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Knowledge Dynamics and Policies for Regional Development: Towards a New Governance Paradigm

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Abstract *If regional policies are to make a difference, they must address the underlying issues that propel growth in successful regions and hamper development in others. This implies that in the wake of structural changes like the ongoing change from an industrial towards a knowledge-economy paradigm, policies for regional economic development must be reconsidered. This article reviews the development of new forms of regional policy in the context of the governance challenges created by the emergence of new knowledge dynamics. Having outlined a conceptual framework and reviewed the literature on the transformation of regional policy in Europe, the article explores current policy patterns in European regions, combining the results of a survey of the policies regional development bodies in European regions, and the findings about the impact of public policies on the basis of an extensive series of in-depth case studies of economic change processes in firms and regions. It is concluded that although important changes have taken place with regard to adopting policies to emerging processes in the knowledge economy, further adjustments may be called for in order for localities to fully benefit from new knowledge dynamics in an increasingly global era.*

Introduction

If economic developments in Europe and beyond are characterized by new knowledge dynamics that transgress traditional geographical, organizational and cognitive borders, then policies for regional development will need to reflect these changes in order to make a difference (Crevoisier & Jeannerat, 2009). This is not just a "technical" issue—to identify the instruments that will work under the new economic conditions (Halkier *et al.*, 2010)—but also a challenge with regard to the governance of regional policy, that is, the institutionalized policy processes and settings in which regional development activities are designed and implemented. Like other public policies, regionally based

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economic development initiatives are located at the intersection between institutional path dependencies—using tools available in the current governance set-up—and a capacity for innovation through learning from new challenges and being inspired by policy practices elsewhere. A good fit between economic challenges and policy responses cannot, therefore, be taken for granted (Parsons, 1995; Pihkala *et al.*, 2007; Mahoney & Thelen, 2010).

This article reconsiders policies for regional economic development in the light of recent findings about the current state of the knowledge economy in Europe and its regions, focusing especially on the development of new forms of regional policy in the context of new governance challenges created by changing knowledge dynamics in regional economies. In other words: to what extent are policies adopted that reflect the new knowledge-economy conditions? It is concluded that although important changes have taken place with regard to adapting policies for regional economic development, institutional path dependencies create particular challenges that must be overcome if the "new" paradigm in regional policy is to "make a difference".

The article consists of three parts. The first part presents the conceptual framework, outlines the transformation of regional policy in Europe through a literature survey, and introduces the methods employed in the ensuing empirical analysis. The second part analyses existing policies in European regions, combining the results of a survey of the policies of regional development bodies in European regions, and the findings about the impact of public policies derived from an extensive series of in-depth case studies processes of economic change in firms and regions. The final part discusses the governance challenges that face those pursuing regional development objectives in the context of new knowledge dynamics and institutional path dependencies.

Conceptualizing Regional Policy and Governance

In order to capture the key features of changes in regional policy and governance in Europe, a simplified institutionalist approach is adopted here, condensing the extensive case study-oriented framework of Halkier (2006) to a format more suitable for comparison of policy paradigms (cf. e.g. Halkier, 2008; Halkier & Cooke, 2010). As summarized in Table 1, four dimensions can be used to characterize regional policy paradigms: territorial governance, which situates the region in relation to its external environment; strategy, describing the direction in which policies attempt to move economic activities; policy instruments, as the means deployed to influence economic activities; and knowledge impacts, which are the expected consequences for knowledge processes of public intervention in the economic development.

With regard to governance, it is necessary to distinguish between the general form of governance embodied in the structure of the political system and the specific ways in which regional policies are being handled with regard to decision-making powers, and also to establish the relationship between development bodies and the economic actors targeted by them. This can take a variety of forms: a hierarchical chain of command, an ongoing network relationship between interdependent actors, or a one-off market-style exchange of resources (Halkier, 2006). Similarly, strategy not only refers to the general direction of change, for example, expansion or modernization of existing firms, or generation of new economic units through duplication or creative innovation. It also includes the specific targets of change, both the institutions (individuals, firms or the entire system) and the type of capabilities that will change: tangible "hardware", immaterial "software" or

Table 1. An institutionalist conception of regional policy

Dimension	Sub-dimensions	Variables
Territorial governance	General	Centralized/decentralized/federal
	Policy sponsorship	Centralized/decentralized/multi-level
	Target relation	Hierarchy/network/market
Strategy	General direction of change	Expansion/duplication/modernization/creativity
	Target institutions	Individuals/firms and organizations/system
	Target capabilities	Hardware/software/orgware
Policy instruments	Resources	Authority/information/finance/organization
	Rules	Mandatory/conditional/voluntary
Knowledge impact	Knowledge types	Analytical/synthetic/symbolic
	Knowledge phases	Exploration/examination/exploitation

Note: Reworked from Halkier (2006) and Halkier and Cooke (2010).

relational "orgware" (Nauwelaers, 2001; Halkier, 2008). Policy instruments refer to the resources used to make it attractive for firms and organization to change their behaviour according to public priorities; for example, when organizational facilities are made available to private firms on the condition that they collaborate with other firms to form a cluster (Halkier, 2006). Knowledge impact refers to the purpose of knowledge activities and the nature of knowledge involved, that is, has it been produced through science-based analytical methods, through engineering-type try-and-fail synthetic methods, or through creative (re-)definition of cultural symbols and conventions (Manniche, 2010). For all these dimensions, some degree of path dependence can be expected because extensive change presupposes the establishment of new procedures for interaction and unlearning of obsolete competences by key actors, or, in other words, institutional change (Halkier, 2006; Mahoney & Thelen, 2010). Neither happens automatically, but requires some kind of effort, creative and destructive, in order to take place.

Despite this, regional policy in Europe has been transformed over the last 50 years to an extent that arguably constitutes a change of paradigm in public policies for regional economic development (Cooke & Morgan, 1993; Halkier & Danson, 1997; Östhol & Svensson, 2002; Bachtler & Yuill, 2007). Table 2 summarizes the main features of each paradigm, which are briefly elaborated upon in the following paragraphs.

The industrial paradigm in regional policy dominated in the 1960s and 1970s to such an extent that regional policy was an unambiguous phenomenon, dominated by central government programmes targeting designated problem regions with high levels of unemployment for support in order to increase inter-regional equality. This strategy aims to expand economic activity in existing and new firms by supporting investment in additional productive capacity through conditional provision of finance: subsidies could only be obtained by investing in the localities designated by national government, and the relationship between policy-implementing bodies and the actors targeted had a market-like nature. Grants were awarded according to automatic claims procedures or discretionary support for specific investment projects (Halkier, 2006, Chapter 2). In terms of direct knowledge impacts, the immediate implication of this will primarily have been an increase in the exploitation of synthetic knowledge through the geographical diffusion of existing pro-

Table 2. Key characteristics of regional policy paradigms in Europe c 1970–2010

Dimension	Sub-dimensions	Industrial paradigm	Knowledge-economy paradigm
Territorial governance	Political governance	Variable (centralized)	Variable (becoming more decentralized)
	Policy sponsorship	Centralized designation of assisted areas	Multi-level designation of assisted areas, decentral bottom-up initiatives
	Target relation	Market	Market, network
Strategy	General direction	Expansion/duplication of existing economic activities to boost volume	Modernization of existing and creation of new forms of economic activity
	Target institutions	Private firms	Private firms and regional system of, for example, innovation
	Target capabilities	Hardware through boosting of physical investment	Software and orgware improved by increasing knowledge and relations between actors
Policy instruments	Resources	Finance	Information, organization
	Rules	Conditional	Conditional, unconditional
Knowledge impact	Knowledge types	Synthetic	Analytical, synthetic, symbolic
	Knowledge phases	Exploitation	Exploitation, examination and exploration

Note: Elaborated on the basis of Cooke and Morgan (1993), Halkier and Danson (1997), Amin (1999), Lagendijk (1999), Hassink (2001), Raines (2002), Benneworth *et al.* (2003), Halkier (2006), Bachtler and Yuill (2007), Moodysson *et al.* (2008), Crevoisier and Jeannerat (2009) and Cooke and Laurentis (2010).

duction technologies and forms of economic organization through expansion of existing firms in, and relocation of branch-plants to, designated peripheral areas.

From the 1980s onwards other actors, both regional and European, came to play important roles in regional development alongside central government, and an increasing number of policy programmes, not least those emanating from the European level, involved cooperation between several tiers of government. The regional subsidy programmes of central governments were gradually reduced, and an explosive growth occurred in initiatives specific to individual regions, targeting the perceived needs of specific areas with policies attempting to strengthen competitiveness by supporting indigenous firms by means of advisory services, venture capital and technological and organizational infrastructure (Halkier & Danson, 1997). In parallel with this, the European level also emerged as a major actor in regional policy, partly replicating the industrial paradigm by instigating a separate system of designated "problem areas", but also transgressing it by creating area-based programmes and gradually embracing a wide array of policy instruments. This often involved regionally based bodies in the design and implementation of development initiatives sponsored by the EU Structural Funds, which ranged from the basic infrastructure improvement to support for science parks, inter-firm networks and creative clusters (Bachtler, 1997; Bachtler & Taylor, 1997; Benneworth *et al.*, 2003).

The rationales and characteristics of the new knowledge-economy paradigm in regional policy have been extensively described in the literature (Amin, 1999; Lagendijk, 1999; Asheim, 2001; Hassink, 2001; Raines, 2002; Moodysson *et al.*, 2008). Here, regional initiatives embedded in multi-level governance structures are the central feature of territorial governance, and this has been interpreted as part of a wider shift away from a traditional welfare regime towards a new Schumpeterian workfare state (Asheim, 1998; Peck, 2002). The strategic focus has shifted towards the modernization of existing firms and the creation of new innovative forms of economic activity, and, in order to achieve this, policies are aimed at a wide range of targets in addition to individual firms, including individuals and regional systems of innovation, and ongoing network relations between policy bodies and the actors targeted became a widespread feature. Policy instruments using information or organizational facilitation have become more frequently employed as the key mechanism through which patterns of economic behaviour are influenced. Similarly, the knowledge impacts of policies have become much more wide-ranging, increasingly encompassing also scientific and cultural forms of knowledge (Crevoisier & Jeannerat, 2009), as well as knowledge processes further removed from immediate economic exploitation (Cooke & Laurentis, 2010; Manniche, 2010).

The reasons for these wide-ranging policy changes have been discussed extensively in the existing literature (Halkier 2006, Chapter 2). Some have favoured what resembles a semi-functionalist perspective: with the demise of traditional/fordist mass-producing industrialism and the advent of (post-fordist) flexible specialization, the old redistributive policies were no longer able to address inter-regional inequalities effectively, and new bottom-up measures emerged through a process of regional learning and experimentation (Moore & Booth, 1989; Stöhr, 1989; Lundvall & Borras, 1998; Lagendijk & Cornford, 2000; Mariussen, 2001; Mytelka & Smith, 2002; Martin & Sunley, 2003; Cooke, 2004; Visser & Atzema, 2008). Others have argued that the changes were primarily driven by political concerns and governance constraints: on the one hand, the rise of neo-liberal ideology and the attempt to reduce public expenditure, and on the other hand, the compensatory rise of relatively cheap and "soft" forms of bottom-up development initiatives which made use of the policy instruments available to sub-national actors (Keating, 1988; Martin, 1989; Martin & Townroe, 1992; Hudson, 1999; Lovering, 1999). However, even the extent to which the knowledge-economy paradigm has actually materialized in new regional policy practices in regions across Europe is uncertain, because of the prominence of large numbers of single/few-region case studies (Danson *et al.*, 2005; Halkier, 2006), the proliferation of high-profile prescriptive ideal-typifications (Hudson, 1999; Lovering, 1999), and a scarcity of systematic comparative studies of spatial economic policies in regions across Europe.[1] It is, therefore, necessary to investigate to what extent the new knowledge-economy paradigm in regional policy and its associated forms of governance have actually materialized in regions across Europe, and, indeed, whether current policy prescriptions and practices need to be further refined.

In so doing, the article draws on empirical research undertaken as part of the "EURODITE" project sponsored by the EU's sixth framework programme. Firstly, a top-down approach to policy analysis was used in a selective yet comprehensive web-based survey of regional development bodies in regions in 22 EU member states in 2006/2007.[2] In each region, the most important organization at the most important meso-level was identified, and the search procedure identified 273 RDAs as potential objects of investigation. However, around one-third of these proved on closer inspection

to have only rudimentary websites or to be inaccessible to the language skills of the researchers, and eventually a total number of 181 organizations were included in the survey.[3] For each organization, a range of dimensions corresponding to the conceptual framework outlined above were recorded in a tailor-made database, including data relating to its four most prominent policies. Secondly, a bottom-up approach to policy analysis was applied to the extensive series of case studies generated by the "EURODITE" project[4] which were examined in order to identify the public policies (local, regional, national, EU) that have influenced knowledge processes at the regional and firm levels. Subsequently, key characteristics of these policies were classified according to the conceptual framework outlined above, and trends within and across sectors documented, as it was assumed (Cooke *et al.*, 2010) that knowledge dynamics, governance and policy practices to some extent vary between different areas of economic activity.

Producing Regional Governance: RDAs and Their Policies

While national and European policies for regional development have been surveyed regularly since the 1980s, regionally based initiatives have rarely been compared in a systematic manner on a European scale, with previous surveys being relatively small-scale (Yuill, 1982; Halkier & Danson, 1997) or limited by organizational affiliation (EURADA, 1995), and, by now, rather dated. This is probably due to the labour-intensive character of such an undertaking. Despite the limitations noted above, the research (Halkier, 2010) from which key findings are reported in this section is actually the most extensive systematic survey of regionally based policies for economic development hitherto undertaken. By undertaking the survey across EU member states, it is possible to identify general patterns, while still being able to keep national peculiarities in mind.

In terms of territorial governance, it might be expected that regional development bodies would primarily be sponsored by regions, but the survey shows that in fact this is the case for less than half the organizations surveyed (Table 3). Regional sponsoring is, unsurprisingly, especially common in regions with high levels of autonomy such as Germany and Spain, but multiple sponsorship characterizes more than one-third of the organizations. The vast majority of organizations surveyed have been given considerable powers with regard to strategic initiatives and implementation, and thus operate outside mainstream government departments at arm's length of their political sponsors.

With regard to regional development strategies, the survey shows that development bodies across Europe have very similar objectives; both in terms of their overall corporate goals and the aims associated with individual policy initiatives. The dominance of the EU Lisbon strategy is pronounced, with 93% of the organizations stating their overall aims in competitiveness-oriented terms while the similar figure for individual policy initiatives is 98%. Moreover, the predominance of policies aiming to bring about qualitative change in the regional economy is also noticeable with 89% of the policy initiatives surveyed involving attempts to qualitatively improve the profile of economic activity in the region by modernizing existing firms or furthering new ventures.[5] Looking at individual policies within the 181 development bodies in more detail, Table 4 charts the changes in capabilities sought in relation to different types of targets, that is, who or what is going to change in which way in order for the policy measure to achieve its aims. It is immediately obvious that organizations—most often private firms—remain by far the most important institutional target of regional policy in European regions, and also that the capacity most

Table 3. Territorial governance of RDAs in Europe. Relative importance of combinations of policy sponsorship, political governance/sponsorship relation (percent of grand total)

	Political governance				Sponsorship relation			
Policy sponsorship	Centralized	Decentralized	Federalized	Total	Departmental	Arm's length	Arm's length/ plural	Total
Regional	2	24	13	40	11	24	4	39
Central	12	7	0	19	4	16	0	21
Local	3	3	0	6	0	0	5	5
Multi	8	28	1	36	1	5	29	35
Total	24	62	14	100	16	46	38	100

Source: Calculated on the basis of the 2007 RDA survey database ($N = 181/165$) as reported in Halkier (2010).

Table 4. Policy targets of European RDAs. Relative importance of combinations of target capabilities and target institutions (percent of grand total)

	Target institutions			
Target capabilities	Individuals	Organization	System	Total
Hardware	3	23	7	33
Software	11	31	4	45
Orgware	1	15	5	21
Total	16	68	16	100

Source: Calculated on the basis of the 2007 RDA survey database ($N = 692$) as reported in Halkier (2010).

often targeted relates to software. It is, however also noticeable that both training of individual persons and various system-level measures (infrastructure, cluster formation) are also significant, and, indeed, that more than one-fifth of the measures targeting firms attempt to improve their orgware, for example, by encouraging them to participate in networks with other firms or knowledge institutions.

The policy instruments used to bring about change combine resources and rules, and as illustrated in Table 5, many of the basic policy instruments—those relying on authority as their primary resource or prescribing mandatory use of other resources—are not in evidence. Given the fact that most RDAs are situated at arm's length from mainstream government structures, this is probably unsurprising. It is more interesting to note that the direct transfer of financial resources plays a relatively limited role, although of course the unconditional availability of informational or organizational resources entails an implicit financial subsidy. Instead, the most frequent policy instruments of regional development bodies in Europe now rely on organizational and especially informational resources. Furthermore, it is common for individual policies to combine different policy rules by making some resources available unconditionally, while other resources are only available if firms meet certain conditions, for example, sign up to participate in more extensive interactions with the development body or undertake to invest some of their own resources in particular ways.[6] Taken together, this would seem to suggest that

Table 5. Policy instruments of European RDAs. Relative importance of combinations of policy rules and policy resources (percent of grand total)

	Policy rules			
Policy resources	Mandatory	Conditional	Unconditional	Total
Authority	0	0	0	0
Finance	0	4	1	5
Information	0	37	31	68
Organization	0	15	12	27
Total	0	56	44	100

Source: Calculated on the basis of the 2007 RDA survey database ($N = 692$) as reported in Halkier (2010).

the relationship between the RDAs and the targets of their policies is not just based on one-off market-style resource exchanges (like provision of e.g. standardized advice for would-be entrepreneurs) but also include more on-going network-type relations; for example, in the form of continuous support for cluster organizations.

In other words, the vast majority of the most prominent policies of the organizations surveyed either attempt to influence the software or orgware capacities of their targets, or employ informational or organizational resources in order to bring about changes within the regional economy. Interestingly, this is the case in regions across Europe and not just a tendency associated with particularly well-off localities or powerful organizations. Furthermore, the data analysis demonstrates that the policies surveyed focus almost exclusively (more than 99%) on knowledge exploitation, that is, using existing knowledge for economic purposes, although it should be recalled that this refers to the most highly profiled RDA activities and thus less prominent policies may still impact on less immediately useful forms of knowledge production. Most policy measures (nearly 80%) are directed towards immediately affecting synthetic knowledge, reflecting a focus on manufacturing and business skills, but it is also noticeable that symbolic knowledge plays an important role in connection with communication-oriented policies such as the attraction of inward investment and advice on markets and marketing.[7]

All in all, an important finding of the survey is the fact that multi-level governance of bottom-up policies for regional development has now become widespread. Most individual development bodies and/or their activities are sponsored by several tiers of government rather than simply by the region itself, and this has reinforced their general position as semi-autonomous entities outside mainstream government. Taken together, this implies that a new generation of regionally based development bodies, networked RDAs, has become a prominent feature in regional policy in Europe. In terms of strategies, the stated objectives of regional development are now firmly dominated by Lisbon-style competitiveness-oriented discourse, and while private firms remain the most common targets, the targeting of individuals (e.g. through training measures) has grown in importance, along with the change in software and orgware. Policy measures for regional development have themselves acquired a noticeable network dimension, with a focus on stimulating inter–firm relations, relations between firms and public knowledge institutions, and, indeed, between RDAs and their clients. The vast majority of policies are of a knowledge-intensive character, requiring detailed knowledge of particular firms and areas of

economic activity, and hence in terms of "policy production", the current generation of RDAs in Europe can be seen as an attempt to institute a new form of governance of public regional development activities, well removed from the industrial paradigm with its centralized attempts to redistribute economic activity by reshaping the market for productive investment through grant-aid in designated problem areas.

Consuming Public Policy: Innovation and Economic Governance

While data about the output of policies for regional development can be readily accessed through the, after all relatively few, and public, implementing bodies, gauging the use made of these policies by economic actors is more demanding because the beneficiaries are numerous and mostly private organizations. However, as part of the "EURODITE" project, an extensive series of case studies of innovative knowledge dynamics in firms and regions have been undertaken. On the basis of these, it has been possible to identify "policies that matter" in the sense that they are reported to have made a difference to economic development projects (Butzin *et al.*, 2007; Crevoisier *et al.*, 2007). These policies (local, regional, national, EU) display a high degree of diversity both with regard to scope (many/few firms covered, scale of funding) and the intensity of interaction between policy-makers and the targets of the initiatives. However, from the perspective of the firm or organization, the most important thing is how it is being affected by a particular policy regardless of the policy's origins and history. In order to capture a more detailed picture of the consumption of economic governance in the case studies, the policies identified as influential have been analysed on the basis of the conceptual framework along sectoral lines, because it is well-established that knowledge dynamics differ to a considerable extent between various areas of economic activity, as, of course, do configurations of public policy, which have often operated along sectoral lines (Cooke *et al.*, 2010). The analysis of the impact of public policies on knowledge dynamics in the case studies was undertaken by a cross-European team of researchers[8] who identified and assessed the characteristics of a total of 148 policies. In order to take into account the uncertainties involved in classifying policies on the basis of descriptions by other research teams, the percentage shares have been transformed into four broad categories (absent, present, common and very common) represented graphically by an increasing number of "tennis balls".[9]

In terms of territorial governance most of the policies making a difference to knowledge dynamics emanate from the regional/local level, but both national and European policies also play important roles, as can be seen from Table 6. It is, however, also noticeable that case studies from some sectors display different characteristics, with biotech and new media having a relatively even spread between supra-, sub- and national-level policies, and regional/local intervention being absent in ICT, perhaps as a result of the relatively small number of case studies in this sector. Taken together, the analysis of the case studies not only illustrates the importance of multi-level policy governance but also that each of the sectors tends to be associated with different patterns of policy governance. With regard to the relationship between policy-makers and targets, the overall picture is one where hierarchical command relations, short-term market-like exchanges, and long-term network-style interactions are important, as can be seen from Table 6. It is, however, also evident that patterns differ among the seven sectors of economic activity: hierarchical relations are particularly important in automotive but play a more limited

Table 6. Sponsorship of policies and target relations by case study sector. Relative importance (percent of total)

	Sponsorship of policies			Target relations		
	EU	National	Regional/local	Hierarchy	Network	Market
Auto	●●	●●	●●●	●●●	●●	●
Bio	●●	●●	●●	●●	●●	●
Food	●	●	●●●	●●	●●●	●
ICT	●●	●●●		●	●●●	●●
KIBS	●	●●	●●●	●●	●●●	●●
New media	●●	●●	●●	●	●●	●●●
Tourism	●	●●	●●●	●	●●	●●●
All cases	●	●●	●●●	●●	●●	●●

Source: Halkier *et al.* (2010, Table 4.5).
Note: See endnote 9 for details on significance of bullets.

role in new media, tourism and ICT. Ongoing network relations are common in all seven sectors, while market relations are relatively rare in automotive, but widespread in tourism and new media. Taken together, this underlines the continued importance of more traditional forms of public intervention—hierarchical regulation and market-like exchanges—that also need to be taken into consideration as part of the overall governance of economic development activities.

The strategic orientation of policies influencing knowledge dynamics in the case studies can be broken down according to their implications with regard to continuity and change in organizations and products/services, resulting in four basic strategic orientations of public policy: expansion, duplication, modernization and creativity. As shown in Table 7, all four strategic orientations are present to some extent in all sectors for which data are available, although overall a focus on qualitative change in products or processes clearly dominates. The latter is especially noticeable in traditional industries undergoing rapid change, like food and drink, and tourism, while the emphasis on strengthening existing types of activities is most pronounced in established high-tech industries such as ICT, knowledge intensive business services (KIBS) and automotive.

Looking at policy strategies in more detail, Table 8 charts the changes in capabilities sought in relation to the different types of institutions and capabilities targeted. In terms

Table 7. General strategic orientation of policies by case study sector. Relative importance (percent of total, no data available for biotech)

	Expansion	Duplication	Modernization	Creativity
Auto	●●	●●	●●	●●
Food	●		●●●	●●●
ICT	●●●	●●	●●	●
KIBS	●●●	●	●●●	●
New media	●	●	●●●	●●●
Tourism	●	●	●●●	●●
All cases	●	●	●●●	●●

Source: Halkier *et al.* (2010, Table 4.2).
Note: See endnote 9 for details on significance of bullets.

Table 8. Policy targets by case study sector. Relative importance (percent of total)

	Target institutions			Target capabilities		
	Individual	Firm/org.	System	Hardware	Software	Orgware
Auto	•	••	•••	•	•••	••
Bio	•	•••	••	••	•	•••
Food	•	•••	••	••	•••	••
ICT	••	••	•••	•••	•	••
KIBS	•	•••	••	•	•••	••
New media	•	••	•••	•••	••	••
Tourism	••	•••	••	••	••	••
All cases	•	•••	•••	••	••	••

Source: Halkier *et al.* (2010, Table 4.3).
Note: See endnote 9 for details on significance of bullets.

of institutional targets, it is immediately clear that measures aiming to influence individuals within the workforce are relatively less common, although more frequent in sectors such as ICT and tourism. In contrast to this, the overall distribution of target capabilities—hardware, software and orgware—is relatively even, but this is actually the result of different patterns in the individual sectors. Change in hardware (often infrastructure) is particularly widespread in new media and ICT, software is particularly associated with automotive, food and drink, and KIBS, while orgware change is common throughout the seven sectors, albeit particularly pronounced in biotech.

In order to make actors behave in ways conducive to public goals, policy instruments make different types of resources available on more or less stringent conditions, and Table 9 charts the policy instruments employed in the case studies. In terms of policy rules, it is clear that mandatory measures play a limited role except in areas like ICT and automotive, where security or safety considerations are important. Safety considerations are of course also paramount in the food and beverages sector, but here mandatory measures are crowded out by the large number of other policies because of the selection of

Table 9. Policy instruments by case study sector. Relative importance (percent of total)

	Policy rules			Policy resources			
	Mandatory	Conditional	Voluntary	Authority	Information	Finance	Organization
Auto	••	•••	••	•••	•	••	•••
Bio	•	••	•••	•	••		•••
Food		•••	•	•	••	••	••
ICT	•	•••	•	•••	•••	•	••
KIBS	•	•••	••	•	•••	•	•••
New media		•••	••		••	•••	•••
Tourism	•	•••	••	•	•••	•	•••
All cases	•	•••	••	•	••	••	•••

Source: Halkier *et al.* (2010, Table 4.4).
Note: See endnote 9 for details on significance of bullets.

innovation-oriented cases. In contrast, conditional *quid pro quo* measures account for more than half of all the policies identified as influencing territorial knowledge dynamics and firm-level knowledge dynamics (except in biotech and automotive). In terms of policy resources, authority is used much less than the other three resources, except in ICT and automotive where "voluntary" industry standards also play a role in some cases. Information is generally an important policy resource, although less so in automotive. The use of financial means is highly uneven, playing a rather limited role in biotech, KIBS, ICT and tourism, but a central role in the new media case studies, possibly because activities associated with culture and education have traditionally been financially supported by the public sector across Europe. However, the most common policy resource has been the organizational support, and thus the case studies confirm the general importance associated with "soft" networking infrastructure.

The estimated impacts of the policies on knowledge dynamics in the case studies are summarized in Table 10. The underlying data show that almost half of the policies analysed impacted on the direct economic exploitation of knowledge, that is, the use of knowledge for economic purposes. The most extreme sectors in this respect are on the one hand tourism with a near-exclusive focus on exploitation, and on the other hand biotech with a very low share, possibly due to the focus of case studies with very R&D-oriented firms. Examination of the potential usefulness of knowledge is less evenly distributed, with biotech, food and KIBS case studies being particularly prominent and tourism weakly represented. Finally, knowledge exploration with no immediate economic goal also turns out to have widespread importance, with the exploitation-oriented tourism cases again being the main exception. Also with regard to the types of knowledge influenced by public policy, differences between the cases from the seven sectors are noticeable and in line with what might be expected (Cooke *et al.*, 2010): unsurprisingly, analytical natural-science-based knowledge is important in biotech and ICT, synthetic engineering-type knowledge dominates in the automotive cases, and culturally based symbolic knowledge particularly affected by policies in cases related to KIBS and tourism. Moreover, further analysis has underlined the importance of combinatorial knowledge in innovative economic projects (Strambach, 2010; Manniche, 2012; Cooke, 2012), thereby stressing the importance of public policies being equally comprehensive in

Table 10. Policy impact on knowledge types and moments by case study sector. Relative importance (percent of total)

	Knowledge phases			Knowledge types		
	Exploration	Examination	Exploitation	Analytical	Synthetic	Symbolic
Auto	••	•	•••	•	•••	•
Bio	••	•••	•	•••	••	•
Food	•	•••	••	••	•••	•
ICT	••	••	•••	•••	•	••
KIBS	•	•••	••		••	•••
New media	••	•	•••	••	••	••
Tourism		•	•••		•••	•••
All cases	•	••	•••	•	•••	••

Source: Halkier *et al.* (2010, Table 4.6).
Note: See endnote 9 for details on significance of bullets.

terms of the ways in which they attempt to influence knowledge processes in firms and regions.

The public policies influencing the knowledge dynamics in the case studies display great variety, but also some common features worth noting. Firstly, it is clear that the individual cases have been influenced by policies sponsored by a wide variety of public actors, albeit with a strong local/regional component. Secondly, the strategic focus of public policy is generally on promoting innovation in products or processes (partly due to the focus on innovative projects in the case-study selection) and attempting to bring about change in a wide range of targets among which general framework conditions and inter-organizational relations are prominent. Thirdly, this is pursued by means of a diverse range of increasingly knowledge-intensive policy instruments that would seem to reflect the specific conditions in individual sectors and cases, often resulting in ongoing network relations between public bodies and economic actors, and stimulating a variety of different knowledge processes in order to achieve their development objectives.

Discussion and Conclusions

This final section draws together the findings regarding provision and take-up of economic development policies in European regions and discusses them in the light of the alleged shift from an industrial to a knowledge-economy paradigm in regional policy, with particular focus on governance challenges in the light of institutional path dependencies.

In terms of the institutional settings for policies, multi-level governance has become widespread: RDAs are frequently sponsored by a plurality of public actors from more than one tier of government, and innovative economic developments are affected by policies emanating from a wide range of sources. This highlights the importance of policy coordination between public actors, whether in the form of joint sponsorship or ongoing network relations. While the strategy statements produced by European RDAs have become almost exclusively oriented towards regional competitiveness in line with the EU Lisbon strategy, their translation into RDA activities still results in a wide range of targets for public policy. Although the most common ambition is to bring about change in the knowledge of private firms, both hardware and orgware, and individuals and systems, are also frequently targeted. It is, however, interesting to note that the policies identified as influential in the case studies are much more likely to focus on bringing about systemic change in the framework conditions for economic activity. While this difference is probably partly the result of a division of labour between RDAs and other policy actors, it also underlines the importance of taking a holistic view of the preconditions of economic change and ensuring coordination between public policies, not just across different tiers of government, but also within individual regions. It is increasingly difficult for one public agency to pretend to have all the answers to the regional development challenges faced by a particular region.

The policy instruments employed by RDAs to bring about change confirm, unsurprisingly, the primary role of these organizations as facilitator of the activities of individual firms, but the analysis of case studies further underlined the importance of organizational forms of support for innovative projects through the provision of, for example, infrastructure or platforms for networking, albeit in conjunction with access to other resources. In terms of knowledge impacts, the most prominent RDA policies tended to

focus almost exclusively on the exploitation of synthetic and symbolic knowledge, while the case studies showed that a much wider range of knowledge impacts have been of importance for innovative economic processes. This would also seem to reflect existing divisions of policy labour at the sub-national level, and again underlines the necessity of creating synergies through coordination of the activities of different policy actors. However, it also indicates the continued importance of enrolling knowledge-creating actors outside the traditional economic development policy network (e.g. from research and education establishments) in these efforts rather than focusing exclusively on knowledge activities that can be readily commercialized.

Returning to the two regional policy paradigms outlined in Table 2, a shift towards the knowledge-economy paradigm is clearly well under way. The strategic orientation and specific targets of policies focus on qualitative change in firms and the structure of the regional economy, and targets of change have become increasingly systematic and rely on building knowledge within networks of key actors. The policy instruments bringing about change are no longer primarily financial, but employ a much wider range of tailor-made informational and organizational resources. In addition, the knowledge impact of public policies has moved beyond the application of existing technology, which was central to the industrial policy paradigm based on the relocation of economic activity. Now other forms of knowledge, also of less immediate economic use, have become increasingly important, although this is more visible in the bottom-up analysis of policies influencing innovative economic activities than in the top-down survey covering the most prominent policies of RDAs across Europe. Last but not least, the territorial governance of regional development bodies and policies has become multi-level, as have the policies impacting on innovative economic activities. At the same time, the relationship between policy-makers and economic actors has intensified in the sense that ongoing network relations now play an important role.

While these changes could be argued to constitute a move towards a new paradigm in the policies and governance of economic development in regions across Europe, in line with new knowledge dynamics, it also entails new challenges for both public and private actors because of the institutional path dependency created by previous forms of regional and other public policies.

Firstly, the more complex multi-level set-up which has become an integral part of regional policy requires increased efforts of coordination (cf. Dahlström & James, 2012), not only within the public policy networks engaged in economic development activities but also in relation to, for example, knowledge institutions involved in research and competence development. This requires the overcoming of traditional functional segmentation of public policy—for example, that university involvement in development activities is actively facilitated alongside their traditional tasks of research and teaching. Moreover, coordination is required between actors with unequal command of authority and other policy resources, and especially for regions which do not, for economic or other reasons, have a strong bargaining position vis-à-vis central government, this will require creative adaptation to circumstances outside their immediate area of influence—and thus both the (external) possibilities and (internal) capabilities for exercising such creativity will be crucial for efforts to tailor-make public policies for economic development to the specific needs of individual localities. The problem here is, in other words, path dependency entailed in the territorial and functional specialization within the public sector (cf. e.g. Pihkala *et al.*, 2007) that creates a set-up in which procedures and

competences are geared towards solving particular core tasks rather than collaborating for a greater public good.

Secondly, the shift towards knowledge-intensive policies potentially makes it more difficult to retain political backing the new activities that often involve uncertain gains at some unspecifiable point in the future, but few tangible benefits for the wider regional community in the short term. Moreover, it also greatly increases the need for policy-making organizations to have access to an ever-widening array of knowledge about the region, its firms and its wider context, either in-house through employment of knowledgeable staff or through private consultants or public knowledge institutions. Again, extensive investments in policy preparation and monitoring that are essential from a long-term perspective but produce little immediate political credit. The problem here, in other words, is the political path dependency of regional policy, namely the expectation of fast and tangible results that can be traced back to the previous policy paradigm where the typical result of public intervention was the attraction of a new factory unit that provided employment and positive media exposure for policy-making bodies and their political sponsors.

Thirdly, the changing quality of knowledge central to economic development represents a challenge in its own right. When new knowledge dynamics imply that the role of combinatorial knowledge is growing, innovation processes involve the bringing together and connection of different knowledge bases of a variety of actors, who are often located in different technological, sectoral and regional contexts. This complicates policy-making because it involves recognizing the importance of forms of knowledge (e.g. symbolic/cultural) that have not traditionally been seen as central to the emerging knowledge economy. It also involves moving beyond the traditional triple helix to include demand and cultural trends in civil society in the innovation process, which has become known as the "quadruple helix". This, in turn, increases the importance of institutions that are able to integrate different forms of knowledge through brokering measures, creatively combine different types of learning processes within and around firms (cf. Cooke, 2012), draw on the resources from different sectors, and have the ability to reach outside the geographical area for which policies are being designed. The problem, in other words, is the path dependency entailed in the competences and processes within policy-making bodies where the traditional emphasis on business- and engineering-type knowledge needs to be supplemented by other competences.

Taken together, these three challenges highlight the importance of addressing path dependency in regional development policy: if multi-level governance is operating in inflexible and segmented ways, if limited resources are devoted to making policies more knowledgeable, and if short-term inward looking concerns dominate the political agenda, then the extent to which the new paradigm of policies and governance will make much of a difference is debatable. In other words, while a paradigm shift in regional policy is clearly under way, there is still some way to go before a new governance paradigm has been firmly established.

Notes

1. At the national and European levels, systematic surveys have been undertaken as part of policy monitoring such as the work undertaken by the European Policies Research Centre at Strathclyde University by Douglas Yuill, John Bachtler and colleagues.

2. EU 27 except the two most recent members (Bulgaria and Romania) and the three micro-states (Luxembourg, Malta and Cyprus).
3. For a full list of the organizations, see Halkier (2010).
4. For more details on the case study methodology used, see Halkier *et al*. (2010, pp. 6–8).
5. Calculated on the basis of the 2007 RDA survey database ($N = 181$ for organizations, 670 for policies) as reported in Halkier (2010).
6. Calculated on the basis of the 2007 RDA survey database ($N = 181$ for organizations, 670 for policies) as reported in Halkier (2010).
7. Calculated on the basis of the 2007 RDA survey database ($N = 670$ for policies) as reported in Halkier (2010).
8. Thanks are due to Rudolf Pastor, Stewart MacNeill, Andrea Stocchetti, Lise Smed Olsen, Margareta Dahlström, Karina Madsen Smed, Jesper Manniche and Robert Kaiser who undertook the analyses of policy impacts in across the sectors covered by the "EURODITE" case studies.
9. The transformation of percentage shares into tennis balls depends on the number of dimensions, which is either 3 or 4. In both cases, occurrence in less than 5% of the case studies was translated into "absent", "present" required 5–24% or 5–19%, respectively, "common" 25–40% or 20–30%, respectively, and very common more than 40% or 30%. In all tables, the "all cases" category refers to analysis across all cases regardless of sector (rather than the mean of the relative scores for the seven sectors).

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