From regional innovation systems to regions as innovation policy spaces

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From regional innovation systems to regions as innovation policy spaces[i]

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Abstract

The regional systems of innovation concept is well established in academic and practitioner discourses about innovation and economic development. As with the innovation systems approach more generally, the use of the concept has expanded significantly from its initial analytical purpose and has been extensively used to inform policy making. The paper identifies a number of dangers associated with the use of RIS as a normative concept and proposes that a better understanding of the roles regions play as policy and implementation spaces may lead to a more careful and nuanced application of the concept in the future.

1. Introduction

Regions are increasingly a key focus of analytical and policy interest in the study of innovation. In particular the notion of 'regional innovation systems' (RIS) has come to prominence both as a conceptual and analytical tool and as component of regional policy discourse[1]. However a number of scholars have identified ambiguities and unresolved questions associated with the concept (see e.g. Howells, 1999; Doloreux, 2002; Doloreux and Parto, 2005; Iammarino, 2005; Uyarra, 2009)[2]. Over time empirical descriptive studies of specific 'systems' have grown to include an ever wider variety of regional cases, whilst at the same time the apparent normative implications of the concept have been increasingly interpreted as widely applicable, perhaps even to all regions. Despite an increasingly complex multi-level and multi-actor policy landscape, *the* approach has encouraged the view that regional-level policies and strategies can not only enhance a region's innovation system but also that sufficient and appropriate levers are available at the regional level.

We believe that a cautionary note is in order to unpack and question certain normative assumptions, particularly in relation to the scope regions possess to influence innovation in their territories. In this paper our aim is not to propose new developments, but rather to elaborate on the perils associated with the conversion of a fuzzy concept into a normative tool and a tool for policy prescription, particularly when applied to different regional contexts. Nor do we wish to argue that the concept has no utility in policy terms. We will however argue that a clearer understanding of the scope and limitations of the concept must provide the starting point for further theoretical or prescriptive developments. We propose a view of the region as a 'space' or series of spaces impacted upon by multiple policies. We use the example of the Northwest region of England[3] to remind ourselves of

[1] As evidenced for instance by the large number of regions participating in the European Commission-funded RIS/RITTS programme and similar initiatives.

[2] It is important to note that 'systems of innovation' approaches do not comprise a formal body of theory in the sense of providing clear propositions regarding causal relations among variables, but rather a conceptual framework (Edquist, 2005). Scholars disagree as to whether the term is 'undertheorised' and should be made more rigorous, or whether it should remain an inductive concept and not be 'overtheorised' (Edquist, 2005).

[3] The Northwest of England is a suitable example of multi-level interactions, as its policy evolution is the product of topdown excellence-driven national science policy and a resulting bottom-up sub-national mobilization to use science and technology as drivers for regional growth (Perry, 2007).

the interplay between multi-level policies and regional places and to highlight the potential conflicts and interactions between policy rationales, objectives, and impacts.

The paper deals, first, with definitional and analytical considerations of RIS. Section 3 and 4 describe recent developments that have seen the concept extended to the analysis of a variety of regional contexts, and the conclusions increasingly used to shape regional policy agendas. Section 4 then elaborates on certain problems that arise from the use of the term as a normative concept. Section 5 tries to shed light into the role regions play as policy and implementation spaces. This latter point is explored in the final section of the paper with an illustration of the NW region of England.

2. Definitional and analytical considerations

There is no simple, universally accepted, definition of RIS. According to Asheim and Gertler (2005: 299) "the regional innovation system can be thought of as the institutional infrastructure supporting innovation within the production structure of a region". In a similar vein Cooke and Schienstock (2000; p.273-274) define a regional innovation system as a "geographically defined, administratively supported arrangement of innovative networks and institutions that interact regularly and strongly to enhance the innovative outputs of firms in the region". Differently put, a RIS is thought to comprise a *regional* production structure (the 'knowledge exploitation subsystem') and a *regional* support infrastructure (the 'knowledge generation subsystem') (Cooke, 2001).

The approach has a number of foundations. The interest in regional innovation systems coincides with and draws upon a wave of interest in the relationship between proximity and innovation and in the role of local specific capabilities in shaping the rate and direction of innovation processes. It is argued that "the greater the complexity, uncertainty and tacitness of an activity, the more it will require physical as opposed to virtual proximity to be transacted" (Pellegrin, 2007). In this view proximity matters for the effective transmission of tacit knowledge (Maskell and Malmberg, 1999; Gertler, 2003). Furthermore, 'new regionalist' approaches (Lovering, 1999) or territorial innovation models' (Moulaert and Sekia, 1999) stress the political, economic, institutional and social basis of regional development, in particular the importance of "untraded interdependencies", i.e. non-economic relations based on trust, social capital, and shared norms and values (Morgan, 1997; Storper, 1997), and the institutional capacity or 'thickness' (Amin and Thrift, 1995) supporting and embedding the economic life of firms and markets.

RIS approaches are also closely connected to a more general literature on systems of innovation (Lundvall, 1992; Nelson, 1993; Freeman, 1995; Edquist, 1997), which is in turn rooted in evolutionary and institutional economics[4] (Edquist 1997; Cooke et al., 1997). National systems of innovation (NIS) approaches view innovation as systemic and dynamic, emerging from interactive learning processes among firms and other organisations (such as universities, business support, research centres etc). RIS approaches see regions, rather than nations, as a (and perhaps the most) meaningful unit

[4] Although some authors suggest that the evolutionary element of RIS could be made more explicit, particularly when formulating policy advice (Iammarino, 2005; Uyarra, 2009; Lambooy and Boschma, 2001).

of economic interest, particularly when they exhibit distinctive administrative structures to support innovation; in the words of Cooke et al, some of the "basic characteristics which distinguish a state can sometimes be distinctive in certain regions" (1997; p.479). Howells (1999) considers that a focus on regional systems rather than on national systems is justified in the cases of significant regional governance of innovation, significant regional industry specialisation patters, and/ or strong core/periphery patterns.

Perhaps because of this mix of theoretical influences the RIS approach is characterized by a certain conceptual ambiguity (Uyarra, 2009), particularly in relation to the identification of key system components, the causal relationships between them, the spatial attributes of systems, and the measurement of system performance (Doloreux and Parto, 2005; Carlsson et al, 2002). Even the key definitional terms region, innovation system, and institutions (Cooke et al, 1997) remain ambiguous (Doloreux and Parto). The literature also struggles to reconcile the bottom-up and top-down aspects of localised innovation and learning processes and supportive institutional and governance structures (Howells, 1999, 2005; Iammarino, 2005; Uyarra, 2009). We will deal with some of these issues briefly in turn.

First of all we turn to the lack of consistency in accounts of the key components of systems, and in relation to the definition of institutions (Parto, 2005). As Edquist (1997) notes, no systems of innovation scholar has been able to provide a clear guide to what exactly ought to be included in the analysis of a system of innovation. Some system descriptions may exclude highly relevant actors and functions (or roles) whilst other approaches can include elements of doubtful relevance or explanatory power. The tendency is to focus on a static landscape of actors and institutions, with discussions about their emergence, evolution, restructuring or even disappearance largely absent, and we are often presented with inventory-like descriptions of regional systems (Nauwelaers and Reid, 1995) - despite the acknowledgement that institutional settings are largely historically determined and country specific. There is a tendency to focus rather more on the quantity of intra-regional actors and institutions than on their functions, roles, relationships and performance - that is on the characteristics that make the system a 'system'. In innovation studies more generally actors and roles are often conflated but to ensure meaningful comparative studies and real policy learning, it is important to acknowledge that different kinds of actor may play similar roles (for instance as the targets of similar policy instruments) in different national or regional systems (Flanagan et al, 2008), and that the roles actors play may change over time (and thus that similar functions may be performed by different types of actor at different times and places).

Other critics detect a productivist bias in some accounts that seeks to reduce the economic performance of a regional system to the competitiveness of firms in the regions (Lovering, 2001; Oinas, 2002; Lawton-Smith et al, 2003; Bristow, 2005). Bristow (2005) raises the problematic causal relationship between regional firm productivity and regional prosperity. First, productivity is contingent upon the stock of industries in the region, namely the industrial structure of the region and the particular 'spatial division of labour' (Fotherhill, 2005). Second, it may well be that income growth that attracts investment of productive firms thus propelling productivity, rather than the other way around.

Defining and explicating 'the region' as a meaningful unit of analysis remains contentious (Keating, 1998). RIS provides a very nebulous definition of regions: it is not clear whether cities, metropolitan areas, local areas, NUTS 2 regions, etc. are (or could be) the key territorial units (Doloreux, 2002). Cooke et al (1997:480) define regions as "territories smaller than their state possessing significant supralocal governance capacity and cohesiveness, differentiating them from the state and other regions". Against this view characterized by clear regional delimitation and boundaries, regionalised patterns of interaction, internal uniformity and cultural or social proximity (Uyarra, 2007), some authors note the danger that intra-regional regional divisions and tensions and extra-regional knowledge sharing networks may be underestimated or overlooked completely (Bunnell and Coe, 2001; Mckinnon et al, 2002, Oinas, 2002; Bathelt et al, 2004; Moodysson, 2008). The significance of factors endogenous to the region may thus be overstated although the actual relative importance of regionally embedded systemic interrelations vis-à-vis globally distributed knowledge networks is likely to be contingent upon various factors, including the industrial structure of the region (Breschi and Malerba, 1997), the dominant knowledge basis (Asheim and Gertler, 2005), the balance of globally-and locally—oriented firms and the extent to which we can consider the region as a internally cohesive, homogenous economic space (Bristow, 2005:293). Other types of proximity (organisational, cognitive, social and institutional) may also be at play and can act at least as partial substitutes for geographical co-location (Amin and Cohendet, 1999; Boschma, 2005).

Responding to such critiques Cooke (2005) advocates a relational rather than a containerised use of the term 'regional', painting the region as 'a nexus of processes' (Cooke and Morgan, 1998). Hassink (2005) further argues that the use of the terms 'local' or 'regional' systems should not mean that the actors and networks of the system are dominantly local, but rather that frames of reference and action for system institutionalisation and development are defined in local terms.

Finally, whilst attention is generally paid to the spatial-relational aspects of knowledge sharing networks for innovation, issues surrounding the structure and performance of these networks tend to be neglected (Oerlemans et al, 2007; Frenken et al, 2007). The idea of related variety has been employed recently to emphasise the need for these networks to exploit complementarities of regional knowledge bases and competences (Asheim et al, 2007).

3. RIS: A fuzzy concept?

Markusen (2003) defines a fuzzy concept as "one which posits an entity, phenomenon or process which possesses two or more alternative meanings and thus cannot be reliably identified or applied by different readers or scholars". (p.702). Problems of conceptual validation aside, the extended use of fuzzy concepts are associated in Markusen's view with negative effects such as a neglect of agency and causality, and a focus on processes and flows rather than on structure and performance. RIS can be seen as a fuzzy concept

in as much as multiple interpretations of RIS coexist. According to Doloreux and Parto (2005), the literature remains unable to address the fundamental question of how one 'knows' a regional innovation system when one sees one. There is therefore little consensus as to how to define RIS and more importantly, whether the concept is applicable to all cases or only to a restricted number of regions. This latter debate echoes a similar one in the NIS literature. Interrogating the literature Sharif (2006) is confronted with various interpretations: according to some accounts, every country has its innovation system, whether effective or not, whether embryonic or well developed, whilst other accounts are more cautious in applying the concept, for instance, to developing countries.

Similarly, early case study analyses of RIS focused on exemplar or 'ideal' cases, regions with well-developed regionally based R&D institutions, vocational training organizations and other local bodies involved in firms innovation processes (Asheim and Gertler, 2005) whilst other regions were held not to exhibit the characteristics of a 'system' (Riba and Leydesdorff, 2001; Sanz et al, 2001). Cooke (2001) suggested that the existence of a RIS is a special case, a rare event. Evangelista et al (2002), in their study of Italian regions based on CIS data, similarly concluded that it is very rare to find the necessary ingredients to identify a regional system of innovation. The European commission funded REGIS project (Cooke et al, 2000) identified only four regions out of 11—Wales, Baden-Württemberg, Basque country and Styria—that could fit the characteristics of RIS. A strict reading of the literature would even suggest that the only three regions that could be considered true regional innovation systems are Silicon Valley, Emilia-Romagna, and Baden-Württemberg (Doloreux and Parto, 2005).

More recent literature tends to suggest that all regions have some kind of innovation system, even though these may differ markedly in their characteristics and performance (Bunnell and Coe, 2001), for instance between leading regions, peripheral regions, old industrial areas, etc[5]. (Asheim and Isaksen, 2002; Doloreux, 2002, Tödtling and Trippl, 2005). This has led to the development of new labels and typologies in an attempt to reflect e.g. different stages or 'problems' in regional economic development (Tödtling and Trippl, 2005), different modes of regional governance (Brazyck et al, 1998) and different types of 'institutional set-up' (Asheim and Isaksen, 2002). The latter authors distinguish between territorially embedded regional innovation systems - such as Italy's Emilia-Romagna, regionally networked innovation systems - typical of regions in Germany, Austria and the Nordic countries (Asheim and Gertler, 2005) and regionalized national innovation systems - characteristic of certain clusters of R&D laboratories and large firms and/or research labs. Cooke (1998) proposes a similar typology of 'grassroots' RIS, 'network' RIS, and 'dirigiste' RIS. Recent work on the influence of institutional frameworks in high-tech sectors such as biotechnology has led Cooke (2003) to introduce a further differentiation between the traditionally conceived RIS, or 'institutional' RIS (IRIS), and 'entrepreneurial innovation systems' (EIS). These developments suggest the emergence of a more inclusive, and indeed still-expanding understanding of what constitutes a regional innovation system.

[5] A comprehensive discussion of comparative regional innovation system studies and their associated methodologies is beyond the scope of the present paper (see e.g. Navarro, 2007; Doloreux, 2002).

4. RIS as a normative/prescriptive concept

How can this conceptual ambiguity be reconciled with the extent to which the concept has penetrated policy action? We are not the first to try to understand why a discourse which is so fuzzy has become so influential in regional economic policy discourse (see e.g. Miettinen, 2002). Markusen (1999:873) argues that "fuzzy concepts are more tolerable the less we expect them to guide action" and suggests that one impact of fuzziness is a 'distance' from policy relevance. Certainly if the ideas used to inform policies are not clear then it follows that the policy implications derived from them may also lack clarity. The RIS literature is informed by multiple conceptual approaches falling under different methodological paradigms, using different levels and units of analysis, and focusing on different explanatory factors (Uyarra, 2009). As a result, there is not a clear normative rationale emanating from the literature but rather a mix of possible rationales (Doloreux, 2002). As De Bruijn and Lagendijk (2005; p.1155) point out "there appear to be as many, explicit or implicit, 'ideal models' of RISs as there are policy applications".

The paradox between Markusen's claim that fuzzy concepts remain distant from policy and the influence RIS concepts have had on policy discourses and initiatives (Power and Malmberg, 2008) is perhaps a false one. Majone (1989) suggests that policy makers use theory in a selective way to justify policy action and indeed policy choices are influenced by norms, beliefs, goals and pressures that differ from those in the an academic community. We have argued elsewhere that scholarly theories are seldom adapted "wholesale in a one-to one transfer of ideas to policy" (Laranja et al, 1998; 825) but instead attractive elements of scholarly ideas tend to be 'cherry-picked' by policy makers. According to De Bruin and Lagendijk (2005) it is this potential for selective use of a broad discourse on innovation and regional development, rather than the use of a common RIS concept, that explains the wide appeal of RIS approach to policy-makers. In his analysis of the use of the NIS approach in policy making, Miettinen (2002) suggests that the concept constitutes a 'boundary object' that permits partial agreement between policy and academic/analyst groups in the usage of a term whilst allowing the participants from different collectives to maintain their original cultures. Bristow (2005) further notes the power of the competitiveness discourse of the new regionalist literature, which appeals both to business interests and national and regional policy elites, particularly those advocating greater self government. It provides a relatively structured formulation and the potential for measurable set of output-based performance indicators, targets and indices. This discourse "helps to provide a way of constituting regions as legitimate agents of economic governance" (Bristow, 2005:299)

Also contributing to the influence of the concept of RIS in the policy discourse is the emergence of the so-called regional economic development industry (Lagendijk and Cornford, 2000). This comprises a wide ensemble of actors such as development agencies, technology transfer centres, training organizations and consultancy companies, supported by the growth and implementation of EU Structural Funds and national and regional funding, and focused around the task of improving the competitive position of

regions[6]. In their view the way these organizations emerge, are funded, and interact (through conferences, seminars, networks, etc.) renders a highly 'isomorphic' organisational field which contributes to a rapid dissemination of knowledge (Lagendijk and Conford, 2000). This process of diffusion and reproduction of knowledge has led to the transformation of certain ideas around innovation and regional innovation into taken-for-granted 'facts', their original empirical roots disregarded. Regional innovation systems therefore become policy 'givens', self-evident and tangible entities the existence of which is no longer in doubt, whilst at the same time other alternative interpretations of economic development and innovation are sidelined (Miettinen, 2002).

An increasingly strong normative connotation of some of the literature can also be seen to contribute to the take up of the term in policy. Morgan (2004, p.873) notes that some scholars may be to blame for "a tendency to collapse levels of abstraction into simple narratives to render them digestible for politicians and policy-makers" (see also Lovering, 1999). Power and Malmberg (2008) note the convergence of various 'real-world' and 'academic' arguments into hybrid discourses on regions and economic development. Lagendijk (2001) observes a shift in the academic realm from mainly descriptive-analytical to implicit prescriptive-strategic approaches. The earlier more analytical approach to specific regional cases has shifted towards a more purposive or strategic view carrying with in the implicit message that the region is able to change its own destiny via dedicated 'systemic' policies. An 'institutional' regional policy is advocated which is associational and network based, allowing for 'bottom-up, region-specific, longer-term and plural-actor based policy actions' (Amin, 1999:366) involving the promotion of networks of association and clusters, public/private partnerships, the legitimisation of intermediate associations or forms of governance, and a renewed role for public sector actors as 'animateurs' and facilitators of development. The use of the (regional) innovation system concept by itself involves the making of a value judgment in relation to the quality of the components, institutions, interactions and policy (Sharif, 2006). It is a powerful metaphor, implying a working mechanism or structure that can be nurtured or supported. The lack of distinction between normative and analytical conclusions is a common problem in policy studies generally, and arguably both understanding and policy are the poorer for the inability of scholars to make a clearer distinction between the two activities. According to Markusen, regional research should be concerned with normative goals, but whatever the normative position it should be clearly stated. This normative bias is all the more problematic when the assumptions drawn from observations in regions with particular social, economic and political configurations are then translated into general prescriptions for regional development (De Bruijn and Lagendijk, 2005; Storper, 1997).

These normative stances give the impression that the regional steering and facilitation of RIS is unproblematic, placing a great deal of confidence in the networking capacity and institutional configurations of regions to secure regional competitiveness. There is little consideration of the limits to policy action, let alone regional policy action. The ability of policy makers to influence and direct the evolution of economies may often be strongly limited, however (Moreau, 2004). Lambooy and Boschma (2001) consider that, whilst

[6] Actors that are on the other hand the 'intermediating' bodies that are held to be important by the RIS discourse

policy makers do have a role to play, a key difficulty exists in determining the degrees of freedom policy makers have to influence the future development of regions in an evolutionary context (Lambooy and Boschma, 2001). This is in line with David's (1987) 'narrow window' dilemma, that is the brief period in which policy makers may be able to influence a dynamic economic system. In other words, it is important to clearly assess the levers available to policy makers at all levels of governance to influence innovation in the region in question. By focusing on regionally devised, regionally implemented innovation policies, RIS approaches run the risk of overstating the room for manoeuvre many regions actually possess, and underplaying the role and influence of national and supranational policy-makers in determining the scope and resources of regional governance (Gertler, 1997; MacLeod, 2001; Bunnel and Coe, 2001; Lovering, 1999).

In making the implication that regional innovation policies can nurture regional innovation systems the reverse is also often implied: that regional innovation systems can be caused by regional innovation policy and therefore that we can evaluate or assess the performance of regional policies by measuring regional economic performance. However, more often than not regional benchmarking and the drawing of best practice cases is carried out with regions whose development has not been primarily, if at all, shaped by *regional* innovation policy. Given what Borras (2008) refers to as the widening and deepening of innovation policy, and the parallel emergence of new state and non-state actors that interact at various levels of governance, the management of the 'policy mix' for innovation within a particular regional space seems likely to be beyond regional action alone. Achieving a more active governance of this broader policy mix, where interactions potentially cross traditional policy domains and levels of governance, is a profoundly difficult challenge.

This section has argued that the influence of RIS as a normative concept has favoured the diffusion and adoption of a simplistic view in relation to not only the presence of a system in all regions but also the assumption that they are amenable to regional policy intervention. Further, whereas many typologies have been developed to describe different dynamics and components of systems, there are fewer tools to describe the interplay between regional actors and policies at different levels. The next section aims to address this gap.

5. Regions as policy 'spaces'

We have already argued that regional patterns of innovation are likely to be influenced by policies formulated at and/or coordinated with other levels and other policy domains. Perry and May (2007) describe a set of stylized roles a region can play within the broader governance arrangement. Regions can be seen as *'stages'* of action within nationally-defined policy frameworks. They can have a role in the *implementation* of nationally defined priorities and targets. Regions can also be *partners* in defining and formulating national priorities for science and innovation, and/or co-funding national scientific infrastructures. Finally, regions can act as more or less *independent policy makers*, devoting significant own resources[7] to funding regionally significant scientific

[7] With the proviso that these 'own' resources often come from higher levels of governance, and often with strings attached.

investments or projects. This role includes independent agenda-setting, institutional creation and new governance arrangements, as well as strategic intelligence and capacity building. Whereas the first two roles see the regions largely as passive recipients of national policy, in the last two regional authorities assume a more active or independent policy making role.

Fritsch and Stephan (2005) note that the active role of regions in innovation policy is often not a 'whether or not' question but rather a question of degree and mode, that is: what is being regionalised (policy objectives, design, implementation, funding,..), how and to what extent? An additional caveat is necessary: regions can be not only deliberate 'stages' for the instrumentalisation of national policies, but also the unintended beneficiaries (positively impacted) or *dis*-beneficiaries (adversely impacted) of policies made at other levels of governance, effects which often determine the direction and scope of the region's own subsequent policy strategies. Regional roles need also not be mutually exclusive - regions may play Perry and May's roles in relation to different elements of the broader policy mix for innovation. Regions can be simultaneously stages for policies defined at other levels, passive beneficiaries of (or negatively affected by) other policies, whilst also co-designers of certain policies affecting their territory and independent actors in the case of still other policies.

Building on Perry and May's approach we can view the region as comprising multiple and overlapping 'spaces' in which policy impacts are being felt – in other words policies – even aspatial ones - have multiple and overlapping spatial footprints which may also vary over time. Thus we can identify regions as *spaces for the mobilization* of resources, priority setting, institutional creation, policy co-ordination and governance, as well as policy learning, strategic intelligence and capacity building to achieve the development goals of the region. This can include a broader or narrower set of policies and different degrees of decentralization. At the same time regions are also *spaces in which the effects of policies* at other levels are being felt. Traditional technology policies are often 'aspatial', i.e., spatial effects do not count among the explicit goals. However, the spatial effects of such policies may be more significant than those of policies made with spatial effects in mind. These policies may bear very different impacts within and between regions (Stenberg, 1996). This is true not only for science or innovation policy but also for other policy domains such as defence.

Regional (or sub-regional) spaces can also be the intended *targets* of national and supranational policies and be positively discriminated to favour their development. National and supra-national policies for regional development, regeneration, and territorial cohesion set targets and development thresholds under which a particular territory is supported financially to achieve these development goals. The spaces so targeted receive disproportionate funding relative to other regions. Support does not equal impact, however, and the effect of such targeting may be insufficient to offset the impact of other national policies and dynamics. Still other policies deliberately use regional spaces as *strategic platforms* for the implementation of policies contributing to overall national growth. Some policies necessarily require a suitable spatial 'platform' for their implementation. National governments may choose a particular location for an

experimental or pilot policy or launch a competition across regions to decide on the best place to implement a particular policy, grant particular funding (such as the BioRegio contest in Germany, or the 'Poles de Competitivite' in France) or simply a 'label' (such as the UK 'science cities'). Regional authorities may have a strong role in the management and implementation of the policy (it may be sold effectively as a regional policy) but the real impact being sought is a contribution to national economic performance.

6. England's North West

The case of the North West of England illustrates the multiple policy dynamics affecting a particular territory and the ensuing strategies and initiatives by regional actors to complement and/or compensate for, their effects. With 6.8 million inhabitants, the North West of England (NUTS I region) it is the third most populated region in the UK after the South East and London (11.4% of the UK population live in the North West). The North West has 5 sub-regions (NUTS II regions): Cheshire, Cumbria, Greater Manchester, Merseyside and Lancashire. Manchester and Liverpool are the two main cities of this region. Manchester is known as the first city of the industrial revolution. Like many other industrial cities, Manchester has suffered from the decline of traditional industries, and has undergone first deep economic restructuring and, more recently, something of an urban renaissance – though the city still has significant pockets of deprivation. Today about 70 per cent of the working population are employed in the service sector, reflecting the national picture. Liverpool too has lost most of its manufacturing base and is now undergoing its own more modest economic recovery.

In recent years the UK has seen increasing decentralisation of economic policy to sub-national regions. The UK comprises the nine regions of England plus Scotland, Wales and Northern Ireland. The latter have devolved administrations and elected assemblies with devolved responsibilities over economic development policies. Some economic responsibilities have also been devolved to the English regions, though without political devolution (excepting Greater London, which has its own arrangements). The English Regional Development Agencies (RDAs), formally established in April 1999, are responsible for promoting economic development and regeneration in their regions. The introduction of a "single pot" of finance in 2002 gave the RDAs substantial funding flexibility to respond to regional priorities. The formula that determines RDA funding gives a premium to the three northern regions due to greater levels of deprivation, which means additional discretionary public resources for those regions. RDAs can also mobilize additional sources of funding such as EU Structural Funds that far exceeds the RDA budgets by orders of magnitude (OECD, 2008).

In the time since they were first established the regional policies of the RDAs have become more strategic, based on endogenous and innovation-led growth approaches. These are materialized in the multi-annual, RDA-led Regional Economic Strategies (RES), centred on the region's development priorities. Over time the RDAs have adopted more responsibilities around competitiveness and regeneration. The most recent reviews

of sub-national policy and governance have suggested that more policy and funding responsibilities should be devolved from the centre to RDAs, together with the development of a more coherent set of institutions for policy making at the regional and local levels to replace the earlier and now defunct plan for elected regional assemblies, and the merging of existing regional economic strategies and regional spatial strategies into a single strategy linking economic development with spatial planning (HM Treasury, BERR & DCLG, 2007).

Despite progressive devolution of responsibilities and the development of the "single pot" model giving greater discretion to RDAs about spending priorities, the agencies work under a national framework of formal targets, the Public Service Agreement (PSA) targets. The most important target affecting regional policy is the Government's objective to *"Improve the economic performance of all English regions and reduce the gap in economic growth rates between regions*. (HM Treasury, 2007). This target is embedded is the wider productivity agenda of the Treasury (Finance Ministry), which aims to raise the productivity of all parts of the UK, focusing on five priority areas or drivers: investment; skills and human capital; innovation; competition; and enterprise. Thus the policy interest in regional innovation is linked to the national policy objective of raising productivity levels.

Decentralisation is therefore justified on the basis of achieving higher quality and efficiency in the delivery of public services and of achieving economic development and reducing regional disparities via regions building on their indigenous strengths. The political significance of the regions may be seen as evidence of the emergence of a 'minimalist' system of multi-level governance in science policy in England (Perry, 2007). Whilst regional and local governments are able to make economic development policies, it is within parameters set by central government, a model which has been dubbed by Corry and Stoker as a 'steering centralism' (2002). All of this has led the OECD to conclude in a recent review that "there remains some ambiguity about whether the regional level is seen as a partner in policy development and implementation or simply and area of implementation of public policy designed from the centre" (OECD, 2008; p.137).

At the same time a new focus for national devolution/decentralisation debates has emerged around the 'city region', defined as the travel-to-work area around a city rather than by formal administrative boundaries. One recent manifestation of the 'city-region' agenda is the 'Science City' title in 2004, a national Government initiative which has so labelled a handful of UK cities (including Manchester[8] in the Northwest). However, it is mainly the economic perspective which more than any other underpins the national policy interest in English city-regions (Harding et al 2006). The 2006 State of the Cities report (DCLG, 2006) advocates the strengthening of city-economies as *key plank of national economic policy* and focuses very much on the role of city-regions as motors of the national economy.

[8] Manchester Science City is implemented as one of the programs of another economic development and innovation partnership organization, Manchester Knowledge Capital (M:KC) which attempts to promote knowledge-based economic development in the wider Manchester city-region.

Efforts directed at promoting regional endogenous potential via regional innovation policies formulated as part of the regional economic strategy, plus the ability of the region to mobilise additional national or EU funding may however not be sufficient to offset the impacts on the region of other spatially neutral policies and funding allocation structures. Innovation patterns within the region are not only affected by space-neutral national science and innovation policies, but also by space-neutral national policies outside of the innovation domain, such as health, energy and defence policies. The Northwest is a major location for traditional 'big pharma' R&D and this is supplemented by a growing bioscience sector. A major policy driver in the retention of significant UK R&D presence in these sectors has been the role of the National Health Service (NHS) as a single, major customer for existing and new pharmaceutical products (and a single partner for UK-based clinical trials of new pharmaceutical products). Thus national health policy has had a dual role as an effective industry policy for the pharmaceutical sector. The region's substantial defence and aerospace cluster also benefits from the historically high UK expenditure on defence and security related R&D. Finally, the Northwest of England is the de facto base of operations for the UK nuclear industry (Flanagan et al, 2007).

There is little scope for regional innovation policy to directly influence the policies affecting these three sectors whose regional presence means that private sector expenditure on R&D within the region is higher than the national average (whilst at the same time public sector expenditure is below the national average, skewed as it is towards the 'Golden Triangle' bounded by Oxford, Cambridge and London). In the absence of such mechanisms regional policy action becomes focused on traditional lobbying, and when that fails, on compensatory regional actions (Flanagan et al, 2007). The effects of 'non-innovation policy' on these three major R&D intensive sectors are a major challenge for the Northwest and in a very real sense this 'vulnerability' to outside economic and policy change is a key concern driving regional innovation policy. The picture that emerges from the Northwest case is thus one of a complex and contingent multi-level, multi-actor story in which emerging regional innovation policies play at best a compensatory or supporting role for decisions taken at different levels of governance, for different reasons, at different times.

The regional innovation systems view has created a widely held impression not only that regional-level actions can in principle enhance the 'systemness' of the regional innovation system but that in practice sufficient levers are likely to be available at the regional level. Even with greater powers and resources, it is highly unlikely that regional policy makers in the Northwest of England could hope to influence the dominant R&D-intensive sectors described above, although all three are highly driven by public policy decisions taken elsewhere. Surprisingly perhaps, the OECD 2008 review of the North of England does not mention the influence of national policies on health, defence or energy on the innovation clustering and the economic fortunes of the region. The causality is even reversed by labelling the clusters in these sectors as "examples of regional assets that may be relevant in the context of national policies" (p.154), rather than seeing them also as built up and still driven by national policies. Acknowledging the spatial impacts of national policies is a first step to devising more realistic, more coherent and better

coordinated strategies at all levels. Understanding the different levers for intervention in regional innovation dynamics and at which levels of governance and in which policy domains they reside should be key to identify opportunities for influencing decisions and adopting more realistic and better targeted policy actions.

Concluding remarks

The regional systems of innovation concept is well established in academic and practitioner discourses about innovation and economic development. As with the innovation systems approach more generally, use of the concept has expanded significantly from its initial analytical purpose in helping to understand the factors which might explain differences in comparative performance. Due to the particular evolution of the concept, and the multiple underlying theoretical influences, no single dominant approach exists. Rather a series of related but distinct and to some extent contradictory understandings coexist. We consider that the regional systems of innovation approach has taken on the status of a fuzzy concept in the sense proposed by Markusen. Unlike Markusen we acknowledge that fuzzy concepts can have an attraction to policy makers and note that the regional systems of innovation concept seems to act as a useful boundary object linking yet at the same time preserving the integrity of academic and policy discourses. However, we accept that there are also dangers associated with deriving policy insights from fuzzy concepts and consider that better efforts in communication between theoretical developments and policy practice would be advisable. Given the role of scholars in popularising this particular fuzzy concept, much of the onus for an improved quality of debate must be on the academic side.
Use of the term 'regional innovation system' involves a value judgement about the presence of a system, whether emergent, functioning or dysfunctional, and automatically foregrounds certain elements as important. The use of metaphors can be misleading and the use of the system metaphor can encourage a view of regional economies as more or less closed systems. As innovation policy scholars we could and ought to be more disciplined about properly distinguishing analytical work from normative prescriptions. At the same time we must adopt more realistic expectations as to the extent to which policy-makers can take up our advice in the face of hard constraints like policy complexities and interdependencies, multi-level governance, path dependencies, information asymmetries, bounded rationality and power, resource and capacity limitations (not to mention *politics*).

Regions can no more be considered closed policy systems than they can be considered closed innovation or economic systems. We need to better characterise the roles regions play as policy and implementation spaces, and the complexity of the multi-level, multi-domain policy mix that acts upon these multiple and overlapping spaces. We do not wish to argue against the utility and relevance of detailed studies of RIS to gain insights on specific regional economic, institutional and social conditions underpinning systemic relations. But such analyses should avoid the dangers of a static approach focused on stocks of actors and institutions and on the quantity of system interactions, and instead find new ways of exploring the quality of interactions, institutions and actors,

understanding how they and the parts they play in the system evolve over time. Specificities on both sides bedevil attempts to draw and apply policy lessons from jurisdiction to jurisdiction and we should be particularly careful about which lessons we draw for positive policy action from cases where success was not primarily driven by intentional regional policy. Here again a dynamic approach will be key as the lessons to be learned surely revolve around development paths rather than current policies.

Implications for Trento Autonomous Province

An area of 0.5 million plus inhabitants, the Autonomous Province of Trento possesses a strong regional government, including fiscal autonomy and regional competences in areas such as health, education and infrastructures. Strong competence in many policy areas and the capacity to set and administer the regional budget confers the region freedom to formulate and implement regional strategies and establish policy priorities. This governance context is coupled with a strong public research sector which, in contrast with the Northwest of England case, is relatively stronger than the industrial R&D sector. Against this backdrop or regionalised innovation policy, policy efforts in the Province of Trento have been directed at knowledge building and safeguarding the regional competence basis through successive regional strategies and initiatives such as foresight and competence building (Koschatzky, 2005), often supported financially by EU structural funding[9].

This paper has viewed the region as comprising multiple and overlapping 'spaces' in relation to innovation. Regions are *spaces for the mobilization* of resources, priority setting, institutional creation, policy co-ordination and governance, as well as policy learning, strategic intelligence and capacity building to achieve the development goals of the region. But regions are also *spaces in which the effects of policies* at other levels are being felt. Regional (or sub-regional) spaces can also be the intended *targets* of national and supranational policies and be positively discriminated to favour their development. Finally other policies deliberately use regional spaces as *strategic platforms* for the implementation of policies contributing to overall national growth.

Even though Trento could be considered an example of a strong RIS (a regionalized national innovation system in Asheim and Isaksen's typology), with a relatively strong governance of innovation and relatively strong network of innovation support structures, such consideration of regions as policy spaces may provide an additional perspective to the analysis of innovation policy in Trento; for instance in relation to the policy levers effectively available and in relation to the potential conflicts between the policies designed and implemented at the regional level and at the national level, and possible compensatory initiatives to overcome these conflicts.

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[9] The region currently benefits from ERDF funding within the Regional Operational Programme for the Autonomous Province of Trento (2007-2013).

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