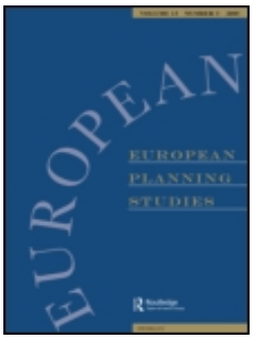

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EUROPEAN BRIEFING

Territorial Knowledge Dynamics: From the Proximity Paradigm to Multi-location Milieus

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Abstract *This paper addresses the issue of updating a research agenda about territorial innovation models (TIMs) such as innovative milieus, industrial districts, regional innovation systems, etc. The theoretical shift from innovation studies to the knowledge economy is taken into account by the suggested concept of territorial knowledge dynamics (TKDs). Observable major changes within society are also integrated, especially the huge increase in the mobility of production factors. The thesis developed is that the learning processes in TIMs were mainly cumulative knowledge dynamics that varies according to the scale of the region (the traditional local/global framework), whereas today's combinatorial knowledge dynamics develop in multi-location and multi-scalar ways. Knowledge circulates to a greater extent and is continuously mobilized and combined within interacting firms and regions. In this paper, ideal typical forms of TKDs are formulated from three research perspectives: a relational approach, a circulatory approach and a structuralist approach. This paper presents the theoretical background used by the European research project "EURODITE" on these specific issues.*

1. Introduction

A knowledge-based economy is defined by the systematic and permanent mobilization of knowledge in order to analyse the result of actions and to design new actions to be undertaken (Ascher, 2001; Foray, 2004). Learning and innovation—meaning the design and implementation of new technical solutions and/or new products/services—are not intermittent or occasional as is the case in traditional industry, but are ongoing processes.

Over the last 20 years, territorial approaches have played an important role in the innovation and knowledge economy. They have given rise to a vast array of literature

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that is currently the subject of numerous syntheses and retrospective reviews (see, for example, the synthesis of territorial innovation models (TIMs) by Moulaert and Sekia (2003), that on innovation and space by Simmie (2005), the special issue of *Regional Studies* on innovation and space in 2005 or the critical review of literature by Lagendijk (2006) on conceptual flow in regional studies). The archetypical productive forms represented by innovative milieus, technopoles, industrial districts or more generally clusters are today considered to be organizational modes through which economic change takes place. They have also made it possible to draw up various regional policies (Sagan & Halkier, 2005). The considerable merit of these approaches is that, as of the 1980s, they succeeded in articulating various analytical dimensions of innovative processes (technological, industrial, economic, spatial and socio-political) and in building a paradigm for study that was, until recently, pertinent.

We nevertheless consider that today it is necessary to bring these conceptions up to date in order to take into account the changes that have taken place at two levels. First, at a theoretical and conceptual level, there has been a rapid development of new theories on the knowledge economy and a radical expansion of the conceptions of innovation to include socio-cultural dynamics and the economy of services, which makes it necessary to move beyond the concept of innovation that was inherited from the industrial economy. Secondly, at a more general level of the development of society and the economy, it is necessary to take into account the extraordinary growth we are witnessing regarding the mobility of information, knowledge, individuals and capital. The traditional paradigm covered by Moulaert and Sekia (2003) under the generic designation of TIMs is in fact essentially based on the thesis of the immobility or low mobility of production factors, at least at an international level. On a European scale and beyond it, however, we are witnessing an increasingly intensive circulation of these factors. Regarding capital, the situation is evident. Regarding labour and competencies, although migrations and changes of job are not increasing a great deal, today's working methods call for considerably more work-related travel than in the past.

The objective of this article is to formulate the basic reflections and main hypotheses within a renewed research programme that articulates knowledge economy and territorial dynamics around the concept of territorial knowledge dynamics (TKDs). The work has been carried out in two research contexts. First, the Group for European Research on Innovative Environments (GREMI) initiated reflection on the current issues at stake within research into territorial economies (Colletis-Wahl *et al.*, 2008). After that, a conceptual framework was established for the EUDODITE (http://www.eurodite.bham.ac.uk/) research programme: a project that is currently carrying out a series of on-site surveys in order to explore theories similar to those presented here.

In this article, we are defending the idea that it is essential to broaden the traditional paradigm based on innovation trajectories to include knowledge dynamics. In the traditional paradigm, and seen in schematic form, economic activities evolve in a linear or cumulative manner, as and when innovations take place. At the same time, only proximity interactions permit rich, multi-functional learning. The regions thus become specialized within a global market.

At present, there is a development of new information technologies, a drop in transport costs, easier movement of persons, progressive integration of research and higher education within corporations, as well as considerable growth in intangible activities within the composition of a product and its consumption. All these factors are leading to a growth

and multiplicity of knowledge, and one that can be mobilized rapidly and over greater distances. The decisive factor is therefore no longer the fact that economic activities match regional training and research structures, but the local capacity to formulate entrepreneurial projects and also the ability to mobilize knowledge and competences at medium and long distances.

The research hypothesis we present here can be described as follows. The traditional regional trajectories of the specialization of techniques and products are based on knowledge dynamics that are mainly cumulative, within a structure that articulates both local and global factors indifferently. The trajectories are, however, giving way to combinatorial territorial dynamics that are mainly based on the anchoring of composite (Antonelli & Calderini, 2008) fields of knowledge. In other terms, there is a move from specialization within regional production systems to more specific regional knowledge and resources within multi-location networks of mobility and anchoring.

Our reasoning is structured into four phases. The first part briefly covers various conceptions relating to knowledge. Knowledge is envisaged as a dynamic of social interactions rather than a public or private good that generates externalities.

The second part handles the characteristics of the traditional paradigm of TIMs (Moulaert & Sekia, 2003) and emphasizes the cumulative aspect and the role of proximity within local/global articulation.

The third section presents the major changes that affect traditional innovation and learning dynamics: the growing and central role of socio-cultural dynamics, the development of increasingly fungible technologies, and finally the growth in the mobility of information, knowledge and individuals.

The fourth part sketches out three possible research avenues in order to explore these hypotheses: a relational approach, a circulatory one and a structuralist one.

To conclude, we shall return to the evolution of the role of the local aspect within TKDs, and in particular concerning the functions of specification by means of local milieus. In fact, the theories of the 1990s see the local scale as being the privileged one for endogenous development. Moreover, the region remains the principal entity for implementing territorial innovation policies. Reflection on the possibility for action at this scale is thus always meaningful.

2. Knowledge as a Social Dynamic

Knowledge is addressed in different ways within economic and social theories. In this section, and without wishing to present an exhaustive inventory thereof, we shall explain how knowledge can be conceptualized within a territorial approach.

2.1 *Knowledge: A Public Good, a Private One or a Collective Activity?*

The neo-classical economic approach specifies knowledge as being a capital good: its construction is costly and its use produces a yield. It is finished in the sense that it does not change during its purchase or sale. It evolves from given technological changes that are exogenous to the system. It is furthermore not contextual and its value is *a priori* independent of its location or depends only on exogenous transaction costs. The debate has thus become focused on its nature as a private or public good. If knowledge is a public good, it generates externalities from which enterprises can benefit.

Antonelli (2006) stresses that it is difficult to consider knowledge as a public good in the strict sense as advanced by Arrow, since certain institutional mechanisms, such as intellectual property rights, or socio-cultural mechanisms such as language, make it possible to restrict access to knowledge or to appropriate it. Inversely, the phenomena of swarming and overflow, frequently observed when new discoveries are made, prove that knowledge cannot be perceived as a private good that can be fully appropriated.

Beyond the public/private debate, Antonelli claims that knowledge can also be treated as a collective activity involving the capacity to enter into interaction with various actors within economic and social contexts.

2.2 *Knowledge as a Sharing Process*

Knowledge is also perceived as a collective, shared activity within territorial economy. When taking a social perspective, the processes of interaction and learning become the main subject of study. We thus move from a concept in terms of static externalities from which certain economic agents can benefit thanks to the market's imperfections to one that is relational, evolutionary, and more compatible with territorial approaches.

Knowledge develops through interaction among actors. It is composed of various processes: generation, use, circulation and anchoring. These general processes are moreover contextualized, i.e. the pertinence of their specific content is only revealed in relation to their context. The socio-spatial configurations of knowledge dynamics networks have thus become particularly worthy of study.

In territorial terms, individuals and competencies move around and interact with others at varying distances. Thus, either continuity and/or development take place or there is a break. These different knowledge dynamics should thus be studied more closely, observing the way in which they are articulated around economic processes.

3. The Traditional Paradigm: Clusters, Milieus, Districts and so on

Towards the end of the 1980s, various trains of thought within territorial economy developed in order to account for the diverging dynamics among regions or within a single country. Benko and Lipietz (1992) offered, at the time, a panorama of these approaches (industrial districts, science parks, etc.). We should also mention the GREMI research programme which, as of 1985 (see Aydalot, 1986), progressively drew up and documented the concept of the innovative milieu (Camagni & Maillat, 2006). Without ignoring the differences between these theoretical approaches, the present paper opts to design them under the generic name of TIMs proposed by Moulaert and Sekia (2003).

TIMs developed mainly during the second half of the 1980s and in the 1990s in order to explain the crisis affecting traditionally prosperous industrial regions on the one hand, and on the other the success of other regions such as the so-called "Third Italy". This work was followed by other approaches such as that of learning regions (Lundvall, 1992; Florida, 1995; Morgan, 1997; Maillat & Kebir, 1999) or that of evolutionary geography (Boschma & Frenken, 2006). These authors developed the basic concept by—among other aspects—integrating concerns relating to knowledge yet without questioning its role.

In this section, we recall the way in which, globally, these theoretical approaches articulate economic change (mainly handled from the notion of innovation) and the territory (which identifies and compares proximity learning and those taking place at a distance).

We also review various criticisms that have been made as of the early 1990s, notably from the "Proximity Dynamics Group" (Torre & Gilly, 2000; Boschma, 2005).

We shall also highlight what constitutes the core theories of innovative milieus and industrial districts, i.e. the idea that "local" is the scale at which innovation emerges. Moulaert and Sekia, for example, provide a clear picture of how endogenous development is at the origin of TIMs.

3.1 *Specialization of Activities and Regions Based on Technological Trajectories and Rich Proximity Learning*

In an industrial approach to economy, Nelson and Winter (1982) distinguish between radical innovations and technological trajectories. Radical innovations (for example, organic chemistry) appear as exceptional phenomena. Their origin is exogenous to the system and they open up a new development constituted by the succession of innovations that mobilize the basic techno-scientific principles of radical innovation. Innovation therefore takes place along new trajectories that appear intermittently. Each phase leads to refining new techniques or products that are then implemented over a certain period. The dynamics of using and generating knowledge emerge during this trajectory, increasing the division of labour within the industry. Thus, sectors of activity and companies develop that are distinct from one another in terms of their technologies and products. The knowledge dynamic is mostly cumulative.

From a spatial point of view, the work carried out in the 1980s and 1990s is largely inspired by work on industrial economy and identifies the trajectories and breaks that characterize the TIMs.

Geographical proximity favours the cumulative dynamics of using and generating knowledge. These theories, but also those on communication, all—in one way or another—place the emphasis on the fact that rich interaction producing creative learning requires, to a considerable extent, geographical proximity.

To do so, it is necessary to differentiate between two degrees of learning (Planque, 1991; Maskell *et al.*, 2006). On the one hand, there are mono-functional (Planque, 1991) or strong focused learning (Maskell *et al.*, 2006), whose objectives are clearly identified from the outset and within which the division of labour among the various participants is clearly established. This rather fine-tuned or targeted mono-functional knowledge dynamic reduces uncertainty or restricts it to calculable risks. The cognitive division of labour is organized and stable. The external effects are in principle known, anticipated and sought after by the organization (whether a network or via intra-company projects). Such learning can overcome the barriers represented by distance or by the absence of a common past, since the said organization and convergence of interests makes up for those aspects.

On the other hand, there are multi-functional or diffused focused learning, which apply to several dimensions at once and in which the participants' contributions are not clearly established at the outset. Consequently, this type of knowledge dynamic is characterized by complexity and considerable uncertainty. It can only take place to the extent that assurances regarding relations between the actors exist (trust, commonly respected rules on competition/co-operation, relational capital, common language, etc.) (Grossetti & Godart, 2007). Since the cognitive division of labour is not stabilized and the external effects among the partners can take many forms, such learning usually traverse a lengthy

socialization process that is in principle only possible within the framework of physical proximity or at least by means of prior sharing of rich experiences typical of a milieu.

3.2 *A Dynamic Between Local and Global, Progressively Placed in Proportion*

Multi-functional learning requiring proximity, associated with a mono-functional opening to increasingly open markets and technologies that are developed elsewhere, leads to the territorial paradigm of the 1980s and 1990s: that the local, innovative dynamic permits a region to become part of an increasingly global economic environment.

This relation has always been perceived as a two-way phenomenon. Regions that come under pressure because of the increase in competing producers or technologies are supposed to adapt thanks to a local dynamic of appropriating the new technologies or of organizational change. Inversely, the regions that produce radical innovations locally achieve penetration of a global market and modify the market's characteristics.

The traditional industrial district (Becattini, 1992; Garofoli, 1992) takes into account a relative continuity and cumulativity in the dynamics of generating and using knowledge within it. In fact, the regional context (social, cultural, economic, institutional, etc.) is articulated in a coherent, cumulative manner with the objective of ensuring that the generation of knowledge is as closely as possible in line with the demands imposed by its use. A district's competitiveness is thus strongly dependent upon coherence between the use and the generation of knowledge within it.

Likewise, in the case of the classical innovative milieu, the local milieu generates and uses, as a priority, cumulative knowledge generated by multi-functional learning. It is, however, also capable of using—intermittently—knowledge generated elsewhere, in a mono-functional manner. Certain territorial dynamics are articulated around a local, multi-functional learning that is open to the evolution of the market, of technologies and of global, external knowledge.

It should be noted that these models once again strongly reflect the idea that industry is the driving activity in innovative regions. Fundamentally, production and innovation takes place in one region and is sold elsewhere. Moreover, it should be noted that innovation is most frequently technological, and that efforts are made to organize space around this reality (in the form of technopoles).

Innovative regions are those that are capable of imagining their local activities within a global environment by means of a development process that is above all endogenous. In other terms, in order to be innovative a region must be capable of matching its dynamics of the use and the generation of knowledge. These dynamics are cumulative and to a large extent evolve within the regional system. Today, with the massive changeover to tertiary activities, the distinction between production and consumption that is typical of industrial society—including from the spatial point of view—is considerably called into question. The current systems articulate production and consumption in a far more complex way.

Traditional literature develops numerous TIMs yet without making knowledge as such a subject for study. It was only with the emergence, towards the end of the 1990s, of theories on learning regions that knowledge was considered as a resource for local innovation (Lundvall, 1992; Florida, 1995; Morgan, 1997; Maillat & Kebir, 1999).

It is also to be mentioned that, over the 1990s, works on communities of practice (Lave & Wenger, 1991; Wenger, 1998) have developed without placing continuous co-location or geographical proximity as a necessity for multi-functional learning. In this theory,

shared social and historical resources, frameworks or perspectives—either at a local or a global scale–permit negotiation and re-negotiation of cognitive resources and create rich knowledge dynamics. Geographical proximity is only seen as an opportunity for the constitution of a community of practice and is not placed in the heart of learning processes.

3.3 *The Local Capacities for Development Remain Central*

The entire debate on territorial development during the 1990s was organized around the models presented above. Certain criticisms emerged at a relatively early stage. As of 1992, the "Proximity Dynamics Group" focused on understanding why proximity would be a source of benefits in the field of learning and innovation. Their work examines the role of space, and more particularly of geographical proximity, in economic organizational processes. It does not, however, seek to be a substitute for TIMs, since the latter are in fact considered to be the "new orthodoxy" (Amin, 1996). Here, we are proposing a broader ideal type, i.e. multi-location knowledge dynamics.

Our proposal cannot, however, be placed alongside criticisms already made in relation to industrial milieus and districts, but quite to the contrary. The strength behind the message conveyed by industrial milieus and districts is that economic development does not depend on the initial allocation, on the production system present in a given space, but far more on the local capacity to mobilize and reconfigure local resources within an innovative entrepreneurial project. This capacity depends only partially on the history of the place in question. Beyond that, the crucial factors are far more those of individual liberty and the capacity to act collectively.

In the proposal made here, the passage to a multi-location milieu consists of reflection regarding the current possibilities for interaction and of developing rich learning that take place at a distance. We do not lose sight of the fact that there are certain spaces—milieus—in which development emerges: our aim is to explore the new forms that these processes are taking on.

4. Adapting to Today's Questions

It is also necessary at present to broaden the traditional paradigm, since the incorporation of knowledge into economic processes no longer takes place in a sporadic manner but one that is systematic and permanent (Ascher, 2001; Foray, 2004). Today, innovation is thus radically different from the traditional model of the industrial society, and in many ways (Colletis-Wahl *et al.*, 2008). Knowledge dynamics are strongly affected. We can advance as a research theory that there is a swing from the model in which knowledge dynamics are cumulative towards one in which they are more combinatorial and are thus able to offer a broader research paradigm.

4.1 *Causes of Change: Changes Within the Economic and Socio-cultural Context*

This hypothesis is mainly based around three economic and social changes that have let to profound changes within our current society.

The first of the changes to the conditions for innovation is that numerous recent technologies, such as information technology or the Internet, have become highly decompartmentalized since they have been brought into—and perfected within—an

extremely large number of activities and have also been combined with other technologies. Antonelli (2006) speaks of fungible knowledge that has become increasingly flexible and configurational, i.e. it can be adapted to the needs and ideas that develop in many sectors.

Secondly, numerous innovations today take place more frequently via socio-cultural dynamics than techno-scientific ones (Kebir & Crevoisier, 2007). In fact, changes to society's values and practices are currently responsible for changes to products and services. This phenomenon takes on various forms and has been the subject of many research projects (Cooke & Lazzeretti, 2008). First of all, and at a fairly trivial level, the growth of the cultural industries (media, entertainment sport, tourism and leisure, cinema, video games, etc.) requires above all socio-cultural knowledge. Secondly, the incorporation of cultural and aesthetic aspects, etc., within products is taking on increasing importance within the components thereof. Clothing, watchmaking, the automobile industry, etc., are examples of traditional industries whose products are evolving more and more according to fashion, aesthetic trends or society's ethics. Finally, we see the significant development of "the experience economy" (Pine & Gilmore, 1999), which consists of creating a high level of added value to a classical good or service by incorporating various types of experience related to the consumer's participation or emotions (branding, events, coaching, etc.). This renewed importance of the socio-cultural component of products and services thus highlights, to a greater extent than in the past, the value of symbolic knowledge (Cooke & DeLaurentis, 2007). This trend results in taking learning resulting from relations with consumers into account to a greater extent.

Thirdly, the unprecedented increase in the mobility of goods, services, capital but above all of information and the labour force has strongly affected the flow of long-distance exchange. New multimedia technologies, the development of low-cost transport and political or institutional creations such as the European Union or the World Trade Organization are all leading to a massive increase in information and knowledge exchange and are thus opening up an extraordinary potential for both innovation and competition.

This increase in mobility has loosened spatial and temporal constraints, and the issues at stake are of a new kind. The distinction between rich (multi-functional) learning requiring physical proximity and more finite (mono-functional) ones that can take place at distance seems to have become more relative today. Certain authors are presently perceiving other types of favoured interaction based on organized proximity (Rallet & Torre, 2001), technological proximity (Orlando, 2004) or even virtual proximity (Fontes, 2005) that are freed from geographical proximity. Rich, complex relations can thus be established on larger spatial scales. The role of geographical proximity as it was perceived over recent decades must thus be reconsidered.

Numerous recent research projects have nevertheless shown that geographical proximity remains an important component within the circulation of knowledge (Cooke & Piccaluga, 2005; Cooke & Martin, 2006). We are thus faced with two questions: first, to what extent, and according to what modalities, does this contraction of space/time call local learning processes into question or reinforce them? Moreover, an industrial project now takes place via a combination of competencies that are located in various places, often at some distance from each other. How do the mobility of competencies on the one hand and on the other their re-anchoring within the industrial project, operate? Finally, which are the places that take part in these TKDs? Which are those that are excluded from them? Are spatial hierarchies emerging?

Reflection regarding the new spatial forms that rich learning are taking on clearly shows the justification for taking territory into account within the analysis of current economic phenomena. A genuine research programme on territorial economies consists of exploring these new forms and understanding how they influence economic processes.

4.2 *Consequences of Change: Composite Knowledge Dynamics and Centrality of the Business Model*

Industrial processes have undergone a major change. Notions of industrial sectors and areas have lost their coherency. Knowledge dynamics are at present articulated in a cross-sectoral manner, around composite entities such as health, communication or tourism (Cooke & DeLaurentis, 2007).

If we base our hypothesis on the idea that today numerous possibilities for learning and innovation via the combination of knowledge exist at various external locations, the central question is that of the modalities by which this knowledge can be mobilized. Within composite logic, making use of knowledge takes place by *ad hoc* use, strongly conditioned by knowledge that has already been generated upstream. The project becomes increasingly structuring. In other words, it is to a lesser extent the enterprise, the sector or the technology that shapes the economic processes and to a greater one the *ad hoc* combination thereof around a production/consumption system with a fairly short lifespan. Today, it is no longer simply a question of accumulating knowledge along a trajectory but to an increasing extent of articulating it with knowledge from the exterior.

Works done by Doz *et al.* (2001) on multi-national companies show that it is today necessary to go beyond traditional theories of the spatial division of labour resulting from low-cost production strategies and to develop new concepts based on the capacity to draw up strategies or projects in a meta-national knowledge network. It is no longer sufficient for an enterprise to establish a good global production or a distribution network. The most competitive enterprises are today those that take the most rapid decisions regarding how they will act globally and that combine various types of knowledge that exist elsewhere. It is no longer a question of simply going out to find the appropriate competencies where they are the least expensive, but one of imagining new projects based on competencies that are currently accessible. The availability of competencies precedes and drives innovation. The development of new, knowledge-intensive business services (KIBS) should be placed in relation to this new state of affairs (Strambach, 2001; Simmie & Strambach, 2006).

4.3 *Towards a Broader Paradigm Based on TKDs*

The knowledge-based society that may well be developing before our eyes is questioning the pertinence of the models developed during the 1980s and 1990s since the issues facing the underlying theory were extremely varied. Today, the tremendous mobility of information, knowledge and individuals, the end to the traditional industrial society centred around the production of goods and services, and the emergence of cultural and natural resources within the economic sector constitute the framework for reflection. Naturally, however, these changes do not affect all spaces and all activities at the same time or at the same rhythm.

At present, the economic actors have easier access to extremely numerous areas of knowledge that are spatially dispersed. Their problem is one of identifying and mobilizing these resources within a coherent business model. Asheim *et al.* (2007) highlight the combination of analytical (science-based) knowledge, synthetic (engineering) knowledge and symbolic (branding, design, advertising) knowledge, which all compete one another within industrial processes. Technological knowledge has thus simply become one of the types of knowledge that is combined within economic production.

Work on creative cities (Landry, 2000; Cooke & Lazzeretti, 2008) reveals that certain cities specialize in symbolic knowledge. Those such as Paris, London or New York have long been aware of and used this phenomenon. Today, however, traditionally industrial cities such as Barcelona and Hamburg are making use of cultural dynamism in order to retain their positioning. Industrial cities that have not been capable of carrying out a conversion in the direction of more symbolic knowledge dynamics have in many cases lost some of their importance over recent years.

Moreover, and as we stressed above, the question is no longer one of simply generating and using local knowledge. Certain places, for example, Cambridge in the UK, are seeking to place themselves at the summit of the hierarchy in terms of knowledge, yet without strategies for using local knowledge. Inversely, other—and particularly urban—ones have developed a strong capacity to combine and use long-distance knowledge (Simmie, 2003). As Gaschet and Lacour (2007) have observed, cities have become "clusties" since they are no longer just a specific knowledge system (a "cluster in the city") but are also becoming a central element within wider territorial dynamics by means of activities that permit the anchoring of mobile knowledge (a "cluster by the city"). Here, for example, KIBS play an overriding role (Simmie & Strambach, 2006).

It is thus the capacity to conceive and manage multi-location and cross-sectoral projects that becomes central. The broader territorial paradigm that we propose sees knowledge as a cognitive process that is shared among humans and that is generated and used within social interaction, in various contexts. The paradigm attempts to go beyond the traditional one of innovation and proximity with a view to developing an approach constructed around the concept of TKDs (Table 1).

5. A First Approach to TKDs

The principal objective of the following part is to identify research issues that correspond to contemporary questions while maintaining the principle findings from territorial economies over the last 20 years. Because of the swing from the traditional model of the industrial society to economies of knowledge and greater mobility, it is thus a question of identifying those places where economic dynamism is most likely to emerge.

We are proposing a renewed territorial paradigm that can be expressed in the form of new ideal types that link knowledge dynamics, territorial changes and the various issues at stake today that are described above. This section outlines three approaches to research that we believe will be developed over coming years. The issue is to identify theoretical entry points resulting from the major lines of thought in order to gain a better understanding of economic territorial dynamics.

A first direction takes as its starting point the traditional paradigm of the innovative milieu—or more generally TIMs—and seeks to integrate rich learning at a greater distance (Section 0). Still falling within Schumpeter's tradition of innovation and also within

Table 1. From innovation and proximity to TKDs

	Traditional paradigm: innovation and proximity	Broadened paradigm: TKDs
Initial question	Explain the success/failure of certain regions in a context of technological change and the tertiarization of industrial production	Explain the territorial consequences of hypermobility, opening of borders, the knowledge society, the "culturization" of the economy
Mobilization of new knowledge	Specialized/intermittent	Generalized/continuous
Unit of change	Innovation (mainly industrial or technological)	Knowledge dynamics
Market inter-dependencies	Production and consumption are distinct (traditional goods and services)	Complex production–consumption networks
Local knowledge dynamics	Essentially cumulative trajectories	Dominant combinatorial dynamics
Territorial scales	Local/global	Multi-location networks and multi-scalar processes
Operators, spaces where emergence occurs	Innovative milieus, industrial districts and so on	Multi-location environments
Relation to the global environment	Specialization of activities; differentiation of products	Specification of the project or the business model
Regional policy	Synergies between production and training/research systems	Capacity to participate in multi-location knowledge dynamics and to anchor them

Source: author's own compilation.

institutional research on the rules of competition/co-operation, the relational approach explores the multi-location and multi-scale forms taken by learning and innovation processes.

Secondly, the circulatory approach calls for work on the mobility of knowledge and trans-nationalism. Here, the approach is one of identifying the varying local capacities for anchoring mobile knowledge, i.e. their ability to interact with the mobile knowledge (Section 0).

Finally, a structuralist approach places emphasis on the manner in which local dynamisms are, or are not, able to call spatial hierarchies into question. The knowledge economy in fact opens up new possibilities: it highlights inequality, since not all regions are equal in the face of the changes taking place (Section 0).

5.1 *Proximity and Distant Learning: The Relational Approach*

A debate around a relational approach in economic geography has developed over recent years (Bathelt, 2006). On the one hand, new communications technology, plummeting passenger transport costs, etc., have today made rich, well-maintained interaction with other persons, enterprises and regions possible at medium and long distances. On the other, market relations have become more complex: not only those concerning production

but also those involving consumption at various spatial levels. The learning that link producers and consumers are currently those that are the most crucial. Knowledge as a shared activity develops both within and beyond companies, both nearby and at a distance. The issue is to identify the spaces that foster such relations.

Numerous critics have put forward the theory whereby approaches in terms of innovative milieus, industrial districts or more generally TIMs tended to favour a closed vision of development that privileged local relations (Lagendijk, 2006). To the contrary, however, opening up to what is "global" is one of the fundamental aspects of these approaches. Lagendijk observes that many authors (Oinas, 1999; Maskell *et al.*, 2006) propose paying more attention to non-local relations. As well, global or virtual communities of practice have become theoretical tools for knowledge management (Wenger *et al.*, 2002). This is without doubt an essential research avenue in order to place the relational approach in line with the current forms of globalization whereby rich, long-distance relations are no longer occasional or short-lived but can also be better maintained, richer and more crucial (Lagendijk & Lorentzen, 2007).

We can deduce from the above that these broadened possibilities lead to new spatial forms that articulate, in a renewed way, proximity and distance relations. One should not, however, misguidedly believe that since long-distance relations are becoming easier within economic dynamics, the local ones lose their pertinence. Quite to the contrary, it has been demonstrated that the easier the mobilization becomes, the more the "small differences" between local spaces are accentuated by economic changes. In a territorial approach to economy, the new information and communication technologies and the increase in mobility call into question the capacity of local spaces to become inserted within multi-location and multi-scalar dynamics. It is not a question of losing sight of the role played by local milieus in economic change but more one of understanding how and why some of these milieus succeed in using the new possibilities that open up to them.

Classical innovative milieus and industrial districts articulate rich proximity interaction and most occasional distant relations, with a notion of "global" that is frequently not differentiated (Figure 1). Today, we should devote more attention to exploring multi-location

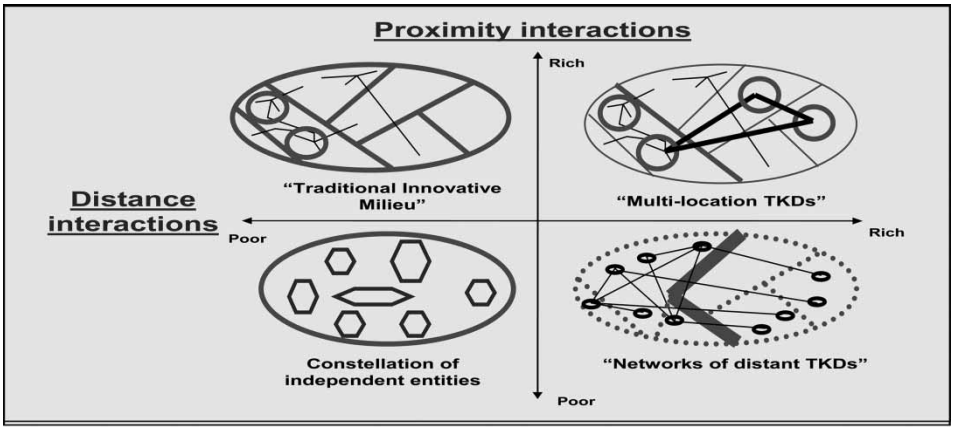

Figure 1. Proximity and distant knowledge interactions
Source: author's own compilation

milieus, which articulate rich proximity learning with intense interaction at medium and long distance. The concept of "from elsewhere" is now differentiated: the places are clearly identified, as are complementary and/or competing ones. At the time of global production networks (Coe *et al.*, 2004), production systems became dispersed in space, but formed relatively stable configurations that combined mutual specializations and integration within multi-location systems. Global cities as described by Sassen (1991) constitute a good example of this, but such configurations also emerged in the industrial sector: for example, Airbus and its activities in various countries or the clothing and fashion industry that works in an integrated way in several continents.

Moreover, as Langendijk (2006) also notes, it is no longer sufficient to stop at production systems alone. The relation with consumption is a source of learning and differentiation. We must turn to studying multi-location production–consumption systems.

5.2 *Mobility and Anchoring of Knowledge: The Circulatory Paradigm*

Knowledge has become extremely mobile and combinatorial. This circulation does not, however, take place everywhere; it is a case of the combinations occurring as a result of various aspects, so some may be richer than others. Examining the forms of interaction among mobile and local knowledge makes it possible to characterize the capacities available locally within knowledge economy. The local environment thus undoubtedly continues to play an extremely important role regarding the way in which it interacts with mobile knowledge.

For Helmstaedter (2006, EURODITE), knowledge becomes mobile when it departs from its original context (decontextualization) and moves on to become integrated within another one (recontextualization).

Bathelt *et al.* (2004) have already demonstrated the capacity, unique to the local, to make use of global knowledge pipelines thanks to the effervescence of local interactions or "local buzz". This concept supposes, moreover, a local capacity for mobilization. It nevertheless remains within a paradigm of local/global forms of interaction. We are proposing a more radical articulation of the notions of mobility and of the anchoring of knowledge in order to bring research into territorial economies closer to that, more general, on trans-nationalism and mobility.

The notion of anchoring must be distinguished from that of mobility if we wish to understand the processes of learning within space. Mobility is a movement within space, which is notably dependent on transport and telecommunications technology as well as institutions such as borders, which latter can facilitate or hamper movement. Anchoring is the other, inseparable face of mobility. One or several mobile or potentially mobile elements will maintain relations with other, less mobile or immobile ones that are more linked to a location. Anchoring means the articulation modalities that occur between a context of knowledge and various elements during their immobile phase. Anchoring is decisive since the easier the mobility becomes, the more the reason behind this mobility (moving where? to do what?) takes on importance and significance. The problem of students who have the Erasmus programme available to them today is to know where to go and what to study and not one of organizing their move within space.

The actors concerned by this mobility may be either enterprises, individuals or certain socio-professional groups. Thus, all major enterprises active in a specific field such as finance need a presence within London. For certain socio-professional groups, mobility

constitutes an established means of acquiring competencies and developing them, such as the case of the marble workers of Carrare (Marotel, 1993). These forms of circulation develop highly rapidly and are widely studied by the trans-nationalist approach (Mahroum & de Guchtenheire, 2006; Tarrius, 1996; Nedelcu, 2004).

The notion of anchoring (Berset & Crevoisier, 2006) is close to that of embeddedness (Granovetter, 1985; Grossetti & Godart, 2007). Embeddedness, in brief, takes into account the various relations within which the actors are positioned and interact. It has a historical basis and form, and above all it takes into account the relation between an actor and the context that constitutes that particular actor's historical origins.

Anchoring is different from embeddedness because mobility is a movement towards a "new" context. For example, knowledge moves away from the context where it is generated—and "embedded"—and into another context. Anchoring is the way in which this new knowledge interacts—or does not interact—with its new context.

The relation between a knowledge dynamics and its context thus plays a major role within mobility and anchoring. It is a relation between two facets. On the one hand, knowledge dynamics are born from their context (political, institutional, economic, social, cultural, etc.), and on the other the context has an effect on the knowledge dynamics and transforms them (evolution of sectoral logics, policies or institutions, etc.).

The modalities of anchoring characterize the wealth, diversity, intensity, duration, etc., of the relations that take place. Depending on the intensity and the inter-relational modalities between the knowledge dynamics and their context, it is possible to imagine various ideal types of anchoring (Figure 2). The main theory is that various local knowledge contexts will mobilize and integrate mobile knowledge generated elsewhere in differing ways. What becomes decisive is the local capacity to interact with mobile elements in a rich manner. To be "on the map" regarding the movement and anchoring of knowledge, in a specific sector or on a wider scale, is certainly among the current challenges facing regions within a knowledge-based economy.

Any form of knowledge mobility does not, however, mean that learning exists. When, for example, a qualified workforce moves towards a country or region offering better conditions, the classical problem of allocation within space can occur, yet without

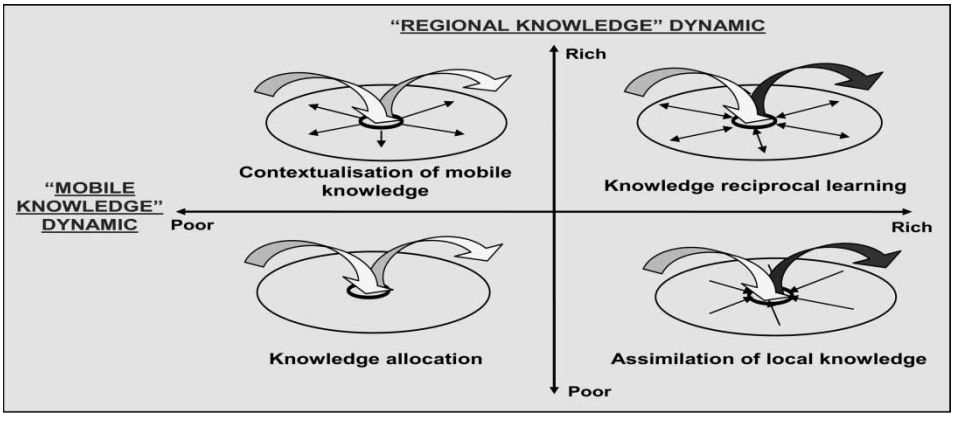

Figure 2. The mobility and anchoring of knowledge within the region
Source: author's own compilation

enrichment or knowledge on the part of the mobile workers or of the target region. In such a case, we cannot speak of knowledge dynamics. Allocation, which is taken into account within the neoclassical model, is a type of anchoring characterized by a relation that is maintained and uncertain, and which does not involve learning or mutual change on the part of the actor and his new environment. The actor maintains his autonomy intact and unchanged as well as his capacity to defect, i.e. to move within space once again. Inversely, an anchoring that leads to rich, evolutionary relations of interdependency engenders a capacity of voice. When the anchoring is strong, the learning permits an enrichment of knowledge: either of the location or of the mobile element or of both. Here, once again, the local milieu is decisive.

As Dankbaar (2007) explains enterprises that delocalize many of their activities for reasons of production costs or competencies have difficulty, for example, to maintain their "core knowledge" fixed; this is knowledge that their delocalized partners are seeking to anchor. These dynamics are becoming a major challenge regarding mobility and anchoring. Local institutional capacities of value creation, value enhancement and value capture (Coe *et al.*, 2004) are all factors that affect modalities of knowledge mobility and anchoring.

5.3 *New Spatial Hierarchies: The Structuralist Approach*

Within the economy of knowledge and intangible goods that appears to be developing today, processes to establish hierarchies are operating in the same manner as they did during previous eras. At the outset, not all regions or nations possess the same allocation regarding research, higher education, networking capacity and centrality. Regarding the processes linked to a knowledge-based economy and, in particular, the capacity to mobilize knowledge within the region and elsewhere, there is no doubt that such processes will emerge unevenly in terms of space. The emergence of a knowledge-based economy cannot avoid raising fundamental questions from the viewpoint of how the economy is organized, because intangible goods are often extremely difficult to appropriate or are appropriated in a highly imbalanced manner. For the time being, very little work carried out in the field of regional economy has focused on the role of knowledge within the economic hierarchization of spaces.

Much research has, however, been carried out regarding such questions in other sectors. An extremely large amount of work has been completed in order to explore the extent to which classical models based on the exchange of private material goods are called into question by a knowledge-based economy. This work above all examines the double dimension of knowledge: on the one hand, there is a liberating aspect, an opening up to what is possible, and somewhat democratic appropriation. On the other hand, knowledge also signifies a logic of control, of profit and a hierarchization not only of individuals and enterprises but also of spaces. Among other works, we should mention those on international trade and intellectual property rights.

For Coe *et al.* (2004), bargaining capacity of local institutions is not equally distributed. Some spaces sustain the global production networks and cannot control their fate and other ones are able to concentrate and retain power of attractiveness through high capacity of value capture. Modern version of the brain drain, accentuated by the facility with which knowledge and individuals circulate is a clear indication that circulation is not carried out symmetrically, but that there are winners and losers in this "game". On the one

hand, selective immigration according to the level of qualifications is encouraged by the US for many years and more recently by the European Union in order to improve their incoming knowledge flows. On the other, and it is the point made by Saxenian (2005), brain circulation has also become a stake for home country of high skilled migrants to develop a political and socio-economic context favourable for returning. While some places such as Hsinchu, Bangalore or Shanghai, for instance, have been able through the return of migrants to co-evolve with the Silicon Valley, other spaces in Latin America or Africa are not able to promote a return of their skilled workers. Also for countries such as France and Japan, preventing the return of migrant entrepreneurs can be crucial for their hierarchical position on TKDs.

A further example is the manner in which the global city (Sassen, 1991) redesigns spatial hierarchies. For Sassen, the major financial centres interact closely in order to constitute a global city. This city is the space where financial information and innovation is established and decrypted. This specific knowledge related to finance and related services (consulting on legal and administrative issues, information technology services, etc.) permit this space to control the globalized economy and to benefit from it.

There is no doubt that the knowledge-based economy is redrawing the map of spatial inequalities, but the structural approaches are there to remind us that the regions more capable of coping will be those that gain the upper hand and that the competition will not be balanced

6. Conclusions and Opening: New Roles for the Local?

It is today possible to take some distance regarding the massive spate of research work initiated in the 1980s, devoted to TIMs to use the generic term used by Moulaert and Sekia. In the present article, we are making two proposals.

First, it is necessary to renew a research programme by taking concrete socio-economic changes and questions that society is asking of researchers into account. The dominant problematic is in fact no longer that of regions in difficulty. Today, regions must face the massive increase in the mobility of knowledge, capital, individuals and goods. Moreover, the economy is moving from one centred around the production of tradable goods towards one that is more tertiarized, in which the interdependencies between production and consumption are complex.

Secondly, work on innovation has a wider theoretical scope. Innovation and the conditions and modalities for its emergence are in fact better understood and mastered at present. Innovation is no longer simply a matter of breaking/affiliation in terms of time but also one of constructing a local environment that seeks insertion in a way that differentiates it from others, that marks its specificity, that is innovative and all this within a much broader context. It is therefore no longer possible to understand innovation independently of space. It is the territory that characterizes innovation by means of its relations with others, including those at a greater distance away, by the way in which it structures the legacy of its past and by the way it permits itself to make projects for its future.

This article proposes that knowledge economy be approached in the same way. Relations with others reveal the extent to which we are not aligned, but also our own specificity and renders learning possible. The result is that in a knowledge-based society, a region is not simply required to train its population to the highest possible level, since this could mean that the individuals or the knowledge generated could leave. It must

also anchor projects, i.e. it must create a milieu that is both locally autonomous and capable of existing within distant interactions, in order to "get on the map" in certain specific areas. In this perspective, policies of the last decade that aim to construct local complementarities between training/research and economic activities must open up to external, combinatorial dynamics.

An approach to innovation via TKDs avoids, first of all, handling all learning processes in an identical way, whatever their local context. Secondly, it avoids the pitfall of an approach that considers space to be a neutral support rather than a constitutive element of learning, since it is indeed the development of relations with other actors and other places that makes it possible to imagine one's own transformation and to formulate productive projects.

The question that arises is thus that of the new roles of the local environment but also of the other scales on which the economy, society and politics are organized.

We are therefore advancing the thesis that the places that succeed today are those that mobilize the "elsewhere" and those that interact and move together with it. Cumulative, local knowledge dynamics can represent a major, solid basis for the competitiveness of regions, but the issue that is now at stake is to know how to create a composition of sorts that brings in the multiple forms of knowledge that are present elsewhere. Local specification is the result of multi-location milieus that achieve specificity together, within the context of globalization. Moreover, this capacity to participate in forms of mobility at medium and long distance can be explored using the concepts and tools developed by territorial economy.

Based on theories on endogenous development from the 1970s, the innovative milieu approaches made it possible to understand that development could be initiated from what was local, small, on the upswing. Naturally, this capacity is by no means present everywhere, but it is at the heart of absolutely remarkable knowledge dynamics that recreate "from the bottom-up" the diversity of economic forms. This is all the more remarkable in a world where major financialized groups are constantly rationalizing, simplifying and becoming concentrated.

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