

TERRITORIAL INNOVATION MODELS BEYOND THE LEARNING REGIONS

Towards understanding the social dynamics of innovation networks.

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0 ABSTRACT

This paper is concerned with theories of territorial economic development in the knowledge based economy, and in particular those concerned with understanding the dynamics of innovation as an economic development process. There has recently been a growing disquiet about the various models used to explain these processes, the so-called Territorial Innovation models, focusing on their narrow regional focus, their orientation towards political rather than economic territories, their uncritical adoption to explain many regional situations and their limited empirical testing. Nevertheless, TIMs have retained a salience and acceptance because they do seek to explain and understand a phenomenon of uneven regional territorial development for which explanations arising in other disciplines are fundamentally unsatisfying. Therefore, addressing these critiques is a central challenge for regional studies, to resolve these tensions and produce more conceptually rigorous and empirically underpinned theories of regional economic change.

To take a first step on this journey, in this paper, we address ourselves to a single Territorial Innovation Model, that of the Learning Region, which appears to have reached the end of its intellectual evolution. The framework for our analysis follows our diagnosis of the problem, namely that despite these theoretical shortcomings, the idea has emerged because it captures something useful that is not captured elsewhere, in this case, the notion of territorialised collective learning. We therefore use the general TIM critique to develop a more detailed critique of Learning Regions to identify where further theoretical analysis is required. We argue that the most urgent and demanding understanding is required of the social dynamics of (partly-territorialised) innovation networks. Taking a global-local perspective on the dynamics by which innovation networks create new knowledge and stimulate innovation should help to produce a more rounded and intellectually rigorous model of territorialised regional learning in the context of the knowledge-based economy.

1 INTRODUCTION

Since the European Commission published its Lisbon Agenda for smart and sustainable competitiveness in 2000, it is possible to say that territorial innovation has entered the policy mainstream. In 2010, the OECD published its landmark Regional Innovation Strategy, setting out a set of dimensions along which policy-makers can create the optimum conditions for regional economic development in their territories in the knowledge economy. There appears to be a robust consensus that in the knowledge economy, the key determinant of economic success is territorial capacity to innovation. The prescriptions for policy-makers are clear, to support that innovation capacity and helping local innovators to access innovation resources to participate more effectively and competitively in global innovation networks.

Yet this policy consensus obscures a more theoretical debate about territorial innovation which to some extent even predates the first articulations of the ideas of territorial innovation in the late 1980s. It was Doreen Massey who in a groundbreaking article in *Regional Studies* posed the question of “In what sense a regional problem” in trying to understand the problems of declining industrial regions as purely endogenous problems. Since their inception, the various theories which have been used to articulate and explain the dynamics of territorial innovation (*cf.* Moulaert & Sekia, 2003) have failed to properly answer the extent to which regional innovation is a regional phenomenon. Innovation is something that takes place within global production networks and multi-national corporate supply chains, and yet, there has been a tendency for explanations to focus excessively on the regional level (Markusen, 1996).

But our contention is that despite this weakness, we must not through the territorial innovation baby out with the regional myopia bathwater. These models emerged out of a desire to capture interesting processes which were overlooked by orthodox analytic frameworks which lacked a nuanced appreciation for understanding the meaning of territory. Places are clearly different, and innovation capacities are affected by those differences, which have a terrible tendency to be brought together under the rubric of ‘culture’. In this paper, we instead seek to make the argument that it is important to sustain our understanding of territorial innovation by returning to the roots of the theories, and rebuilding them in the light of the substantial critiques which have been developed over the intervening quarter century.

In this paper, we argue for the value of this approach by demonstrating its application in a single theoretical frame, that of the Learning Region, something with which we are not admittedly not unfamiliar. We have elsewhere (e.g. Rutten & Boekema, 2010; 2012) identified the fact that the theory has reached the end of its theoretical evolution, and developed a comprehensive conceptual critique. In this paper, we take a following step, that is to use this critique to reconceptualise what it is about Learning Regions which have sustained its development to this point. Starting from first principles, we identify that what is important is its emphasis on the social networks¹ within which collective learning takes place.

¹ It is here necessary to define what we mean by social networks, and that is groups of individuals that interact collectively and in sub-groups, on the basis of shared socio-cultural commonalities or shared interest. Although some use social networks to refer to ‘virtual communities’ as defined by new media such as Facebook or Wikipedia, these are merely one kind of what we define as social networks.

The natural corollary of that, which Learning Regions as a TIM never really came to terms with, was the autonomous social life of innovative actors. The networks within which actors are embedded are not necessarily functional economic networks, yet allow actors to access resources which they would not otherwise be able. Ideas of Diaspora entrepreneurship and innovation are a good example of this, providing concrete access to resources on the basis of kinship and shared religious/ cultural backgrounds (e.g. Saxenian, 2000; Henry *et al.*, 2002). But there has been a tendency so far to treat these cultural variables as characteristics of the actors rather than as themselves being constructed in networks (Boschma, 2005; Beugelsdijk & ..., 2006).

Clearly, ethnic entrepreneurs are not just able to access Diaspora finance just because they have a particular ethnic background – that access is regulated through a network whose dynamic is primarily social and cultural rather than economic or indeed territorial. At the same time, cultural networks influence what can successfully be achieved in terms of innovation, and so influence the regional system or style of innovation, and indeed the positioning of that region within wider production networks. Finally, these innovation activities involve interpersonal interactions which themselves create their own culture and have their own social dynamics (Benner, 2003). These networks each have their own spatiality, in the sense of the kinds of geographies over which the networks they operate, from the global nature of Diaspora networks to the micro- and regional- scale of local innovative communities of practice.

The challenge for reconceptualising the learning region is therefore coming to terms with a great deal of complexity. We seek to highlight three key axes along which territorial learning can be classified, between social and economic networks, between global and local scales, and between integrated and fragmented local complexes. On this basis, we seek to develop a stronger conceptual foundation for understanding the social dynamics of innovation networks. We offer a number of key propositions related to this foundation, and suggest a set of avenues for future research to ensure the revitalisation of the learning regions concept, as a basis for a more general plea to reconceptualise territorial innovation models more widely.

2 THE RISE AND FALL OF TERRITORIAL INNOVATION MODELS (TIMS)

These discussions can be traced to an interest emerging in the mid 1980s in understanding a global economy with increasing levels of trade, multi-national ownership and with information communications technologies (ICTs) reducing barriers to communication. Piore & Sabel (1984) argued for a second industrial revolution with high-technology industries replacing traditional manufacturing in advanced economies, but with a very different underlying geography. Romer (1985) identified the increasing importance of the accumulation of knowledge to explaining productivity growth in these advanced economies, something with increasing returns to scale, namely a propensity to concentrate at particular successful locations. These different trends all pointed to an economic geography shift away from the manufacturing economy to a knowledge-based economy, and these territorial innovation models emerged to attempt to make sense of this wider shift.

Moulaert & Sekia (2003) identified what they called a Territorial Innovation Model (TIM) family of concepts which had emerged in parallel in different disciplines interested in explaining differential economic performance in terms of different

territorial innovation performance. Their argument was that increasing economic globalisation had placed a premium on local capacities as a determinant of those local outcomes. Uniquely amongst contemporary economic activities, innovation was dependent on face-to-face contact to transmit the necessary tacit knowledge, and that contact in turn depended on the degree of proximity present (Boschma, 2005b).

As a result, many cognate disciplines had developed their own explanatory theories for that localisation process. Moulaert and Sekia argued for five basic models; local production systems; innovative milieux; learning regions; regional innovation systems; new industrial spaces, and; spatial clusters of innovation. Each model was rooted in its own disciplinary history, with its own conceptual clarity, intellectual integrity and clarity both about the conditions to which it is applicable, as well as the extent of findings which can be inferred from its application.

These explanations have not been uncontentious, and have been subject to critique from a variety of perspectives². It is possible to distinguish two critiques operating at two scales, firstly within the trajectories of individual models and secondly with the ideas of TIMs as a whole. We later offer a more thorough critique of a single TIM, the Learning Region, and at this stage offer only the very brief examples of ‘clusters’ as a TIM which were comprehensively attacked for being a slippery concept which elided between theoretical foundations at the whim of policy-makers (Gordon & McCann, 2000; Martin & Sunley, 2003; Benneworth & Henry, 2004; Karlsson, 2008). Secondly are those critiques which can be made of TIMs as an approach more generally, although we concur with Benneworth & Henry who note the importance of not assuming homogeneity within the TIM family nor critiquing one class of argument for its failure to follow the rules of another. Within these critiques, we seek to highlight four particular problems.

The first of these critiques is that there has been an implicit assumption that knowledge assets are somehow intrinsically ‘regional’ (Gertler & Wolfe, 2006). One manifestation has been an uncritical focus on politically-bounded spaces rather than looking at the wider networks within which innovation takes place (what Cooke, 2005, calls the ‘spatial envelope’ into which the region is placed). Secondly it overlooks the importance of non-regional knowledge and the fact that knowledge brought into the region through – for example foreign investors – has its own topologies of power its regional application (Kotzschatzky, 2009). Whilst Storper (1995) points to untraded interdependencies and knowledge spill-overs as drivers of industrial districts, Christopherson & Clark (2007) provide compelling evidence of how lead companies in one particular industrial district in North East America deliberately limit the free flow of knowledge in the supply chain as a deliberate competitive strategy.

A second critique is that the ideas are too specific to a particular kind of industrial region in North America and Europe, particularly those involved in high-technology manufacturing. Part of this relates to the genesis of the ideas which can be traced to understanding a wider socio-economic shift from Fordist manufacturing to a post-Fordist, post-industrial form of economic organisation (*cf.* Piore & Sabel, 1984; Albrechts & Swyngedouw, 1989). Also within this can be identified the role of

² We will not concern ourselves with one set of critiques, that of irrelevance, which has come from approaches which regard territorial unevenness as a form of spatial disequilibrium within self-equilibrating systems, and hence necessarily temporary and a distraction.

policy-makers who have sought solutions for their regions with problems which has encouraged the uncritical transfer of policy measures between regions. This has the effect of making these concepts appear in regions where they are not necessarily applicable (Hassink, 1993; Lagendijk & Cornford, 2000; Hassink & Lagendijk, 2001).

A third critique is that the TIMs are undertheorised and that there has been conceptual borrowing and elision between the TIMs, which has left them as ‘small’ theories subject to but incapable of challenging external global ‘big’ powers and structures (Amin & Palan, 2001). This argument has most effectively been developed by Markusen (1999) who critiqued many studies in practice for failing to really test theory via empirics, instead defaulting towards illustrating theoretical contentions. Lagendijk (2003) argued that there was a rush towards the careless development of concepts which were never rigorously empirically tested and which became the basis for further theoretical developments. Hudson’s (2003) argument was that this had served to detach the concepts from wider political economies of power and reify the idea of the ‘local’ as subordinated to the ‘global’, which in turn served a particular kind of neo-liberal economic development agenda.

Finally was the critique that TIMs had been driven by policy-makers who had funded academics to give their normative ideas a veneer of scientific plausibility, or in a less sceptical view of the process, had encouraged academics down a particular theoretical path which was appealing to them as policy-makers (Lovering, 1999; Martin & Sunley, 2003). Certainly, it is hard to refute the accusation that a huge number of empirical studies were undertaken which had very little connection to theory, undermining serious comparisons and further detaching theoretical developments from empirical efforts (Coenen, 2006). But the criticism here was not so much one of rigour as to the negative effects of policy-makers rather than academics shaping the research agenda, with a sense that academics were required to find the ‘right’ results.

We acknowledge that all these critiques are in large measure justified and require a critical scepticism about the further validity of territorial innovation models that do not overcome these shortcomings. At the same time we make two further observations: firstly, we return to the argument that territorial innovation is in some way important, and rigorous theoretical models which explain uneven development in space are important to understand these processes. Secondly, in seeking to make TIMs rigorous, it is not necessary to address the faults of TIM models as a whole, rather to look at how they apply to one of the five sub-models identified by Moulaert & Sekia and specify a more specific critique in order to synthesise and transcend the current problems with TIMs. To do this, we turn to one TIM which we have both used in various ways in our own research, namely that of the learning region.

3 THE LEARNING REGION APPROACH AND ITS SHORTCOMINGS

The idea of the learning region emerged in a 1993 article by Michael Storper in which he sought to understand the competitive success of a limited number of industrial districts in terms of the way they built local connections between the global networks within which key actors were embedded. The idea achieved further currency two years later when Richard Florida (1995) published an article in *Futures*, which drew on emerging thinking in corporate studies around learning companies and learning organisations, and applied it to his own interests in regional competitiveness (Pedler *et al.*, 1991; Garvin, 1993). This was influential because of the then-importance of the

Porterian ‘diamond’ (Porter, 1990) for analysing endogenous competitiveness and potential of regional economies (Simmie, 1997).

Two subsequent articles by Bjørn Asheim (1996) and Kevin Morgan (1997) set the theoretical parameters for the learning region approach, and laid the foundations for its adoption as a widespread territorial innovation model (Rutten & Boekema, 2007a). The idea has continually been critiqued since its inception for a number of problems but nevertheless, it succeeded because offered a grammar for beginning to talk about issues which people were concerned (Rutten & Boekema, 2007b). The value of learning regions can be distilled down to understanding the process of learning in regional networks. The idea was that learning regions were places where actors interacted in ways that constructively stimulated mutual learning.

Hassink (2007) offers four specific critiques of the Learning Region concept, namely that it is fuzzy, normative, overlapping and caught between national and global levels. Exploring each of these in turn is useful for providing the boundary conditions for a re-examining of learning in regional networks. The first of these is that the Learning Region theory is ‘fuzzy’, as defined by Markusen (1999) and stated by Martin & Sunley (2003). Hassink cites in particular the weakness of the movement of the idea between academics and policy-makers over a long decade without a substantive improvement in the quality of the theory, or addressing the theoretical critiques which can be made of the approach, as particularly indicative of its fuzziness.

The second is that the Learning Region is a normative concept, and in particular sets out an ideal type along with the value claim that every region that wishes to be successful should subscribe to creating that ideal type. Hassink (2007) argues that little is known about the processes whereby regions are able to become learning regions, or to be able to convincingly at situations of change where unsuccessful, non-learning regions are able to become learning regions followed by an improvement in their economic position. Part of the problem arises because of the assumption made that it is a process rather than characteristics which is important, namely the learning rather than the knowledge (Rutten & Boekema, 2005). The learning process is much harder to measure than regional characteristics, and learning is a micro-process whereas regional development is a meso-scale process. The result has been a reliance on arguing that particular activities are learning processes and drive regional economic development (Lagendijk, 2000).

The third critique is that Learning Regions concepts are not sufficiently distinctive from other kinds of TIM, and therefore suffer from a conceptual overlap. Hassink’s argument (2007) is that much of learning regions concepts are bound up within regional innovation systems approaches, whilst Butzin (2001) & Fürst (2000) argue a close similarity between learning regions and innovative milieux. Perhaps a more compelling critique derives from Lagendijk (2003) who notes the problems which emerge in transferring between conceptual frameworks rooted in different kinds of disciplinary approach. Certainly, learning regions makes a simplistic elision between the micro-scale of collective learning and the meso-scale of regional economic development. The differing assumptions that those two approaches make are smoothed away in a process of conceptual borrowing relating to the fuzziness of the original idea.

The final critique is that learning regions find themselves squeezed between national innovation systems and global production networks. The locus of innovation and research policy has resolutely remained the national, whilst corporate innovation

increasingly takes place within transnational innovation systems. Storper (1995b) offers the idea of a Corporate Innovation System (CIS), corresponding to firms' "inter-regional and international networks for technology development are systems which exchange the specialised knowledge that is valued in each of the nations and regions in which they are active (between different parts of the firm)" (p. 897). This raises the question of how much meaningful capacity can regions enjoy to create their own optimum conditions for success when the value that is placed on those characteristics is determined in much wider production networks. Against that, any regional concept immediately runs the risk of seeming small and unimpressive by comparison.

However, we argue that whilst these shortcomings might undermine the explicative value of the learning region, they certainly do not undermine the validity of the intellectual project, namely to understand the process of learning in regional networks. That learning might not be regional, the networks within which learning takes place might not be regional, and regional actors may have a strong-self interest in misreporting the regional situation. Nevertheless, to our understanding, the learning region idea has been successful in terms of pointing to the regional dimension in these wider networks through which learning takes place and within which innovation is prosecuted. The question which remains to be answered is then how to treat that regional dimension without falling foul of the problems afflicting TIMs in general and the Learning Region concept in particular.

4 THE LEARNING REGION OR LEARNING ACTORS IN REGIONAL CULTURES AND CONTEXTS?

Our contention is that the four problems identified with the learning regional concept all relate to a more fundamental problem of a simple elision between actors and their regions. The idea of a learning region has become – for what are primarily practical reasons associated within its diffusion – strongly identified with a version of regions in which regions are themselves actors with characteristics and agency (which are typically theorised in terms of the hard institutions and soft cultures prevalent in a particular place; Trigilia, 1991; Morgan, 1997). This raises a particular conceptual difficulty relating to the 'real' actors which exist within a particular region and the extent to which they are determined or influenced by these meso-actors (institutions and culture) (Harrison, 1992).

It is a particular recurrent problem within sociology to create clearly defined causal relationships between micro-behaviour and culture & institutions, either in terms of culture determining actor autonomy or cultures emerging as aggregates of common individual behavioural patterns (Granovetter, 1985). Granovetter pointed out the dual risks of either over-determining actors, reducing their autonomy by explaining their behaviour in terms of group membership, or under-determining those actors, failing to explain the influence of their social status and position on their behaviour.

These risks can be seen within TIMs in general and the learning regions in particular is a requirement that has been placed on the theory to define whether it considers actors to be 'of the region' or 'in the region'. Actors are 'of the region' when they are a subset of it, and can be assumed to share in a common set of characteristics that are for all intents and purposes regional i.e. are over-determined. Actors are 'in the region' when they are regarded as primarily being related to wider, extra-regional

production networks, and certainly not being a reflection of the characteristics of the lead actors i.e. under-determined.

We argue that the problem arises from a distinction in scale between the actor and the region which is a deliberate choice and is nevertheless intractable. Actors and their micro-behaviours are necessarily small compared to the regional meso-scale. This places an unfulfillable requirement on theories of micro-action to be able to explain meso-changes based on micro-behaviour, without being able to resort to reified co-ordinating mechanisms such as regional culture. But at the same time, we argue that given the way that we have defined the learning region, the region does not have to be used as a distinctive scale separate from the micro-level, but instead is used to define a particular space within which actor interactions take place.

When we talk about the ‘region’ in the context of the learning region (or indeed other TIMs), what we are referring to is a space at which regular and repeated interactions take place (Legendijk & Oinas, 2005), rather than to a ‘scale’ with all its connotations of hierarchy. This means that the regional space is a space where regular and repeated interpersonal interactions take place in contrast to the national or global spaces. The point about the region as here defined is it is a level at which tacit knowledge exchange and socialised learning can readily take place through a physical proximity of the participating actors. We have already refined our interest in socialised learning to the understanding of innovation processes drawing on socialised learning in regional networks. This reconceptualisation of region as a space for regular interaction for local actors further nuances our area of focus, which is to say understanding how innovation processes drawing on socialised learning which take place in repeated, regular, interpersonal learning exchanges, produced through a physical proximity of the actors. We believe that this point might seem slightly esoteric but helps any subsequent conceptualisation to avoid the weakness of the learning regions approaches.

In terms of fuzziness, there need be a clear focus on the networks within which learning between actors takes place. Regarding normativity, we are not arguing that there is some configuration which is better than others, or particular policy interventions can help build global-local connections, merely that physical proximity helps to develop networks which whilst not entirely economically rational have an economic rationality by supporting innovation processes. In terms of an overlap with other TIMs, this approach seems closest to the “spatial clusters of innovation” approach in Moulaert & Sekia’s classification, and to a neo-Marshallian nodes (Henry & Pinch, 2001). Finally, in terms of the global/ national bounding of regional behaviour, we are specifically arguing that more consideration needs to be given to the wider – global and national – networks within which actors are positioned.

5 THE KEY CONCEPTUAL PROPOSITIONS OF A POST-LEARNING REGIONS TIM

Our argument is that if one is to return to the roots of the interest with which learning regions originated, understanding learning in regional networks, then there needs to be a renewed emphasis on the individual actor. This would focus on exploring how individuals learn in networks as part of innovation processes, upon which elements of those networks are regionalised and on how those regional networks relate to the other, non-regional networks within which actors are embedded.

This approach helps to nuance Markusen's description of regional industrial districts as 'sticky places within slippery space' (1996, pp. 293). It is not the places themselves that are sticky, rather the innovative actors located within those spaces, . Those innovative actors' relative stickiness within those places is a function of their mobility and potential to move, but also the extent to which they are able to realise their own goals whilst located within a particular context.

Any approach seeking to understand territorial learning has therefore to understand the dynamics of all the relevant networks within which innovating actors are embedded, and not just those between innovators within a region. We would highlight at least four different kinds of additional networks which would be included in such a comprehensive analysis of 'sticky regional actors in slippery space', two kinds of wider (inter-regional) network and two kinds of intra-regional network:-

1. Wider global economic networks within which regional actors are embedded (such as global production networks, *cf.* Yeung, 2009),
2. Wider social networks within which regional actors are embedded for non economic reasons, which do not entirely relate to social or cultural characteristics, (Henry *et al.*, 2002)
3. Regional social networks within which regional actors are embedded (relating to culture and social interests) and in which not all actors may necessarily be involved, and
4. Regional social networks which may arise between regional actors as a by-product of the collective learning activity and which may manifest themselves in new formal institutions or informal collective habits, routines and cultures (*cf.* Klein Woolthuis, 1999; Benner, 2003; Wenger, 1998).

In seeking to summarise our starting point, we would put forward a number of propositions concerning territorial learning and regional innovation activity. We argue that these can be used to form the basis for an approach which transcends those limitations and places the concept of collective territorial learning for innovation in its wider extra-regional contexts.

- **Proposition 1:** The key starting point for economic innovation are actors who seek to access resources to solve problems in the innovation process.
- **Proposition 2:** Innovation is a difficult process and happens through a social and networked process of interactive search, learning and refinement.
- **Proposition 3:** Actors access problem-solving resources both through contractual relationships as well as inter-personal, interactive relationships.
- **Proposition 4:** Regions are defined as spaces within which actors can regularly and interpersonally interact because of territorial proximity
- **Proposition 5:** Actors are influenced - but not determined by - their everyday, regional environment.
- **Proposition 6:** Space matters: regional articulated networks benefit from the proximity and cohesiveness facilitated by regular, repeated interpersonal interactions
- **Proposition 7:** Actors are active within multi-regional economic production systems and networks

- **Proposition 8:** Actors can be active in multiple networks and transmit properties between the different networks within which they are active
- **Proposition 9:** Network economic outputs are partly a function of the social networks in which actors are embedded

These propositions are not in themselves particularly novel, and have been drawn from assumptions made elsewhere in the TIM literature. All TIM approaches make the assumption that innovation is an interactive process which operates through resource exchange between actors which is facilitated by different kinds of connections (propositions 1-2). Proposition 3 lies at the heart of innovation system approaches which see an overlap between formal institutions and informal relationships. Proposition 4 is derived from industrial districts, and in particular the perspective which regards industrial district as neo-Marshallian nodes (Amin & Robins, 1991; Henry & Pinch, 2001).

Proposition 5 is a re-statement of Granovetter's (1985) and Harrison's (1992) argument that individuals are never fully autonomous nor fully constrained but their behaviour is an emergent property from the intersection of intention and opportunity which may be framed by pre-existing environmental situations. Proposition 6 is derived from work on proximity, culture and innovation which suggests that geographical proximity is more than just being physically near and depends on building shared norms and value systems through repeated interactions (Lagendijk & Oinas, 2005; Boschma, 2005b).

There are four propositions which are less easily derived from the TIM literature, but they are corollaries of the critiques we have developed of the learning region approach. Proposition 7 argues that one actor will be simultaneously active within multiple networks: some will be economic, but others relate to their social position, others are cultural and may also be ethnic or creed-based. Proposition 8 may seem more contentious, that actors can transmit properties between their different networks, but is for example a general version of the idea of Diaspora finance for entrepreneurship, in which people use ethnic links and contacts to identify sources of financing for innovation.

Finally, property 9 is derived from the preceding propositions, and argues that if actors are embedded in multiple networks and resources can be moved between those networks, then the network state of the region is an aggregate of all the networks within which innovative actors are embedded. Or put alternatively, the innovative capacity of a place to undergo collective learning activities is shaped by all the networks which influence innovative actors within a region. Territorial innovative capacity need therefore be understood in terms of the different ways in which these networks interact with each other. As a consequence of this regional typologies should be constructed on the basis of the typical configurations of actors' existing networks within a particular regional space.

Our argument is that what is now necessary is a more direct and explicit treatment of these social networks, their dynamics, impacts and influence on the territorial networks through which innovation takes place. This arises from the fact that Proposition 9 is neither theoretically necessary nor empirically demonstrated: rather it is conceptually possible within the existing TIM theories and empirically suggested through a number of interesting case studies which do not nevertheless add up to a compelling proof of the notion. We therefore argue that what is now necessary in

order to explore this interesting possibility, without falling into the recurrent trap of TIMs of raising interesting theories and finding further suggestive evidence (Hassink, 2007), what is now necessary is a more rigorous conceptual and empirical analysis of the social dynamics of innovation networks.

6 TOWARDS UNDERSTANDING THE SOCIAL DYNAMICS OF INNOVATION NETWORKS

This mode of argumentation has not been entirely absent from the literature, but has always been present in a rather implicit form, in a way in which actors are over-determined by their position within particular networks, or in a way that gives the ‘region’ more autonomy than might theoretically be justified. Viewed in this light, it is possible to nuance the typology offered by Markusen (1996), which we argue represents a very effective way of typologising global-local connection within these regional industrial spaces. Markusen argues that industrial districts in reality represent at least three kinds of configuration:-

- Marshallian industrial districts: very strong social and economic connections between small producers responding rapidly to externally changing demands.
- Hub-and-spoke systems: these are local clusters with some strong local social and economic connections, but focused around lead innovators (often large firms) which are strongly economically networked within wider global production networks.
- Satellite Platform: these are regional firms with very little intra-regional connectivity which nevertheless are well-embedded in these wider production networks

In table 1 below, these three types of network (regional economic, regional social, global economic) are mapped to the three kinds of networks which have tended to assume a prominence in the regional economic development literature, and which are identified above.

Figure 1 Markusen’s typology of firm size, connectivity and local/ non-local embeddedness for three kinds of industrial district

| | Regional economic | Regional social | Global economic |
|--------------------|--------------------------|------------------------|------------------------|
| Marshallian | ü | ü | ü |
| Hub-and-spoke | ü | ü | ü |
| Satellite Platform | ü | ü | ü |

Source: after Markusen (1996), authors’ own design

We would offer two critiques of this analysis and distinction of innovation networks. The first is that there is an omission of non-functional ‘global networks, with an emphasis on only those that are related to the position within the global production network. There is a growing body of literature which stresses the wider socio-culture networks within which people are active, relating to notions of ‘epistemic communities’ (Haas, 1992). This parallels Boschma’s (2005b) notions of non-spatial forms of proximity which may influence the innovation process, including juridical, social, institutional, organizational and cognitive, by bringing certain kinds of remote partner closer together to facilitate the transfer of knowledge.

The second critique of this approach is that there is a very 'thin' and functionalist reading of regional social networks. Even if one restricts consideration of regional social networks to those which immediately pertain to the economic transactions at hand, these regional social networks are not viewed as networks but rather as actor characteristics. By actor characteristics, we argue that there is a tendency to say that there is a characteristic such as 'trust' or 'social capital' present within the economic network which facilitates the material interactions. But what this effectively does is deny the wider social base of this, and in particular, ignore the wider social life of that particular activity.

Once we regard these social activities as being networks in their own right then we must also concern ourselves with the dynamics of those social networks beyond the direct innovation networks within which the economic activity takes place. Some of those social networks will be exogenous to the economic activity, such as those networks through which personal social and cultural identities are enacted such as ethnicity, religion, nationality, regional identity and leisure activities. But – following Wenger (1998) – it is important to emphasise that even for those social networks which are endogenous to the economic activity, social relationships and behaviours may build up which are primarily social and not primarily dedicated to the pursuit of innovation (*cf.* Klein Woolthuis, 1999; Whitehurst, 2007).

We argue that although these various networks are slippery and the concept of a regional space as an emergent property is perhaps slightly unsatisfying, it does provide a means of addressing the problem which has undermined TIMs. This problem is the already alluded to focus on micro short-term behaviours whilst making claims about meso-level long term cultures and structures. Dealing with this complexity is necessary in order to get beyond the spatial envelope, and its complexity is clearly a challenge which needs directly addressing to revitalise the stalled progress in ideas around learning regions and territorial innovation more generally. It is to the scientific practicalities of this future challenge that the final section of this paper now turns.

7 TOWARDS A FUTURE OPERATIONAL RESEARCH AGENDA

To date, we argue that there has been insufficient work in this area which has been sufficiently theoretically robust or empirically generalisable to allow the development of such an agenda without considerable additional work. Our paper is concerned with the robustness of TIMs in general, and uses SDIN to make a wider point that there is a need for a reconceptualisation that particularly comes to terms with the complexity of 'regional' systems which drawn on multiple networks which are more or less bounded by formal territorial boundaries. We argue that there are four key areas where there need to be further work to expand this agenda and help to create a territorial innovation model emphasising network learning which does not fall foul of the critiques made of TIMs in general and learning regions in particular.

There needs to be a robust theoretical definition, establishing clearly the assumptions made for the concepts used and the relationship with other concepts (Lagendijk, 2003). Secondly, there needs to be an identification of the mechanisms and characteristics under exploration (Moulaert & Sekia, 2003). Thirdly, there needs to be a methodological frame established for the research work (*cf.* Markusen, 1996; 1999). Finally, it is necessary to reflect on the tensions which are evident at the outset to

avoid overclaiming the theory and to allow for its judicious further development (Hassink, 2007).

7.1 Towards a theory of social dynamics of innovation networks

The first element is to establish its theoretical framework, and specifically to answer the question of what is a socially embedded ‘regional’ innovation network, and how does it drive regional economic development? In this it is necessary to state that this approach is actor-driven, and the ‘region’ functions as an aggregate space where many connections within networks overlap: the region is an emergent property of actor choices rather than an actor itself with autonomy and agency. The theoretical approach is rooted in network-based theories of economic development, which go back to Williamson (1975) who sees networks as an efficient way of co-ordinating innovation activities. Granovetter (1985) sketches out the enculturating effects that this can have where innovation networks are co-terminous with regional spaces, and when policy-makers seek to improve and exploit them.

Much has been said about the idea of networks without really drawing very heavily on network theory, so it is worth at this stage saying a little about our heuristic of networks in regional economic development. This has its origins in Lundvall’s ideas of user-producer interaction (1988) and Callon & Bell’s (1992) notion of techno-economic networks, also drawing on *inter alia* Klein Woolthuis (1999), Hanson *et al.* (2004) and Kahlio *et al.* (2010). However, the difference lies in the treatment of social variables: in regional innovation systems approaches, repeated interaction between innovators has a structuration or enculturation effect. This is highly functional, and has the effect of making it seem like the purpose of institutions and cultures is the support of economic activity, which is a very restrictive materialist perspective.

By contrast, we argue that – drawing on literatures of socialised learning in networks (e.g. Wenger & Snyder, 2000; Wenger *et al.*, 2002), it is possible to argue that in particular these ‘soft’ cultures have their own social lives which unfold in networks which operate in parallel to these formal economic production networks (Burt, 2004; 2004). Where there is a ‘strategic coupling’ between the social and innovation networks (to draw on Yeung’s phrase) then this supports the innovation process. Likewise, when ‘hard’ institutions are created that help encourage particular business cultures and the supporting cultural networks, then new institutions can be supported. If this is true, then this would provide a novel insight into the long-standing enigma of institutional borrowing, and in particular, the conditions under which institutions can be transferred between different regional contexts.

7.2 The mechanisms and dynamics of social and socialised learning in innovation

This helps us to develop the second of our dimensions, the mechanisms and characteristics of socialised learning in networks. Actors are connected within networks for the purposes of innovation, exchanging knowledge and resources with one another to allow each actor to reach their goals. Innovation networks largely overlap with supply chains but sometimes third parties may become involved, and there can be links between sectors (Neffke *et al.*, 2009; Neffke & Henning, 2010). Formal network analysis focuses on understanding the topology of networks, and in particular which actors are most powerful within the networks in terms of having greatest access to resources, and which gaps exist in the network which inhibit

effective co-operation (structural holes). To this formal network analysis we would argue that it is necessary to understand the dimensions of multiple, overlapping networks with variable local participation and no guarantee of local boundedness.

This point raises the very important question of how actors active work across multiple networks which have very different dynamics (e.g. a innovation network and a kinship network) where the different actors may disregard the validity of the other. Hitherto this point has tended to be avoided, assuming that under certain conditions actors may act as boundary spanners between these different 'network worlds'. We contend that understanding the regional effects of social and cultural networks on innovation means that it is important to understand the conditions and dynamics whereby these different and non-interacting networks can mutually interact. Is it purely through financial resources, which is at least likely, or are there knowledge and human (capital) overflows across networks? Can and does social capital build up linking these networks over time? How can we categorise regional socio-cultural dynamics in ways that go beyond treating culture as a residual that explains what other variables cannot.

7.3 The methodology of researching social networks in innovation

This leads to the third of our points, which is to clearly specify the methodological and methods to be used to produce evidence which helps develop, rather than merely and suggestively supporting, the theories developed. There are three elements of our network model, namely, the actors, the relationships and the resources which interact, to which a fourth may be added of the kind of network (regional vs global, economic vs social, formal vs informal). Methodological rigour requires that these different elements are well-specified, and avoiding at least two recurrent problems.

The first is of the actor, and the question for innovation is whether it is the organisation or the individual which is the actor – if it is the individual, then the organisation itself can be viewed as an innovation network which adds an additional level of complexity to the analysis (Mattes, 2006). Clearly there is a problem here in corporate innovators who have not embraced 'open' models in assuming a primacy of these corporate innovation networks over those networks external to the firm. However, we argue that this is necessary to allow at least a consideration of the other social, cultural and epistemic networks in which innovators are active which have a role in shaping their innovative behaviour, and in aggregate shaping regional economic innovation performance.

The second methodological problem is specifying the definition of relationships and resources; in many of the interactions, these will be inseparable: a firm and a university will exchange cash and knowledge and at the same time that will be the nature of the relationship between the innovator and the scientist. If networks are defined by relationships and not just resources (a key contention of our approach) then more thought will need to be given to conceptually specifying these two elements, as this distinction is a critical part of our analysis, without which it collapses to a 'innovation network' approach which does not capture the 'social' in the socialised learning processes.

7.4 Tensions and barriers on the road ahead

The final point that we make concerns the tensions evident in the model we are proposing, the most evident of which is its complexity. Complexity has to be dealt

with through a process of simplification, and the way that that simplification is undertaken will affect the overall validity of the research undertaken. The biggest risk in such a situation is a reversion to incomparable case studies which do not produce 'stylised facts' around the role of social networks in socialised innovation processes. Stylised facts are a means of getting beyond (Venables, 2004) particular case study situations and inferring more general rules and regularities which can contribute to ongoing scientific debate around the topic at hand. This commonly happens in regional studies through the development of regional typologies based on common characteristics and dynamics of interaction. It is therefore necessary to identify the kinds of social network characteristics on which regional typologies could be developed.

A second tension relates to the possibility of theoretical elision with other kinds of TIMs which are not so thoroughly rooted in network models of innovation as the key driver of economic growth. We have already noted that the social networks approach differs from regional innovation system approaches in terms of its attitude towards the cultures and institutions which emerge, and the consequent agency and autonomy of the region. A similar distinction can be made in terms of innovative milieu where 'culture' is an exogenous independent variable; in our approach culture and social variables are continually evolving through networked interactions whose evolution shapes the territorial innovation capacity. Care need to be taken in ensuring that these distinctions are retained and claims are not readily transported from social networks approaches

8 BIBLIOGRAPHY

- Albrechts, L. & Swyngedouw, E. (1989) "The challenges for regional policy under a flexible accumulation regime" in L. Albrechts, F. Moulaert, P. Roberts & E. Swyngedouw (eds) *Regional policy at the crossroads: European perspectives*, London: Jessica Kingsley
- Amin, A. & Palan, R. (2001) Towards a non-rationalist international political economy, *Review of international political economy*, 8, pp. 559-577.
- Amin, A., & Robins, K. (1991) 'These are not Marshallian times', in R. Camagni (ed), *Innovation networks: spatial perspectives*, London: Belhaven.
- Asheim, B.T. (1996) 'Industrial districts as "learning regions": a condition for prosperity,' *European Planning Studies* 4 (4) pp 379 400.
- Benner, C. (2003) "Learning communities in a learning region: the soft infrastructure of cross firm learning networks in Silicon Valley" *Environment & Planning A* 35 (10) pp 1809-1830.
- Benneworth, P. S. & Henry, N. (2004) "Where is the value added in the cluster approach? Hermeneutic theorizing, economic geography and clusters as a multi perspectival approach" *Urban Studies*
- Boschma 2005a in Boschma & Kloosterman Festschrift.
- Boschma, R.A. (2005b), Proximity and innovation. A critical assessment, *Regional Studies*, 39 (1) , pp. 61-74.
- Burt, R. S. (2000). The Network Structure of Social Capital. In R. I. Sutton & B. M. Staw (Eds.), *Research in Organizational Behaviour* (pp. 345-423). Greenwich: Elsevier.
- Burt, R. S. (2004). Structural Holes and Good Ideas. *American Journal of Sociology*, 110, 349-399.
- Callon, M. & Bell, G. (1994) 'Techno-Economic Networks and Science & Technology Policy', *Science Technology Industry Review*, Paris: OECD.
- Christopherson, S. & Clark, J. (2007) "Power in firm networks: what it means for regional innovation systems", *Regional Studies* 41 (9) pp. 1223–1236.
- Coenen, L. (2006) ' "Faraway, so close" the changing geography of regional innovation, CIRCLE, Lund University, Lund, Sweden.
- Cooke, P (2005) Regionally asymmetric knowledge capabilities and open innovation : exploring 'Globalisation 2' – a new model of industry organisation, *Research Policy*, 34, pp. 1128-1149.
- Florida, R. (1995) 'Towards the learning region,' *Futures* 27 (5) pp 527 536.
- Garvin, D.A. (1993) 'Building a learning organisation' *Harvard Business Review* July August, pp. 78 91.
- Gertler, M. S. & Wolfe, D.A. (2006) "Spaces of knowledge flows. Clusters in a global context" in B. Asheim, P. N. Cooke, & R. Martin (eds) *Clusters and regional development. Critical reflections and explorations*, Routledge, London.

- Gordon, I. R. and McCann, P. (2000) "Industrial clusters: complexes, agglomeration and/or social networks?" *Urban Studies* 37 (3) pp 513-532.
- Granovetter M. (1985) 'Economic action and social structure: the problem of embeddedness', *American Journal of Sociology* 91(3) pp. 481-510.
- Hansson, F. Husted, K. & Vestergaard, J. (2004) Rethinking science parks – from structural holes jockeys to social capital catalysts, *Technovation* (25), 1039-1049.
- Harrison, B. (1992) 'Industrial Districts: Old Wine in New Bottles?' *Regional Studies* 26 (5) pp. 469-483
- Hassink, R. (1993) 'Regional Innovation Policies compared', *Urban Studies* 30 (6) pp. 1009-1024.
- Hassink, R. (2007) "Learning regions: a constructive critique" in R. Rutten & F. Boekema (eds) *The Learning Region; Foundations, State of the Art, Future*, London: Edward Elgar, pp 252-272.
- Hassink, R, Lagendijk, A. (2001) 'The dilemma of inter.regional institutional learning' *Environment and Planning C: Government and Policy*, 19: 65-84.
- Henry, N. & Pinch, S. (2001) 'Neo-marshallian nodes, institutional thickness and Britain's 'Motor Sport Valley': thick or thin?' *Environment and Planning A* 33 pp. 1169-1183.
- Henry, N, McEwan, C and Pollard, J S (2002), *Globalization from Below: Birmingham - Postcolonial Workshop of the World?*, *Area*, 34, (2): 117-127, June.
- Hudson, R. 2003 Fuzzy concepts and sloppy thinking: reflections on recent developments in critical regional studies, *Regional Studies*, 37: 741-746.
- Kallio, A., Harmaakorpi, V., & Pihkala, T. (2010) "Absorptive Capacity and Social Capital in Regional Innovation Systems: The Case of the Lahti Region in Finland", *Urban Studies* 47 (2), pp. 303-319.
- Karlsson, C. (2008) "Introduction" in C. Karlsson (ed.) *Handbook of research on innovation and clusters: cases and policies*, Cheltenham, Edward Elgar.
- Klein Woolthuis, R. (1999) *Sleeping with the Enemy: Trust Dependence and Contract in Interorganisational Relationships*, University of Twente Press, Enschede, the Netherlands.
- Koschatzky, K. (2009) "The uncertainty in regional innovation policy: some rationales and tools for learning in policy making" Working Papers Firms and Region No. R6/2009, Karlsruhe: Fraunhofer ISI.
- Lagendijk, A (2000) "Learning in non-core regions: towards intelligent clusters; addressing business and regional needs" in R. Rutten, S. Bakkers, K. Morgan, and F. Boekema (eds) *Learning regions, theory, policy and practice*, London: Edward Elgar, pp. 165-191.
- Lagendijk A. (2003) "Towards conceptual quality in regional studies: the need for subtle critique — A response to Markusen" *Regional Studies*, 37 (6/7) pp. 719-727.
- Lagendijk, A. & Cornford, J. (2000) "Regional institutions and knowledge — tracking new forms of regional development policy" *Geoforum* 31 pp 209-218.

- Lagendijk, A. and Oinas, P. (2005) Proximity, external relationships and local economic development in A. Lagendijk AND P. Oinas (Eds) Proximity, Distance and Diversity, Issues on Economic Interaction and Local Development, London: Ashgate.
- Lovering, J. (1999) 'Theory led by policy: the inadequacies of the 'new regionalism' (illustrated from the case of Wales)' *International Journal of Urban and Regional Research*, 23 (2) pp. 379-395.
- Lundvall, B. Å. (1988). Innovation as an interactive process – from user-producer interaction to the national system of innovation. In: G. Dosi et al. (Eds), *Technical Change and Economic Theory*. London: Pinter Publishers
- Markusen, A., 1996, "Sticky Places in Slippery Space: A Typology of Industrial Districts", in *Economic Geography*, 72: 293–313.
- Markusen, A. R. (1999) 'Fuzzy concepts, scanty evidence, policy distance: the case for rigour and policy relevance in critical regional studies' *Regional Studies* 33 (9) pp. 869-884.
- Martin, R. and Sunley, P. (2003) "Deconstructing clusters: chaotic concept or policy panacea?" *Journal of Economic Geography* 3 (1) pp 5-35.
- Massey, D. (1978) "In what sense a regional problem?", *Regional Studies* 13, 2.
- Mattes, 2006.
- Morgan, K. (1997) 'The learning region: institutions, innovation and regional renewal,' *Regional Studies* 31 (5) pp. 491 403.
- Moulaert, F. & Nussbaum, J. (2005) Beyond the learning region: the dialectics of innovation and cultural in territorial development, in R.A. Boschma & R.C. Kloosterman (Eds) *Learning from clusters: a critical assessment from an economic-geographical perspective*, Dordrecht: Springer.
- Moulaert, F. and Sekia, F. (2003) 'Territorial Innovation Models: a Critical Survey' , *Regional Studies* vol. 37 no. 3, pp. 289-302
- Neffke F.M.H. & Henning M. (2010) Seeds of regional structural change. The role of entrepreneurs and expanding firms in shaping local path dependencies, *Papers in Evolutionary Economic Geography* 1005, mimeo.
- Neffke F.M.H., Henning M. & Boschma R.A. (2009) How do regions diversify over time? Industry relatedness and the development of new growth paths in regions, *Papers in Evolutionary Economic Geography* 0916, mimeo.
- Pedler, M., Burgoyne, J., & Boydell, T. (1991) *Towards the learning company: concepts and practices*, London: McGraw.Hill.
- Piore, M. J. & Sabel, C. F. (1984) *The Second Industrial Divide*, New York: Basic Books.
- Porter, M. E. (1990) *The Competitive Advantage of Nations*, Basingstoke: MacMillan.
- Romer, P. M. (1986) 'Increasing returns and long-term growth,' *Journal of Political Economy* 94 (5) pp. 1002-1037.
- Rutten, R. & Boekema, F. (2007a) "The learning region: a conceptual anatomy" in R. Rutten & F. Boekema (eds) *The Learning Region; Foundations, State of the Art, Future*, London: Edward Elgar, pp 126-142.

Rutten, R. & Boekema, F. (2007b) "The learning region: foundations, state of the art, future" in R. Rutten & F. Boekema (eds) *The Learning Region; Foundations, State of the Art, Future*, London: Edward Elgar, pp 1-14.

Rutten, R. & Boekema, F. (2007) paper in *Zeitschrift für Wirtschaft Geografie*.

Saxenian, A.-L. (2000) 'Networks of immigrant entrepreneurs' in C. M. Lee, W. F. Miller, M G. Hancock & H. S. Rowen (eds) *The Silicon valley edge: a habitat for innovation and entrepreneurship*, Stanford, CA: Stanford University Press.

Simmie, J. (1997) 'The origins and characteristics of innovation in highly innovative areas: the case of Hertfordshire' in J. Simmie (ed) *Innovation, networks and learning regions*, London: Jessica Kingsley, pp. 13-31.

Storper, M. (1993) 'Regional "worlds" of production: learning and innovation in the technology districts of France, Italy and the USA', *Regional Studies* 27 (5) pp. 433-455.

Storper, M. (1995a) 'The resurgence of regional economies ten years later: the region as a nexus of untraded interdependencies', *European Urban & Regional Studies* 2 (3) pp. 191-221.

Storper, M. (1995b) "Regional technology coalitions an essential dimension of national technology policy," *Research Policy*, 24 (6), pp. 895-911

Trigilia, C. (1991) 'The paradox of the region: economic regulation and the representation of interests', *Economy and Society* 20 (3) pp. 306.327.

Venables, 2004 in regional studies

Wenger, E. (1998) *Communities of Practice: Learning, meaning and Identity*. Cambridge University Press, Cambridge; new York; Melbourne.

Wenger, E., McDermott, R. & Snyder, W. M. (2002) *Cultivating Communities of Practice: A Guide to Managing Knowledge* (Boston, MA, Harvard Business School Press).

Wenger, E. C. & Snyder, W. M. (2000) *Communities of practice: the organizational frontier*, *Harvard Business Review*, 78(1), pp. 139 – 145.

Whitehurst, F. (2007)

Williamson, O. E. (1975) *Markets and hierarchies: analysis and antitrust implications*, New York: The Free Press. Yeung, H. W. (2009) "Situating regional development in the competitive dynamics of global production networks: an East Asian perspective" in H. W. Yeung (ed) *Globalizing regional development in East Asia: production networks, clusters, and entrepreneurship*, London: Routledge