur Struktur des institutionellen Systems für Akteure im Regionalen System der Innovations- und Wirtschaftsförderung***

Zu Ihrer Information:

Bitte tragen Sie Organisationen in die folgende Matrix ein, die eine aktive Wirtschafts- und Innovationsförderung in NRW betreiben und unterscheiden Sie dabei, wenn möglich, zwischen den Beziehungen zu den Organisationen bezüglich der folgenden Unterscheidung: Konkurrenz, Mischung aus Konkurrenz und Zusammenarbeit, Zusammenarbeit.

Mit dieser Unterteilung soll hier die Zusammenarbeit und das Wirken innerhalb des gesamten Wirtschafts- und Innovationsförderungssystems, und nicht die Stärken oder Fähigkeiten einzelner Organisationen untersucht werden.

*Die Beziehungen zu anderen wichtigen Förderungseinrichtungen im Regionalen System der Wirtschafts- und Innovationsförderung und deren Aktionsebene. (Bitte umkreisen Sie auch die Aktionsebene Ihrer Organisation)*

Aktionsebene /	<b>Lokal</b>	<b>Regional</b>	<b>National</b>	<b>EU / International</b>
Beziehungen zu anderen Organisationen				
<b>Konkurrenz</b>				
<b>Mischung aus Konkurrenz und Zusammenarbeit</b>				
<b>Zusammenarbeit</b>				
<b>Keine der oben genannten Unterscheidungen oder keine Verbindungspunkte</b>				

### *Interviewleitfaden für Akademiker*

<b>Thema</b>	<b>Mögliche Fragen</b>
Rolle von Innovationen	Wie wichtig sind Innovationen für die wirtschaftliche Entwicklung einer Region?
Form	Welche Form von Innovationsförderung sollte angeboten werden (finanziell, technisch, informativ...)?
Organisation	Was sind die Charakteristika einer erfolgreichen Innovationspolitik/ -förderung? Wie sollte Innovationsförderung organisiert werden (Organisationsebene, Akteure, Kooperationsform...)?
Initiativen	Sind in der momentanen Ausrichtung von Initiativen und Programmen eher reaktive oder proaktive Ansätze zu erkennen?
Netzwerke	Welche Rolle spielen Netzwerke in den Regionen?
Best practice	Welche Vorbilder für eine erfolgreiche Innovationsförderung sind Ihnen bekannt?
Zielgruppe	Welche Firmen und Branchen sollten mit Initiativen angesprochen werden (Größe, Innovationsreichtum, Wirtschaftliche Situation)?
Cluster-Analyse	Halten Sie eine Cluster-Analyse für notwendig in der Ausrichtung der Wirtschaftspolitik von Regionen? Wenn ja, wie sollte dieser Cluster-Ansatz konzeptionalisiert werden (geographischer Fokus, sektoral Fokus, Mindestgröße, top-down/bottom-up...)? Mit welchen Methoden sollte man Produktionscluster identifizieren? Welche anderen Analyse-Konzepte halten Sie für notwendig für die Durchführung einer effektiven und effizienten Wirtschaftspolitik?
Probleme	Welche Hauptgründe können Sie erkennen, die zu einem Scheitern vieler Initiativen führen?
Literaturempfehlungen	Literatur und mögliche zusätzliche Gesprächspartner, die Sie empfehlen.

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