Cluster Policies in Germany - A Multi-Level Governance Approach to Policy Learning

Paper prepared for the Research Colloquium on "Cluster Policy in European Regions: Governance, Innovation and Actor Interactions", Audencia Nantes School of Management, October 5-6, 2009

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Abstract

The cluster approach to economic development enjoys continuing popularity among policymakers and practitioners across Europe. Despite the underlying generic model and some signs of policy convergence, cluster policies still differ markedly, reflecting industry characteristics but also institutional differences at various spatial scales, or levels of governance. This paper uses the case of Germany to illustrate the variety of cluster policies in a federal state. It particularly focuses on the relations, interdependencies and divisions of labour between four levels of governance, from the supra-national via national and state-level all the way down to the municipal level. Policy learning can be observed either within or between regions and levels of governance. The findings allow us to derive some basic policy implications and questions that may guide future research.

1 Introduction

Since the 1990s, policymakers and practitioners’ enthusiasm for clusters and regional networks of firms and research institutions has surged far ahead of our theoretical and empirical understanding of the phenomenon. Repetitively pointing at the still unsatisfactory evidence of the innovation and productivity edge of clusters has certainly not made advice to policy and practice any easier. The recent emergence of cluster policy research as a new interdisciplinary field may thus be seen as a scholarly attempt at turning the tables on policy and practice by moving those spheres including their actions and incentives into the research focus. The results will hopefully help academics to package their knowledge more elegantly to deliver advice that no longer goes unheard by the outside world.
Despite this spark of hope, research on clusters and related concepts like industrial districts, innovative milieux or learning regions has for far too long focused on intraregional sources of dynamics while neglecting a cluster's external dimension (cf. MASKELL/MALMBERG 2002). While this blindness has apparently been overcome, the emerging field of cluster policy research is currently in danger of falling for the same trap. With its focus on single-case studies and a noticeable drive to extract policy recommendations from perceived best-practice cases, the majority of accounts fail to acknowledge the complexity of horizontal and vertical governance issues that cluster policies entail.

This paper uses the case of Germany, a federal country whose devolution of power has led to a plethora of cluster policies at the state and sub-state level. To varying extents, they are influenced by the supranational level of the European Union and the national level of federal government, adding up to four different levels of governance to be taken into account. After introducing cluster policy as an issue of multilevel governance, we outline the nature of cluster policies at these four levels, resorting to case studies when scaling down. We then focus on policy learning with the ultimate aim of weighing vertical learning between the different scales against horizontal and intra-regional policy learning. Implications for policy and research will conclude our discussion.

2 Cluster Policy, Multi-Level Governance, and Policy Learning

Since the mid-1990s, the cluster concept enjoys continuing popularity with academics, politicians and economic development practitioners alike. PORTER (1998: 197 f.) defines clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate”. Despite - or due to - its rather broad character, this definition is most widely used and may well serve as a common denominator of most alternatives. Its fuzziness received a fair share of scholarly criticism, of which MARTIN/SUNLEY (2003) is still the sharpest piece whilst echoing an earlier and more general critique by MARKUSEN (1999). Furthermore, clusters which overwhelmingly emerge and evolve organically over matters of decades or even centuries are frequently confused with organised efforts to stimulate and manage clusters in policy and practice. The technocratic perspective is that clusters are made rather than occurring spontaneously, which strikingly contrasts all established wisdom on cluster emergence and evolution.
Leaving the conceptual fuzziness of the cluster notion aside, (regional) cluster policies comprise all “efforts of government to develop and support clusters (in a particular region)” (HOSPERS/BEUGELSDIJK 2002: 382, parentheses added). Cluster policy may hence be seen as a particular form of industrial policy targeting specific regional features and aiming at the development of certain building blocks already in place (for example specialised agglomerations, networks) into clusters, or at growing potential and latent clusters into working ones (cf. ENRIGHT 2003: 104). From an evolutionary perspective, cluster policies emerge at the interface of hitherto largely unconnected established fields, such as industrial policy, science, technology and innovation policy, as well as regional and local economic development policy (cf. BOEKHOLT/THURIAUX 1999, NAUWELAERS 2001). It may thus be expected that the interpretation of the cluster approach is critically shaped by past experiences in the respective field. For instance, applying the cluster concept in science policy will likely differ noticeably from an application to local economic development. Focusing on public agency, this concept of cluster policy differs from the wider term cluster initiative, in which cluster firms assume centre stage, supported by government and/or research institutes (cf. SÖLVELL ET AL. 2003). Within this broader concept, cluster policy may therefore be seen as a subset characterised by substantial state involvement through initiation, funding and/or governance. Somewhere along the spectrum of public-private partnerships, an imaginary line may be drawn to set cluster policies apart from private-led initiatives. In addition to this governance dimension that was already highlighted by FROMHOLD-EISEBITH/EISEBITH (2005), KIESE (2008C: 131 f.) develops six further dimensions to characterise and delineate cluster policies in empirical research:

- **Cluster reference**: Policy may explicitly refer to the term `cluster` which per se does not say anything about the underlying conceptual understanding. After all, it might only serve marketing purposes, using the successful cluster `brand` single-handedly created by Porter (cf. MARTIN/SUNLEY 2003). On the other hand, cluster policy might remain implicit by avoiding the catchword while still promoting spatial concentrations of industries and technologies and the externalities generated therein. Explicit cluster reference is thus unsuitable as a strict definitional criterion, especially since many countries outside the English-speaking realm tend to prefer other terms which better reflect their particular policy traditions, such as *pôles de compétitivité* in France, or *Kompetenzfelder* or *Kompetenznet-
Cluster orientation: A policy strategy in support of regional innovation and growth rarely focuses on cluster exclusively. In practise, support of clusters may be mixed with generic measures to address issues like new firm formation or skills development across the board irrespective of cluster membership. Cluster orientation may thus vary and can be approximated by the share of projects exclusively targeting clusters out of a given set of policy measures. As a stylised fact of regional cluster policies in Germany, KIESE (2008B: 206) concluded that as a consequence of political and bureaucratic rationalities, as well as the absence of a proper analysis of real cluster potential, the cluster orientation of policy approaches tends to decline over time at the expense of generic policy measures which are usually easier to implement.

Complexity: Clusters may be promoted with single instruments like targeted incubators, industry networks or business plan competitions. However, the complex character of clusters demands the use of multiple instruments to pursue a more holistic approach towards cluster promotion. Complexity may also denote the targeting of more than one industry or technology to better reflect a region's industry structure, avoid overspecialisation, and create synergies and opportunities for breakthrough innovation at the interfaces of previously distinct technologies.

Coherence: Cluster policy should ideally be led by a shared vision and common strategy agreed upon by all relevant actors and levels of governance, requiring substantial horizontal and vertical co-ordination. If this co-ordination cannot be achieved, a region might end up with an incoherent cluster policy in which isolated actors compete in applying isolated measures promoting different parts of a given cluster.

Institutionalisation: Cluster policy may be weakly institutionalised when objectives and tasks are formulated in non-binding memoranda of understanding between partners with a rather loose commitment. A higher degree of institutionalisation is achieved when individuals or organisations are charged with implementing a cluster strategy, while the creation of a dedicated cluster management organisation (CMO) represents the strongest form of institutionalisation, with the main stakeholders expressing their commitment by turning into shareholders. More than any other dimension, the institutionalisation of cluster policy

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1 For an account of the systematic variations of cluster policy between Germany, France and the UK see KIESE (2009).
appears to offer a window of strategic opportunity to policymakers, being only constrained by the given constellation of actors.

- **Maturity**: Last, but not least, the ability to evaluate cluster policies critically depends on their maturity: Is a policy still being conceptualised, already being implemented or already completed? Highlighting the process character of cluster policy obviously calls for an evolutionary perspective accounting for path-dependency and cumulative learning.

Regarding the governance dimension of cluster policy, more recent accounts explicitly acknowledge the characteristic interaction between public and private agency by using the term ‘policy’ more broadly to "include those activities designed and carried out by semi-public and/or private actors as well" (BORRAS/TSAGDIS 2008: 20). This clearly echoes the discourse on governance referring to "the reflexive self-organisation of independent actors involved in complex relations of reciprocal interdependence" (JESSOP 2003: 101). These actors may be public or semi-public, private businesses or members of civil society. In a similar fashion, MAINTZ (2003: 72) defines governance as all forms of collectively resolving civic tasks that may stretch from the institutionalised self-governance of civil society via different forms of interaction between public and private actors to sovereign actions of public bodies. The governance approach not only matches the complex constellation of actors in clusters, but also reflects a shift towards a more co-operative and activating role of the state, setting incentives for self-regulation rather than directives to develop the self-governing capacity of economic and societal sub-systems.

Since most clusters do not extend beyond the sub-national scale, cluster policies may be best associated with issues of regional governance at first sight (cf. DANSON 1997, DANSON ET AL. 2000). However, regional cluster policies are rarely isolated from national and supranational policies, leading to complex interrelations across the different levels of governance. Cluster policies are thus a pivotal case of multi-level governance (MLG) connecting all scales from the supranational via the national to the regional (sub-national) and local (municipal) level. However, by focusing on vertical relationships between different governance levels, the MLG approach tends to neglect the increasing density of horizontal partnerships, networks and col-

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2 Reviewing evidence on 833 clusters world-wide, the Harvard Business School's Cluster Meta Study found that out of 705 clusters whose territorial dimension was reported, only 6.5 per cent stretched across an entire nation or even beyond national boundaries (VAN DER LINDE 2002: 10).

3 First applied by FUCHS (1994) to the restructuring of the EU's telecommunications sector, the MLG approach has since guided a lot of research on various policies within the EU (cf. CHRISTIANSSEN 1996 and HOOGE 1996 for some early contributions and BOVARD ET AL. 2008, CONZELMANN/SMITH ET AL. 2008 and KOHLER-KOCH/LARAT (2009), for compilations of more recent work. Introductory overviews are provided by BENZ (2007) and HAGUE/HARROP (2007, ch. 14).
laborative institutions within a governance level, accumulating to form a complex set of policy linkages in what SKELCHER (2000) refers to as the "congested state" of governance plurality. There is probably not better case to illustrate and explore cluster policies within a MLG framework than the Federal Republic of Germany which is not only highly decentralised by international standards, but also integrated into the EU's supranational governance structures. Germany owes its decentralised constitutions to the allied forces desire to prevent a re-centralisation of power after World War II. However, rather than realising the dynamic benefits of competitive federalism among the 16 states, or Länder, the system evolved into a cooperative federalism with increasingly complex interdependencies between the federal and the state level which is referred to as Verflechtungsfaelle, or interdependence trap (cf. BERTHOLD 2005, KIRCHGAESSNER 2008).

Of the various interrelations between levels of governance, this paper focuses on policy learning in which repeated acts of transfer at the micro level might lead for policy concepts such as clusters to diffuse across time and space, or induce hitherto independent policy approaches to economic development to converge towards a common model. Vertical policy learning across different levels of governance may occur top-down when the higher level imposes certain strategic thrusts or policy instruments onto the lower level(s), addressed as 'direct coercive transfer' by DOLOWITZ/MARSH (1996: 347). However, it may also work bottom-up when experiences gained at the lower levels feed into policy formulation at higher levels. However, the relevance of vertical policy learning can only be assessed in relation to horizontal policy learning, i.e. the transfer and adaptation of experiences between entities at the same level of governance, e.g. between regions. To complete the picture, both vertical and horizontal cluster policy learning may be contrasted with cumulative intraregional learning processes. Figure 1 illustrates the interaction of interregional versus path-dependent intraregional learning.

[Insert figure 1 about here: model of interregional policy learning]

In their knowledge spiral model, NONAKA/TAKEUCHI (1995) suggest that new knowledge exclusively emerges implicitly and context-bound. To apply this knowledge in another context, it needs to be decontextualised and codified through terms, models or theories. Once codified, this knowledge can only be used when recontextualised and adapted to new circumstances, which in turn requires implicit and context-specific knowledge. Based on this model,
Hassink/Lagendijk (2001) develop a cyclical model of interregional institutional learning, which Lagendijk (2001) applies to the case of mixed land-use in the Netherlands. Applying their model to cluster policy suggests that regional cluster concepts are developed in close interaction between predominantly implicit and contextualised regional knowledge on the one hand, and largely codified conceptual and methodological knowledge on the other. The latter is accumulated through the decontextualisation and codification of experiences from various case studies and thus becomes embodied in scholarly literature, practical guidelines, specialised consultants and their organisations, or in the relations connecting knowledge communities. Applying this stock of knowledge for the development of a new cluster policy requires de-coding and adaptation to a specific context, which is realised through cognitive, social and institutional learning (cf. Hassink/Lagendijk 2001). At the interface between codified and context-specific knowledge, discourse coalitions form between local change agents and non-local transfer agents, referred to as relay agents by Lagendijk (2001). However, the exchange of conceptual and operational know-how between the regional and any higher level of governance is rooted in path-dependent learning processes in which incremental on-the-job learning accumulates a stock of "coagulated experience" (Brödner 2003: 150).

3 Multiple Scales, Federal Variety: Overview of Cluster Policies in Germany

3.1 European Union

In a recent policy document, the European Commission (2008: 5) summarises its view of clusters: "Europe does not lack clusters, but persistent market fragmentation, weak industry-research linkages and insufficient cooperation within the EU mean that clusters in the EU do not always have the necessary critical mass and innovation capacity to sustainably face global competition and to be world-class." The cluster approach has substantially gained prominence at the supranational level with the EU's 2000 Lisbon growth strategy aiming at becoming the world's most competitive knowledge-based economic area within a decade. Clusters came to be seen as an obvious vehicle to promote innovation, competitiveness and growth to meet this aim. However, the EU's principle of subsidiarity entails a clear division of labour between the supranational and the subordinate (national, regional and local) levels of governance. While cities and regions are responsible for the promotion of clusters on the ground, the European Commission assumes responsibility for cluster mapping, SWOT analyses and comparisons.

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4 The main mapping exercise is the European Cluster Observatory: [http://www.clusterobservatory.eu](http://www.clusterobservatory.eu).
the identification and dissemination of best practice\textsuperscript{5}, the creation of platforms for the exchange of knowledge between cluster policymakers and practitioners, and the linkage of clusters across boundaries (\textsc{Reppel} 2007: 6). The European Commission's Directorate General Enterprise and Industry has two initiatives to pursue these activities: While \textsc{Europe INNOVA}\textsuperscript{6} targets policymakers, \textsc{Pro INNO Europe}\textsuperscript{7} caters for the needs of cluster practitioners. Knowledge sharing is promoted by the European Cluster Policy Group established in October 2008 to advise the Commission and member states on cluster development, and the European Cluster Alliance set up as an open platform to maintain a permanent policy dialogue among public agencies charged with cluster policy development and cluster management at the national and regional level.

Further to these direct activities in support of clusters, the indirect impact of the EU's reorientation of its structural funds to support the ailing Lisbon agenda for the recent 2007-2013 period should not be underestimated (cf. \textsc{European Commission} 2006). Defining 'Regional Competitiveness and Employment' as the new Objective 2 thrust means that the European Regional Development Fund (ERDF) are no longer restricted to supporting lagging regions, but also to support innovation and growth in all other regions for the first time - with clusters again coming in as the suitable device. Although only accounting for one sixth of cohesion policy's total indicative financial allocation at 49.1 billion € for 2007-2013, this strategic shift in funding priorities has direct repercussions at the governance level in charge of the Operational Programmes, which are the federal states in the case of Germany.

\textbf{3.2 Federal Government}

Associated with the co-ordinated nature of its market economy, Germany’s system of innovation is focused on incremental innovation and diffusion, but has comparative weaknesses in radical and breakthrough innovations, such as biotechnology (cf. \textsc{Casper} 2007). German policymakers praise the country’s research excellence, but lament that German inventions such as the MP3 standard are too often commercialised abroad. Clusters are hence welcomed as vehicles to bridge the perceived gap between science and industry to eventually accelerate innovation. However, a too consequent spatial concentration of public resources is at odds

\textsuperscript{5} For a critical appraisal of the 'best practice' mantra in cluster and regional policy more generally, see \textsc{Hospers} (2005, 2006). Hospers suggests that success factors cannot easily be transferred from one institutional context to another, whereas 'poor practice' might offer greater potential for policy learning, a point recently echoed by \textsc{Burfitt/MacNeill} (2008: 494).

\textsuperscript{6} \url{http://www.europe-innova.org}

\textsuperscript{7} \url{http://www.proinno-europe.eu}
with Germany’s traditionally redistributive regional policy, given that spatial equity is a constitutional goal. Unification in 1990 suddenly increased spatial disparities in productivity and innovative capabilities. Technological and socio-economic convergence of the new Länder towards the West German level is a special priority of federal government since, and a regionalised innovation policy including the promotion of cluster structures in the new Länder is one way of pursuing this aim. National technological competitiveness and the catching-up process of the Eastern states are thus the twin and potentially conflicting goals of federal government cluster policies.

Federal government started to embrace the cluster concept with the BioRegio contest in 1995, an attempt to jump-start Germany’s then embryonic biotech industry. Policy lessons learnt from BioRegio were adapted to promote innovative capabilities in the new Länder with the InnoRegio initiative in 1999 and the subsequent Entrepreneurial Regions family of programmes. The federal government’s cluster policy received its most recent impetus with the leading-edge cluster competition in 2007, which is part of a broader High-Tech Strategy for Germany. It is worth looking at these three key policy thrusts in greater detail.

Germany’s federal government embraced the cluster notion in the mid-1990s when trying to promote its fledgling biotechnology industry which was estimated to lag twenty years behind the U.S. and ten years behind the UK at that time (COOKE 2001: 267). The experience of those countries suggested that clusters like San Diego, Boston in the U.S. or Cambridge in England were important sources of those nations' competitiveness in biotech. To close this gap, federal government decided to leverage on the competitive potential of federalism. In 1995, the BioRegio contest was launched to identify and promote Germany’s most promising potential biotech clusters (cf. DOHSE 2007). 17 regions entered the contest, and in November 1996, Munich, the Rhineland and the Rhine-Neckar area emerged as winners, with a special vote awarded to Jena in the new federal state of Thuringia. The three winners received around 25 million € each over five years, plus privileged access to R&D funding from the federal Biotechnology 2000 programme. The BioRegio contest is now regarded as an important vehicle to jumpstart the biotech industry in Germany which scored spectacular growth in the second half of the 1990s, although this was helped by legislative changes, a favourable business cycle and ample supply of venture capital. Following the burst of the New Economy bubble in 2000/2001, the industry stabilised at around 400 companies with about 10,000 employees (ERNST & YOUNG 2008).
In the mid-1990s, the initial convergence of the new Länder vis-à-vis West Germany had come to a halt, and significant disparities in innovative capabilities and productivity threatened to become persistent. The federal Ministry of Education and Research thus adapted its acclaimed BioRegio model to the specific needs of the new Länder: While BioRegio strove for the mobilisation of regional assets for the benefit of national competitiveness, the InnoRegio contest was designed to narrow the gap between the eastern and the western states. In contrast to BioRegio, the new contest was not only confined to the new Länder, but also open to all industries and technologies. In 1999, the initial call triggered 444 applications from diverse consortia of individuals and organisations such as businesses, research, education, politics, public administration and associations at the sub-state level (DOHSE 2007: 75 f.). Out of these applications, 25 projects were selected by an independent jury, and 23 ultimately qualified for funding. Their relatively equal distribution over the five new Länder and Berlin cast some doubts on whether the jury’s decision was led by the quality of the applications alone, or if spatial equity may have influenced the final choice, especially since it relied on rather ‘soft’ criteria like originality when comparing proposals across a wide range of subjects. An evaluation by Eickelpasch/Fritsch (2005) revealed that in 87 per cent of InnoRegio projects, most partners had not worked with each other before, and in 55 per cent of projects the actors did not even know most of their partners before their funded project. Convinced by the success of InnoRegio, the federal ministry differentiated the initial concept into a whole new family of programmes called Entrepreneurial Regions (Unternehmen Region) to support innovative networks in the new Länder.

In September 2006, Germany’s federal government for the first time announced an interministerial high-tech-strategy (BMBF 2006). Of 14.6 billion € earmarked for 2006-2009, 11.94 billion € are designated for a set of 17 industries and technologies, while the remaining 2.66 billion € are reserved for generic measures of innovation policy. Of the latter, 600 million € are earmarked for measures to join the forces of science and industry, of which the leading-edge cluster competition (Spitzenclusterwettbewerb) is the key thrust. The aim is to promote up to 15 already well-developed clusters irrespective of technology or industry in three rounds over a period of five years. Essentially, this means an extension of the BioRegio concept beyond the narrow confines of the industry. Consequently, the overall objectives are the same: to identify and strategically promote clusters to achieve leading positions in international competition, to accelerate the commercialisation of new knowledge, to stabilise and create growth and employment, and to make Germany a more attractive business location.
Following the first call for applications in August 2007, 38 regional projects applied by the closing date in December. A dozen of those projects qualified for the final, before the five winners of the first round were disclosed in September 2008. They qualify for a total funding of up to 200 million € over a five-year period. Out of the first five winners, two are from the new Ländere, while one was filed by one of the BioRegio winners, regional network BioRN.

Soon after the first round of selection was completed, the call for the second round was issued in January 2009, with the application period closing in April. Out of 23 applicants, ten finalists were chosen in June and invited to submit detailed applications8. Figure 2 summarises the evolution of the federal government's cluster contests by mapping the winners of the most important competitions. The map highlights both the federal focus on East Germany through the InnoRegio contest and the relative success of regions in the technologically more advanced and yet more prosperous southern Germany. As a result of the underlying strategy to "strengthen the strongest", the metropolitan region of Rhein-Neckar around the biotech research hub of Heidelberg has been the main beneficiary of federal government cluster contests so far. The finalists of the second round are exclusively from Western Germany though the portfolio of states is rather diverse9; it remains to be seen if the dominance of the South can be challenged successfully.

Federal innovation policy in Germany has firmly embraced the notion that national competitiveness depends on localised assets. To unleash the hitherto underutilised potential of competitive federalism, the federal government employs contests as a device for discovery and mobilisation, and shows signs of cumulative policy learning when differentiating initial concepts like BioRegio and InnoRegio into entire programme families. However, it may be criticised that the prevailing approach promotes intraregional networks at the expense of interregional and international networking, and that the InnoRegio family to promote innovation networks in the new Ländere is intrinsically trapped between the conflicting aims of growth and competitiveness on the one hand, and spatial equity on the other.

9 Of the ten finalists, two come from Baden-Württemberg, Bavaria and North Rhine-Westphalia, respectively. Bremen, Hesse, Lower Saxony and Rhineland-Palatinate each account for one candidate (BMBF 2009).
3.3 State Level

Federal autonomy and competition has led all 16 German states to employ the cluster concept in their economic, regional, and innovation policies, albeit with different degrees of intensity. Table 1 provides an overview and illustrates the variety of approaches, but also highlights some notable commonalities.

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The table shows that the cluster concept has been adopted in one way or the other by all 16 states. As at the federal level, the cluster approach has mainly been adopted in technology policy with the aim of bridging the perceived commercialisation gap in areas where the respective states have technological or industrial strengths, or both. However, there is a systematic difference between the old and the new Länder since federal government is much more active promoting clusters and networks as part of its particular concern with the lagging East outlined above. As a consequence, the eastern states are generally less active in cluster promotion. Nevertheless, there are also vast differences among the ten western states, especially with regard to the maturity and coherence of their policies, reflecting in part their political orientation and philosophy. For instance, in Baden-Württemberg which has received a fair amount of scholarly attention for its organic cluster structures in automotive and mechanical engineering, the state government traditionally has a liberal and hands-off attitude and refrains from committing significant resources to a broad cluster strategy. Its recent efforts including a modestly-funded regional cluster contest were mainly triggered by the ERDF’s new competitiveness thrust.

It is worth taking a closer look at the two most prominent cases of state-level cluster policies in greater detail, namely North Rhine-Westphalia (NRW) and Bavaria. Both happen to be the largest and economically most powerful of the 16 federal states, accounting for 21.9 and 15.2 per cent of Germany's population in 2007 and 21.7 and 17.9 per cent of the country's GDP in 2008, respectively. These figures already indicate that with a per capita income of 17.1 per cent above the national average, Bavaria is clearly more successful economically than NRW.

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10 Indeed, it became part of the 'holy trinity' of economic geography together with Silicon Valley and the Third Italy until STABER (1996) opened our eyes by finding no evidence for the proposed embeddedness of interfirm relations in the social structure of the local milieu, nor their widespread utilisation of local institutional arrangements in support of co-operation and innovation (cf. MASKELL/MALMBERG 2002: 435-437).
which even trailed the national average by 0.8 per cent (StBA 2008, Statistische Ämter der Länder 2009). While Bavaria is characterised by modern high-tech industries and services, NRW still feels the legacy of deindustrialisation and structural change in its core Ruhr conurbation, and lags behind southern Germany in all major labour market and innovation indicators. In addition, table 1 shows that both states are pioneers of cluster policy at this level of governance. It seems thus intriguing to ask how these differences affect the two states’ cluster policies.

Based on experience from its regionalised structural policy developed in the 1980s, the government of North Rhine-Westphalia started promoting its pilot network programme PROFIS in 1993, which is now seen as the antecedent of its first fully-fledged cluster policy that was to follow after the 2000 state election. This Kompetenzfeldpolitik was implemented by gradually focusing ERDF funds for the Ruhr Area, the state's industrial heartland, onto a dozen fields of competence which were defined in an archetypal political bargaining process (cf. Rehfeld 2006). Following a historic change in government in 2005, the new conservative-liberal coalition publicised an interministerial cluster policy as part of its innovation strategy in March 2007. During the funding period ending 2013, 635 million € of ERDF Objective 2 funding was earmarked for competitive tenders in 16 pre-defined state-wide clusters, an open RegioCluster contest, as well as some cross-sectional competitions (cf. MWME 2006). The state provides degressive funding for 16 state-wide cluster managers which are supported by a central cluster office.

The state of Bavaria embarked on a major privatisation effort in 1994, successively divesting 4.15 billion € worth of utility stakes. This money was invested in the state's R&D infrastructure through the Offensive Zukunft Bayern launched 1994 and the High-Tech-Offensive (HTO) started in 1999. While the state has always been and still is committed to support its lagging peripheral regions, the first pillar of the HTO accounting for 664 million € was designated to develop and support high-tech centres of world-wide recognition in key technologies. It thus constituted cluster policy par excellence, but without explicit reference to the term. The latter only entered political communication when the government searched for a succession to HTO when privatisation revenues had dried up. In February 2006, the state government launched its recent cluster initiative as a new stage of its technology policy, endowing it with a rather modest 50 million € to establish and fund the management of 19 clusters which were pre-defined top-down after network-based consultations with industry and university representatives. Each of the 19 cluster management units typically consists of a full-time
manager, an unsalaried speaker for representation, and a secretary. Public funding is announced to decrease over five years to put pressure on cluster managements to eventually become self-sustaining (cf. StMWIVT 2006). It is worth pointing out the stark difference in governance philosophy when compared with Baden-Württemberg. Both southern states are undisputedly the most advanced German states in technological and economic terms, but the Bavarian government was not as reluctant to invest and guide development as its Baden-Württemberg peers.

3.4 Cases of Regional Cluster Policy

There is as yet no systematic survey of cluster policies in Germany below the level of the 16 federal states. Though direly needed, a comprehensive mapping of all regional and local cluster policies in Germany is still absent not just for its high costs, but most importantly due to the lack of a commonly agreed and operational definition of cluster policy. Bases on literature and exploratory interviews, a comprehensive study by Kiese (2008B) selected seven case studies of regional (i.e. sub-state) cluster policies, drawing on the seven dimensions of cluster policy outlined above. This research focused on the interpretation and application of the cluster idea in different institutional contexts as well as the policy transfer and learning processes involved. Between August 2006 and August 2007, 110 semi-standardised interviews were conducted with 134 cluster policy experts. The sample of interviewees comprised 60 practitioners in ministries and economic development agencies, of which 19 explicitly classified themselves as cluster managers, ten consultants and 75 independent observers.

Since the survey covered the federal and state levels as well, interviews were restricted to the three states of Bavaria, NRW and Lower Saxony which accounted for 53, 44 and 35 interviewees, respectively. A further 13 experts were active in more than one state or at the supra-state level more generally. At the state level, NRW, Bavaria and Lower Saxony were chosen to roughly represent three economically distinct types of region. While structural policy in NRW was for decades dominated by the challenge to promote structural change in the Ruhr area, Bavaria stands for the opposite case of a late industrialised state with a strong presence of high-tech industries and firms. With its manufacturing sector shaped by Volkswagen (VW) and its supplier network, Lower Saxony appears quite unlike these two extremes but rather falls into the “grey mass” category of regions often neglected in regional studies. This choice of states was meant to create structural, but also institutional and political variety for the interregional comparison of cluster policies. Our choice is furthermore restricted to Western
Germany as the new Länder deviate too strongly because of their transition background and a more direct involvement of federal government cluster programmes (cf. DOHSE 2007, KOSCHATZKY/LO 2007). Mapping the sub-state case studies, figure 3 illustrates their varying size stretching from the City of Regensburg as a single municipality with 131,000 inhabitants to horizontal coalitions of counties and municipalities like the regions of Hannover, Braunschweig and Nuremberg whose populations range from 1.1 million to 1.7 million inhabitants.

[Insert figure 3 about here: map of case study regions]

Case studies have been selected according to the seven dimensions of cluster policy introduced in section two. In the governance dimension, the focus on cluster policy rather than cluster initiatives more generally requires a significant degree of public agency in the initiation, funding and operational governance of the effort. Despite embracing the cluster notion, policies under study do not have to use the cluster term explicitly - in many German regions there is a tendency to adopt more ‘neutral’ terms like fields or networks of competence instead. Although cluster concepts often cite Porter’s definition of a cluster, there is generally little deeper theoretical grounding, and practitioners tend to understand clusters as organised networks of firms and research organisations (cf. KIESE 2008c). However, the selected cases all have a substantial degree of cluster orientation when measured by the usage of cluster-specific versus generic economic development tools. They are complex in combining wider sets of instruments for cluster promotion and coherent by uniting different policies and regional stakeholders within a single programme. Institutionalisation may vary from rather loose associations to the dedicated cluster organisations, but all cases are sufficiently mature to allow for some at least preliminary evaluation. Table 2 provides an overview of the seven regional case studies policy, organised along the seven dimensions of cluster policy.

[Insert table 2 here: overview of regional case studies]

In NRW, the most ambitious cluster policy effort can be found in Dortmund, Germany's sixth largest city on the eastern edge of the Ruhr conurbation that had already embraced pro-active structural change since the establishment of its innovation centre and technology park in the
mid-1980s. In 2000, the city council approved a cluster strategy devised by international management consultancy McKinsey & Co. targeting IT, micro technologies and e-logistics to compensate for the demise of coalmining, steelworks and breweries. As a second sub-state case within NRW, the *kompetenzhoch*³ collaboration between the city triangle of Wuppertal, Solingen and Remscheid was also driven by the legacy of early industrialisation and a pressing need for structural change. Since 2001, the three municipal economic development offices established a division of labour based on five fields of competence, namely automotive, metal processing, product development and design, event management and communication, as well as health and personal care (cf. DEWALD 2006). While Dortmund’s strategy entails a radical break with the past, *kompetenzhoch*³ includes an injection of design competencies into the remains of the centuries-old cutlery district of Solingen and Remscheid which was prominently analysed by both Marshall and Porter (cf. BATHELT 1998; VAN DER LINDE 1992).

As the most important case of regional cluster policy in *Bavaria*, the northern district of *Central Franconia* surrounding Nuremberg devised its first cluster strategy in response to the decline of its dominant electrical engineering sector which culminated in massive employment losses at Grundig, a traditional manufacturer of consumer electronics. Initial efforts were incorporated in the more coherent Nuremberg Programme in 1994, which was followed by a consensual perspective report originally drafted and signed in 1998, and renewed in 2005 (cf. NEUMANN 1996, IHK NÜRNBERG 2005). These documents contained a set of fields of competence defined as clusters, which are promoted through independent competence initiatives founded successively from as early as 1994 (cf. HEIDENREICH 2005). Contrasting the industrial decline experienced by Central Franconia, the city of Regensburg witnessed a rather exceptional late industrialisation from the 1980s following the attraction of large manufacturing establishments like BMW or Siemens in what was previously a rural backwater. In Regensburg, municipal cluster policy did not emerge in response to some perceived crisis, but to federal government contests such as the BioRegio initiative leading to the establishment of the BioRegio Regensburg in 1996 and the BioPark incubator in 1999. A similar top-down stimulus triggered the establishment of the Strategic Partnership for Sensor Technology in 2003, a concept transferred locally to the field of IT security in 2006 (cf. STADT REGensburg 2003, DIEFENTHAL 2006, IT-SPEICHER 2008).

Unlike NRW and Bavaria, the state of *Lower Saxony* does not pursue an explicit and coherent cluster strategy, but adapted a McKinsey & Co blueprint to revamp its regional structural pol-
icy in 2004. At its heart, so-called Regional Growth Concepts (RGCs) are designed to stimulate the bottom-up development of regional cluster policies (cf. KIESE 2008A). The approach is modelled after the above-mentioned dortmund-project and the older AutoVison concept developed in 1998 by McKinsey on behalf of VW to reverse the economic fortunes of their headquarter and company town in Lower Saxony, Wolfsburg. Next to cutting local unemployment by half within five years, which was achieved with the help of a cyclical upswing, the local cluster organisation Wolfsburg AG aims at transforming the traditional single-plant location into a self-augmenting mobility cluster in the long run. To reduce the overwhelming dependency on one single employer, the concept proposed the development of new interlinked clusters of IT, leisure and tourism, as well as health businesses (cf. STERNBERG ET AL. 2004). As a prototype of its newly-conceived RGCs, the state government teamed up with the city and region of Hannover to fund the development of a cluster-based strategy to improve the competitiveness of its capital region by McKinsey & Co in 2002. In March 2003, local and regional governments jointly incorporated hannoverimpuls as a new economic development agency to pursue their strategy built on the development of automotive, IT, life sciences, optical technology and manufacturing technologies into working and interlinked clusters (cf. KIESE 2008D). In the meantime, the state co-funded the development of a similar McKinsey concept for the Braunschweig region, which is pursued by the projekt REGION BRAUNSCHWEIG GMBH since early 2005 (cf. PRÄTORIUS 2004).

The governance of regional cluster policy includes aspects of initiation and funding and is a reflection of regional governance structures combined with horizontal and vertical interactions, i.e. with neighbouring regions and superordinate levels of governance. According to the degree of their involvement, actors may be divided into shareholders and stakeholders. Shareholders commit financial resources to the equity and/or the operating costs of a cluster organisation, and their support extends beyond individual projects. By contrast, stakeholders are more loosely involved through e.g. advisory committees, or their involvement is restricted to single projects. Since substantial public agency was a definitional criterion of cluster policy, it is little surprising that all seven case studies of regional cluster policy are mainly initiated, funded and governed by counties and municipalities. Looking solely at stakeholders, the cases of Dortmund, kompetenzhoch³, hannoverimpuls and Regensburg are purely state-driven. The Wolfsburg AG represents a typical public-private partnership as the CMO is jointly owned by Volkswagen (VW) and the city of Wolfsburg, while the constellations of shareholders are much broader in the mature industrial regions of Braunschweig and Nurem-
ber representing a tripartite alliance between local government, the business sector, and trade unions. While there is a clear asymmetry of power with VW setting the agenda in Wolfsburg and Braunschweig, the Nuremberg case is characterised by a lengthy process of coalition building in which the resulting cluster portfolio represents a classical compromise between the three parties involved.\(^{11}\)

[Insert table 3 here: actors in regional cluster policies]

These differences in the constellations of actors to a certain degree reflect the different types of regions and thus the starting conditions and motivations of cluster policy. Mature industrial regions typically contain long-established and stable networks whose strong ties are frequently regarded as a major obstacle to radical change (cf. GRABHER 1993), though they might conversely act as growth coalitions as pointed out by Axford/Pinch (1994) and Vallier (1995). The fact that the earliest cases of regional cluster policy in Germany emerged in response to acute and severe challenges of structural adjustment lends support to the so-called crisis trigger hypothesis claiming that major disturbances and threats (or at least the perception thereof) are needed for a heterogeneous set of governance actors to overcome their egoistic interests to join forces and agree on a common vision and strategy. Further to the breadth of regional coalitions, the participation of trade unions is a second key characteristic of crisis-induced cluster policies in mature regions, as illustrated by the Dortmund, Braunschweig and Nuremberg cases. Although the unions provided important conceptual stimuli in favour of cluster policy initiation in these regions, their influence on the actual governance is limited by resource constraints and a dwindling membership base in times of structural change. In contrast to the diversity of actors and the involvement of unions, the participation of large firms and SMEs as shareholders or stakeholders is hardly associated with the type of region, be it mature or high-tech. While Volkswagen is the driving force behind the Wolfsburg and Braunschweig cases and Siemens has been more instrumental behind the scenes in Central Franconia, failure to engage the business sector in the case of Hannover points towards the importance of a region's political economy and culture that in turn affects

\(^{11}\) The local government's preference for high-tech industrialisation is expressed by medical technology, communication and media, while the trade union put energy, environmental technologies, transport and logistics on the agenda - sectors in which it was still well represented. New materials completed the original 1994 portfolio as it was a key target of the Bavarian state government's technology policy at that time (cf. Heidenreich 2005: 752).
the organisational capacity of a region on which collective vision, leadership and strategy formulation critically depend (cf. VAN DEN BERG ET AL. 1997, VAN DEN BERG/BRAUN 1999).

4 Cross-Scalar Interdependencies and Policy Learning

Having characterised cluster policies on four levels of governance, the ultimate aim of this paper is to identify critical linkages between these scales. The MLG perspective demands particular emphasis on vertical learning processes, but these need to be weighed against horizontal and path-dependent intra-regional policy learning for a complete picture.

4.1 Vertical Interdependencies and Learning

The regional cluster policies of Dortmund, Wolfsburg and Central Franconia not only emerged endogenously from within their regions. The Dortmund case served as a case of inspiration for the NRW state government's Kompetenzfeldpolitik, together with the Cologne media cluster which the then Prime Minister Wolfgang Clement strongly promoted in his previous position as a secretary of state responsible for the media industries. The two McKinsey-designed cases of Dortmund and Wolfsburg served as a blueprint for the formulation of Lower Saxony's New Structural Policy (NSP) in 2004. Hence, vertical policy learning is not only one-way but may involve critical bottom-up inspiration and transfer at the conception stage. The latter case is particularly interesting since the NSP was only formulated after the state government had co-commissioned McKinsey to work out a cluster strategy and detailed projects for Hannover which led to the establishment of hannoverimpuls as a new regional development Agency in April 2003 (cf. KIESE 2008D for a detailed account of this case). Having thus used its capital region as a pilot case, the NSP led to the development of three further regional growth concepts including the Braunschweig case which drew on this on-the-job political learning exercise (cf. KIESE 2008A).

In the other four regional cases, bottom-up initiative was substantially mobilised by top-down incentives from higher levels of governance. The Hannover and Braunschweig cases were triggered by the state government's McKinsey-style NSP. Kompetenzhoch³ was induced by the Triangle winning the NRW state government's Regionale 2006 contest, while the Regensburg initiatives were induced in a similar fashion by federal government competitions including the much acclaimed BioRegio contest.
Since the emergence and expansion of European regional policy from the mid-1970s, Brussels has successively taken over conceptual leadership over its member states and their regions in this field of policy (cf. REHFELD 2005A: 133 f). The Lisbon agenda and its offspring, the new ERDF Objective 2, directly feed into the agendas of the Länder governments since they are the governance level responsible for setting up Operational Programmes. This is most evident in the case of NRW which decided to distribute most of its Objective 2 funding through cluster contests. To participate in such a competition and to qualify for Objective 2 funding, a county or municipality has to develop a cluster concept, which is a strong vehicle spurring the top-down diffusion of cluster policies. At the same time, this triggers an inflation of efforts well beyond the cluster potential that can realistically be developed towards national or even international visibility. Among the first winners of this policy are professional consultants who readily meet the burgeoning demand for cluster analysis and strategy development. Additional consultancy business is created by the federal government’s recent leading-edge cluster contest since hardly any cluster organisation has the resources and know-how needed to develop a viable proposal on its own.

Owing to the relative autonomy of the Länder in Germany’s federal set-up, federal government acts as a facilitator by organising competitions and selecting regions, but does not intervene in state policies, nor is it actively involved in programme management which is left to the federal states or to independent agencies. This explains the government's early resort to contests as a soft instrument setting incentives for states and regions to institutionalise cluster structures and processes. Some state governments have already started to subsidise applications, hoping to raise their high-tech profile by having ‘their’ candidates among the winners of this prestigious competition. It should not be forgotten though that the previous cluster contests, mainly BioRegio and InnoRegio, mobilised sustainable regional cluster initiatives even in many regions that were not among the winners. As a consequence, by the mid-2000s there were 25 regional networks and cluster initiatives and five state-level associations in charge of regional biotech promotion (BMBF 2005: 5). Some of them received support from subsequent programmes like BioFuture, BioChance and BioProfile (DOHSE 2007: 77 f.), but it remains questionable if the almost ubiquitous promotion of biotech networks is the most efficient way of growing internationally competitive clusters. Critiques even argue that this rather reflects the country's preference for equity and leads to little more than reintroducing the old-fashioned watering can of regional policy through the back door, an impression that may also be gained from the inflationary tendencies inherent in many Länder cluster policies (cf.
REHFELD 2005B: 6). InnoRegio triggered a similar mobilisation effect since 40 per cent of the rejected proposals were nevertheless realised by the applicants (EICKELPASCH/FRITSCH 2005). However, it is not known how many of the funded projects would have been carried out irrespective of contest.

4.2 Horizontal Policy Learning: NRW and Bavaria

Frequent references in policy documents and interviews show that the cluster policies of both NRW and Bavaria have been inspired by Upper Austria in their design. The Austrian state made an early decision to invest substantially in cluster promotion and is now regarded as the best practice example within the German-speaking area. However, Upper Austria’s cluster policy itself was in turn inspired by earlier experiences with automotive cluster promotion in Styria, another Austrian state (cf. STEINER/HARTMANN 1999, TÖDTLING/TRIPPL 2004, FROMHOLD-EISEBITH 2007). However, interviewed practitioners stressed that Austria’s smaller size limits the transferability of experiences, as does the volume of funding committed in Upper Austria that German states are neither willing nor able to match, except for Bavaria due to its privatisation thrust which provided a rather unique window of political opportunity. The latter questions the assumption of HOSPERS/BEUGELSIDIJK (2002) that the relatively homogenous per capita income of developed economies implies a comparative resource endowment of their cluster policies. Instead, political philosophies, priorities and opportunities seem to play a critical role here.

Further to a common source of inspiration, NRW and Bavaria are also more strongly connected by mutual learning than most other German states. As early as 1997, Bavaria drew on experiences from NRW and other states in the design of its innovation and co-operation initiative for the automotive industry, BAIKA. More recently, NRW’s recent cluster policy was inspired by the establishment of cluster management units in Bavaria, but added the rather innovative element of competitive funding based on own experiences and, more importantly, EU funding requirements. However, policy learning between the two largest German states builds not only on mutual observation, but also on direct interaction that can be traced back to 1998 at least when NRW’s Prime Minister Wolfgang Clement came into office. Despite representing competing parties, Clement and his Bavarian colleague Edmund Stoiber agreed on close co-operation and frequent consultations of their leading civil servants, and even held joint cabinet meetings. This partnership included the informal knowledge exchange by ministerial bureaucrats in charge of cluster policy. This unlikely alliance of political entrepreneurs
(cf. FACCHINI 2006) rested on similar biographies and traits, but also on shared political interests vis-à-vis federal government and the EU. At a more general level, informal meetings of bureaucrats and a joint federal-state committee for research and technology provide opportunities for both horizontal learning between states and vertical exchange between federal and state ministries.

In sum, horizontal policy transfer between the states is rather weak and mainly limited to mutual inspiration. The two case studies illustrate, however, that path-dependent institutional learning leaves a much greater imprint on the design and implementation of cluster policies. Just like sponges, large ministerial bureaucracies at the state level act as repositories of experience-based knowledge. This is best evidenced by the breadth and continuity of NRW’s cluster portfolio: When the new state government came into power in 2005, it announced a thorough examination of previous policies and a significant reduction in the number of targeted clusters. After one and a half years of internal discussion and policy formulation, the government came up with a list of 16 clusters in NRW to replace their predecessors’ portfolio of twelve fields of competence for the Ruhr area. It can be shown that some clusters were artificially split up to divide responsibilities between rivalling ministries. In the end, NRW’s cluster portfolio did not only grow, but also contained all major industries and technologies that were previously supported through the fields of competence policy and other schemes. This strong continuity illustrates the power of the ministerial bureaucracy. State ministries are not only repositories of knowledge and arenas of incremental learning, but also represent the interests of specific industries, fields of science and technology, and political programmes which tend to develop their own dynamics (cf. OLSON 1965).

In contrast to NRW with its 2005 change in government, Bavaria’s ruling conservative party CSU is in power since 1957 without any interruption. Due to this strong political continuity, path-dependent policy learning is even more evident than in NRW. Bavaria’s recent cluster initiative builds upon the state’s technology programmes Offensive Zukunft Bayern and High-Tech-Offensive (HTO). At the operational level, Bavaria’s cluster initiative draws heavily on existing organisations from its earlier technology policy thrust, most notably the state-owned Bayern Innovativ society for innovation and technology transfer and its prototype automotive network BAIKA, both established in the mid-1990s. Continuing concerns about spatial equity led to the integration of the regional management instrument from Bavaria’s spatial development policy as a path-dependent supplement to its cluster policy.
4.3 Horizontal Policy Learning: Regional Cases

Compared to the state level, the analysis of alternative channels, processes and intensities of cluster policy transfer indicates an overall low degree of transfer to start with. Interregional policy learning is generally restricted to inspiration and some elements of combination. However, there is one notable exception to this general pattern. Influenced by management consultancy McKinsey & Co., the cluster policies of Wolfsburg, Dortmund, Hannover and Braunschweig display higher transfer intensities of copying and adaptation. Among the alternative mechanism of policy transfer, these four cases may be classified as unilateral policy shopping, warranting a more detailed discussion at the end of this section. However, policy transfer was found to be much weaker for the other three sub-sate case studies, with mutual observation embedded in locational competition as the main mechanism.

As far as the channels of policy transfer are concerned, cluster literature appears to play a negligible role among policy-makers and practitioners alike. References to cluster literature are overwhelmingly limited to Porter’s definition of a cluster, and manuals dedicated to network and cluster development were largely unknown and did not play a role in the design and implementation of cluster policies. By contrast, the mobility of key personnel appears to be a more relevant channel of policy transfer. Some of the younger cluster organisations surveyed stated that they had consciously hired staff from older cluster organisations, mainly to acquire procedural knowledge, for example on start-up contests. At the executive level, a notable case within our sample is a key individual who worked in the city of Cologne’s urban development department where he acquired cluster policy experience as managing director of the city’s MediaPark. After moving to Nuremberg in 1992, he injected his openness towards the cluster concept into the Nuremberg Programme and thus became one of the founding fathers of Central Franconia’s cluster policy. In 1997, this change agent was appointed head of the city of Dortmund’s economic development division where he accompanied the development and implementation of the dortmund-project until his retirement in 2004 (cf. KÜPPER 2005; KÜPPER/RÖLLINGHOFF 2005). Through his openness and enthusiasm towards the cluster concept, this change agent thus left a trace of cluster policies linking the different stations of his professional career. Tight budgets notwithstanding, business trips by economic development professionals are quite common during the concept development stage to learn from successful cluster policies first-hand. However, there is a general scepticism towards the transferability of cluster policy experiences made elsewhere and hence towards the potential for interregional policy learning in general.
In our sample, the cases of Wolfsburg, Dortmund, Hannover and Braunschweig provide an outstanding example of mainly horizontal policy diffusion via consultants as transfer agents. When international management consultancy McKinsey & Co. was commissioned by VW to develop a concept to revitalise its ailing company town of Wolfsburg in 1998, they could draw on relevant experiences from consulting projects in the U.S. which were decontextualised into the consultancy’s knowledge management system. For the development of Wolfsburg’s AutoVision concept, this codified knowledge was combined with the accumulated experience of local experts who helped the consultants draft the concept in a joint team over a few months. When the AutoVision concept coincided with a favourable business cycle, McKinsey & Co. went on to sell it as a “plan for German job creation” (Heuser et al. 2001) and as a showcase for the acquisition of further projects.

When ThyssenKrupp was pressured to compensate the city of Dortmund for the closure of its steel plant, their key customer VW demanded that they set up a manufacturing facility in Wolfsburg (cf. Ziesemer 2004). This is how the steelmaker became aware of the AutoVision approach which entails the attraction of suppliers to Wolfsburg. In October 1999, ThyssenKrupp commissioned McKinsey to develop a similar concept in Dortmund to strengthen regional competitiveness through cluster development, which led to the establishment of the dortmund-project in May 2000. When the state ministry for the economy of Lower Saxony became aware of McKinsey’s work in Wolfsburg and Dortmund, it developed plans to apply this approach with its capital region of Hannover as a testing ground. When developing the cluster concept for Hannover, the McKinsey-led project team of local experts went to Dortmund for a presentation of the dortmund-project. Some practitioners who were involved in this early stage confirm the consultants’ strong inclination to follow their blueprints applied in Wolfsburg and Dortmund (cf. Kiese 2008d).

Following the Hannover pilot case, three further regions of Lower Saxony accepted the offer of state co-funding for concept development, which led to the establishment of new cluster-oriented economic development agencies to pursue RGCs including the Braunschweig case (cf. Kiese 2008a). The latter project purposefully learned from McKinsey’s showcase projects in Dortmund and Hannover how to employ and guide the consultants more effectively to accommodate their local interests. Nevertheless, practitioners again report the consultants’ strong push to apply their blueprints, indicating a systematic struggle between generic and context-specific knowledge. As a common thread to the four regional McKinsey cases, the consultants injected critical conceptual and procedural know-how. However, due to their
costs their influence was limited to a few months of concept development before the window of intraregional learning closed and path-dependent and experience-based learning took over once again.

Table 4 summarises our case study evidence of path-dependent cluster policy learning in lines and inter-regional policy transfer indicated by arrows. Inspiration as the lowest possible degree of policy transfer is most common, while initial attempts at copying by consultants were gradually eroded in the process of implementation. Although policy tourism does play a certain role, consultants and the mobility of key individuals are the most effective channels for transfer, but they are rather singular phenomena. As far as mechanisms are concerned, the top-down impetus of policy contests does not fit into the classification proposed by the policy transfer literature which draws on analyses of international policy transfer (cf. LÜTZ 2007). By contrast, policy contests are confined to the federal and state level, and have even been tested at the sub-state level by the Stuttgart region of Baden-Württemberg (cf. SAUTTER 2004). Compared to path-dependent policy learning, however, interregional transfer is relatively sporadic and offers policy and practice ample opportunities for further learning.

[Insert table 4 here: Policy Transfer and Path-dependent Learning in Cluster Policy]

5 Implications and Outlook

Our contention that cluster policy represents a good case of MLG was well illustrated by Germany, the archetypal federal state in which despite horizontal variety, a distinct division of labour has emerged between the four levels of governance. While the supranational level explicitly restricts itself to cluster mapping, networking and the dissemination of best practice, the EU’s reorientation of its structural funds to also support competitiveness and employment outside the lagging regions creates strong implicit pressure on the Länder and regions to join the cluster bandwagon as best evidenced by the NRW case. In the absence of centralist power, federal government started experimenting with the soft instrument of cluster contests in the mid-1990s which it has developed into elaborate families of programmes in the meantime, the current Spitzencluster contest being the legitimate heir of its initial BioRegio initiative. The sub-national state level shows systematic differences in inter-level relationships in East Germany where federal government assumes special responsibility. Among the old Länder, top-down stimuli cause some convergence towards the cluster concept, but
marked differences in policy preferences and underlying policy traditions persist. At the scale of sub-state regions, variety is even greater. Mature industrial regions were among the first to apply cluster concepts bottom-up in the 1990s when responding to challenges of severe structural adjustment, thus representing cases of necessity cluster policy. To borrow an analogy from entrepreneurship research, the majority of regional cluster policies today grasp the opportunity provided by top-down cluster contests which may carry heavy funding weight as in the NRW case.

This paper has shown that within a framework of multi-level governance, the direction of learning has changed with the life cycle of the cluster concept in policy and practice. While there have been instances of bottom-up learning in the early stages, this has now given way to a strong current of top-down diffusion emanating from the EU’s competitiveness thrust and federal government cluster contests. These contests in particular join top-down impetus and bottom-up initiative in a counter current fashion. Less visible but no less important, demonstration and learning also occurs horizontally between states and regions, the latter mainly aided by a management consultancy in our sample of cases transferring conceptual and procedural know-how from one region to the other. However, interregional policy learning only occurs discontinuously during certain windows of opportunity. Strategy formulation at the state level and day-to-day policy delivery at the regional level draw to a much greater degree on path-dependent and experience-based learning than on the injection of best-practice know-how from outside.

Policymakers and practitioners may draw some useful conclusions from the variety of cluster policies and the interrelationships between different levels of governance. It appears that the potential for continuous policy learning between regions and across levels of governance is still largely untapped. The regional and local levels often lack the resources to engage in continuous policy learning, let alone concept development. This is an issue that the supranational and federal level might address more thoroughly. Similarly, the mobilising, awareness-raising, and learning effects of cluster contests call for further applications of this Hayekian discovery device to different institutional contexts (cf. von Hayek 1978). However, politicians and practitioners should be aware that implementation is increasingly complicated complex vertical and horizontal constellations of actors in the congested state. This complexity is

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12 For an early distinction between push and pull factors in entrepreneurship research, see Birley/Westhead (1994). The Global Entrepreneurship Monitor started juxtaposing necessity and opportunity entrepreneurship in its 2001 report which proposed distinguishing between “entrepreneurship reflecting the voluntary pursuit of opportunity and that reflecting a necessity to engage in entrepreneurship when there is an absence of employment opportunities” (Reynolds et al. 2002: XV). Parallels with cluster policies are thus obvious.
further exacerbated by the variety of industrial structures and institutional environments across regions that limit the usefulness of best practices and policy blueprints considerably. Successful cluster policy thus does not only depend on a region's economic and technological cluster potential, but also on the institutional or organising capacity needed to meet the ensuing challenges of governance (cf. BURFITT/MACNEILL 2008). Further to these demands, to a number of critics successful clusters stimulating economic development are the exception rather the rule. Policies in support of clusters are thus well-suited if there is credible potential for national if not international competitiveness and sufficient institutional capacity for its development. If these conditions are not met, clusters should not be used as model but rather as an analytical tool for economic development to identify and address regional bottlenecks to innovation and growth. Drawing on FESER (2008), this means a shift from the conventional to an intelligent approach to cluster policy that acknowledges clusters not as an end in itself, but rather as a means of lifting regional innovation, growth and employment onto a higher level.

This paper was an attempt to explore the interrelationships between different levels of governance from a policy learning perspective. More detailed case studies are needed focusing on vertical and horizontal co-ordination, as well as their interrelation and distributions of power. Complexity further multiplies when MLG and intra-level relations are combined with alliance building and maintenance within a region. Further exploring the congested state empirically calls for an in-depth single case study approach. However, to overcome a major deficiency of previous research, case studies should also be designed as comparative endeavours using a common methodological approach to allow for some degree of generalisation, abstraction and modelling at a later stage. As already demanded in the introduction, the complexity of its object calls for cluster policy research to adopt an interdisciplinary approach. Clusters do not care for administrative boundaries or statistical industry classifications, and neither can one single academic discipline accommodate the manifold facets of the issue.

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Figure 1: Development of Cluster Policies as Interregional Learning
Source: based on HASSINK/LAGENDIJK 2001 and LAGENDIJK 2001
Figure 2: Winners of Major Federal Government Cluster Contests

Source: KIESE 2009: 59
<table>
<thead>
<tr>
<th>State</th>
<th>Policy Initiative (Year of initiation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Germany</td>
<td></td>
</tr>
<tr>
<td>Hamburg</td>
<td>CMOs for logistics, aerospace, and media/IT/telecoms</td>
</tr>
<tr>
<td>Hesse</td>
<td>Promotion of 5 key technologies Regional cluster contest (2008)*</td>
</tr>
<tr>
<td>Lower Saxony</td>
<td>State initiatives to promote science-industry networks in 6 key technologies Regional Growth Concepts (2004)</td>
</tr>
<tr>
<td>North Rhine-Westphalia</td>
<td>Fields of competence for Ruhr area (<em>Kompetenzfeldpolitik</em>, 2000-2005) Contests for 16 pre-defined clusters and open RegioCluster contest*</td>
</tr>
<tr>
<td>Rhineland-Palatinate</td>
<td>Some ad-hoc industry initiatives and joint activities with neighbouring states, but no coherent cluster strategy</td>
</tr>
<tr>
<td>Saarland</td>
<td>Innovation Strategy 2015 to set up 5 cluster platforms (2001)</td>
</tr>
<tr>
<td>Schleswig-Holstein</td>
<td>2004 report listing eight mostly state-wide clusters ED focus now on 10 clusters</td>
</tr>
<tr>
<td>East Germany (New Länder and Berlin)</td>
<td></td>
</tr>
<tr>
<td>Berlin</td>
<td>Innovation Strategy (2005) defines health services as cluster and assigns management to five further fields of competence</td>
</tr>
<tr>
<td>Brandenburg</td>
<td>Cluster-oriented regional policy assigning 16 industry-based fields of competence (<em>Branchen-Kompetenzfelder</em>) for priority promotion in selected locations (2005)</td>
</tr>
<tr>
<td>Mecklenburg-Western Pomerania</td>
<td>Focus on 9 technology growth poles</td>
</tr>
<tr>
<td>Saxony</td>
<td>Policy focus on 4 high-tech industries, but no coherent strategy 6 industry initiatives, starting btw. 1999 and 2008</td>
</tr>
<tr>
<td>Saxony-Anhalt</td>
<td>5 innovation networks based on federal InnoRegio contest Cluster study commissioned, but no cluster strategy</td>
</tr>
<tr>
<td>Thuringia</td>
<td>Policy focus on 9 key technologies State promotes 8 cluster initiatives, but not coherent strategy</td>
</tr>
</tbody>
</table>

*) direct use of ERDF Objective 2 funding

Table 1: Cluster Policies at the State Level

Source: Own compilation from miscellaneous websites and policy documents
Figure 3: Map of Case Study Regions

Cartography: Stephan Pohl
<table>
<thead>
<tr>
<th>Governance</th>
<th>Cluster reference</th>
<th>Cluster orientation</th>
<th>Complexity</th>
<th>Coherence</th>
<th>Institutionalisation</th>
<th>Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dortmund</td>
<td>public, bottom-up, initiative by large firm, civic foundation</td>
<td>Explicit (&quot;leading industries&quot;)</td>
<td>high, but diminishing</td>
<td>high (⇒ urban development)</td>
<td>high</td>
<td>project team ⇒ municipal LED office</td>
</tr>
<tr>
<td>&quot;Triangle&quot;</td>
<td>public, bottom-up</td>
<td>explicit (&quot;fields of competence&quot;)</td>
<td>high, but diminishing</td>
<td>medium</td>
<td>medium</td>
<td>co-operation of municipal LED units</td>
</tr>
<tr>
<td>Wolfsburg</td>
<td>bottom-up PPP (50% VW, 50% City)</td>
<td>explicit (&quot;fields of competence&quot;)</td>
<td>high, but diminishing</td>
<td>high (⇒ urban development)</td>
<td>high</td>
<td>CMO</td>
</tr>
<tr>
<td>Hannover</td>
<td>Public, with private sponsoring for projects; counter current</td>
<td>explicit (&quot;focus industries&quot;)</td>
<td>medium, but diminishing</td>
<td>high</td>
<td>medium</td>
<td>CMO</td>
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<td>Brynchen</td>
<td>tripartite; counter current</td>
<td>explicit</td>
<td>medium</td>
<td>high</td>
<td>medium</td>
<td>CMO</td>
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<tr>
<td>Nuremberg</td>
<td>tripartite, bottom-up</td>
<td>explicit (&quot;fields of competence&quot;)</td>
<td>high</td>
<td>medium</td>
<td>medium</td>
<td>competence initiatives with cluster managers</td>
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<td>Regensburg</td>
<td>public counter current</td>
<td>explicit</td>
<td>high</td>
<td>medium</td>
<td>low</td>
<td>co-ordination by municipal LED office; strategic partnerships ⇒ associations</td>
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</table>

Table 2: Overview of Regional Case Studies
Table 3: Actors Involved in the Governance of Regional Cluster Policies

<table>
<thead>
<tr>
<th></th>
<th>Dortmund</th>
<th>Triangle</th>
<th>Wolfsburg</th>
<th>Hannover</th>
<th>B’schweig</th>
<th>Nuremberg</th>
<th>Regensburg</th>
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<td>Counties &amp; municipalities</td>
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<td>Chambers &amp; Associations</td>
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● Core agents, shareholders
○ Other agents, stakeholders

Table 3: Actors Involved in the Governance of Regional Cluster Policies
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Governance levels: A - supranational, B - national/federal, C - state, D - sub-state
1) SP = Strategic Partnerships pilot project, 2) SP = Strategic Partnership
Path-dependent learning connects programmes parallel to the time axis in each line.

Table 4  Policy Transfer and Path-dependent Learning in Cluster Policy: Selected German Case Studies