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Territorial Innovation Models: A Critical Survey

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MOULAERT F. and SEKIA F. (2003) Territorial innovation models: a critical survey, *Reg. Studies* **37**, 289–302. This paper provides a critical review of the literature on territorial innovation models (industrial districts, *milieux innovateurs*, new industrial spaces, local production systems, etc.). The review is organized in two stages. First, the main features of each of these models and their view of innovation are compared. Second, their theoretical building blocks are reconstructed and evaluated from the point of view of conceptual clarity and analytical coherence. It is found that despite some semantic unity among the concepts used (economies of agglomeration, endogenous development, systems of innovation, evolution and learning, network organization and governance), territorial innovation models (TIMs) suffer from conceptual ambiguity. The latter is mainly a consequence of the way territorial innovation is theorized, i.e. in terms of technologically driven innovation and a business culture that is mainly instrumental to the capitalist market logic. This pressing ideological priority pushes the 'conceptual flexibility' of TIMs across the border of coherent theory building.

Regional and local development Learning region Social innovation Integrated area development Community ontology

MOULAERT F. et SEKIA F. (2003) Des modèles de l'innovation territoriale: une étude critique, *Reg. Studies* **37**, 289–302. Cet article cherche à fournir une étude critique de la documenatation sur les modèles de l'innovation territoriale (p.e. districts industriels, milieux innovateurs, nouveaux espaces industriels, systèmes de production locaux). L'étude se fait à deux temps. Dans un premier temps, on compare les principaux caractéristiques de chacun de ces modèles et leur point de vue sur l'innovation. Dans un deuxième temps, on reconstruit et évalue leurs éléments de base théoriques quant à leur précision conceptuelle et à leur cohérence analytique. Il s'avère que malgré une certaine unité sémantique pour ce qui est des notions employées (économies d'agglomération, développement autochtone, systèmes d'innovation, évolution et apprentissage, organisation de réseau et gouvernance), les modèles d'innovation territoriales (MIT) souffrent d'une ambiguité conceptuelle. Ceci remonte à la façon de théoriser l'innovation territoriale; c'est à dire, en termes de l'innovation déterminée par la technologie et par une culture d'entreprise qui répond dans une large mesure au credo du marché. La priorité idéologique urgente pousse la 'flexibilité conceptuelle' des MIT au-delà de la frontière de la construction des théories cohérentes.

MOULAERT F. und SEKIA F. (2003) Territoriale Innovationsmodelle: eine kritische Untersuchung, *Reg. Studies* **37**, 289–302. Der vorliegende Aufsatz liefert einen kritischen Überblick über die Literatur, die sich mit territorialen Innovationsmodellen befaßt (Industriegebiete, milieux innovateurs, neue Industrieräume, örtliche Produktionssysteme, usw.). Der Überblick besteht aus zwei Teilen: zuerst werden sowohl die Hauptzüge jedes dieser Modelle als auch ihre Ansichten über Innovation verglichen. Dem folgt eine Rekonstruktion ihrer theoretischen Bausteine und Bewertung vom Standpunkt konzeptualer Klarheit und analytischer Kohärenz. Es zeigt sich, daß trotz einer gewissen semantischen Einheitlichkeit der dabei benutzten Konzepte (Einsparungen durch Ballung, emdogene Entwicklung, Innovationssysteme, Evolution und Lernen, Netzwerkorganisation und -maßnahmen) territoriale Innovationsmodelle (TIMs) unter begrifflicher Vieldeutigkeit leiden. Letztere ergibt sich vorallem infolge der Art und Weise in der territoriale Innovation theorisiert wird, d.h. durch Begriffe technologisch betriebener Innovation und eine Unternehmenskultur, die sich vorallem an die Logik des kapitalistischen Marktes wendet. Dieser nachdrücklich ideologische Vorrang schiebt die 'konzeptuelle Elastizität' der TIMs über die Grenze der Errichtung einer zusammenhängenden Theorie.

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Aménagement du territoire Zone d'apprentissage
Innovation sociale Zone d'aménagement concertée
Ontologie locale

Regionale und örtliche Entwicklung Lernregion
Gesellschaftliche Innovation
Einheitliche Gebietsentwicklung
Gemeinschaftsontologie

INTRODUCTION

Over the last 15 years, regional economists, geographers and planners have devoted a considerable part of their time and energy to the search for a 'new' model of regional development. Once the euphoria of the reconstruction after World War Two had waned, the structural economic weaknesses, particularly in traditional manufacturing regions, became increasingly visible. Inspired by location theory, investment and employment subsidies were granted to corporations which came to invest in these regions (BROWN and BURROWS, 1977). And, following the logic of the growth pole model (PERROUX, 1955), infrastructure works combined with significant aid to investment were expected to generate the necessary production initiatives in lagging regions.

The effects of these policies on regional development were ambiguous. On the one hand, these infrastructure and cost subsidizing measures encouraged new employment in local firms, and attracted external direct investments to the regions, offsetting at least partially the loss of employment in traditional industries. But on the other hand, in many regions, there was a lack of structural linkages between the new investments (often assembly branch plants) and the economic tradition of the region (MARTINELLI, 1998). This lack of linkages became overt with the advent of the economic crisis in the mid 1970s, when many branch plants began to reduce their activities, or simply closed down, together with the remaining coal mines, steel and textile plants, shipyards, etc., and when central governments had to take budgetary measures, and therefore became increasingly selective in their regional development policy (DE MONTRICHER, 1995). This selectivity meant, in the first place, a shift in political 'clientele' from loss-making old industrial firms to promising new initiatives applying new technology and advanced services. Selectivity was furthered by the creation of the European competitive space (European Union) and by the several rounds of GATT (General Agreement on Tariffs and Trade) negotiations, which not only led to the creation of the WTO (World Trade Organization), but also to the proliferation of a global 'market watch' by the geo-economically dominant regions (North America, Europe, Japan, etc.) over each other's industrial and competition policy.[1]

It is in this climate of crisis in 'traditional' regional policy that, starting in the 1980s, an appeal for (endogenous) local and regional initiatives for economic development was made. Both in the small and medium sized enterprise (SME) business world and in academic circles, strong voices rose to reassert the value of local and regional development potential as an alternative to national-state led regional economic policy.

In European academic circles, AYDALOT, 1986, and the GREMI took the lead. They laid the grounds for the regional endogenous development approach. And, more in the footprints of 'orthodox' growth theory, a regional version of the endogenous growth model was put forward (BARRO and SALA-I-MARTIN, 1992). Growth and development factors such as human capital, local business culture and schooling system, infrastructure, quality of production factors and systems, and learning from the regional experience for renewed regional development (RATTI, 1992) were put in a context of territorial innovation dynamics. This was the beginning of a literature on territorial development and regional innovation systems (KAFKALAS, 1998) that is now almost 15 years old.

Many convergent or competitive academic currents took part in the debate. In the US, the Californian school of economic geography stressed the relationship between technical innovation, industrial organization and location (STORPER and WALKER, 1989) and launched the notion of New Industrial Spaces (STORPER and SCOTT, 1988). The industrial district school, which historically preceded the GREMI, but became only later internationally known, focused on the quality of formal and informal social, economic and political relations in the district, as a determinate factor of long-term economic development (BECCATINI, 1981; BRUSCO, 1982; GAROFOLI, 1992). The French current of *systèmes productifs locaux* came in the footprints of the industrial district school and stressed the founding role of artisan production systems in the diffusion of manufacturing patterns in urban and rural areas (COURLET and PECQUEUR, 1990).

The regulationist school, in line with its institutional tradition, modelled some of the archetypes of industrial relations accompanying the successful application of technological innovation. It gave a social and territorial content to the concepts of 'technological paradigm' and 'system of innovation' (LEBORGNE and LIPIETZ, 1988; MOULAERT and SWYNGEDOUW, 1989). Recently the 'regional innovation system' and the 'learning region' models have provided a new interpretation (a synthesis?) of the territorial innovation model (MORGAN, 1997; BRACZYK *et al.*, 1998).

After 15 years of theoretical debate, analysis and policy implementation, the territorial innovation models (TIMs) are up for critical evaluation. This

paper seeks to contribute to this evaluation and pursues to this effect two tasks:

- The presentation of the territorial innovation models from Bagnasco and Aydalot till today's learning region, indicating as much as possible the varieties found in the literature, especially with respect to the concept of innovation.
- The analysis of the building blocks on which these models were built: the main concepts (economies of agglomeration, endogenous development, systems of innovation, evolution and learning, network organization and governance) and the generic theories (e.g. regional development and evolutionary innovation theory). This analysis includes an evaluation of the conceptual clarity and analytical coherence of the TIM.

It is found that, despite their apparent semantic unity, these models are conceptually quite diverse and their theoretical building blocks are used in incongruent ways. This is a consequence of many factors: superficial theoretical reflection; a technocratic view of innovation; and the models' almost ideological attachment to the capitalist market logic of development.

THE TERRITORIAL INNOVATION MODEL

'Territorial innovation model' (TIM) is used here as a generic name for models of regional innovation in which *local institutional dynamics* play a significant role. At least three traditions can be distinguished within the population of the TIM. In the original French model of the *milieu innovateur*, which was the basis for the synthesis produced by GREMI (AYDALOT, 1986), the role of endogenous institutional potential to generate innovative dynamic firms is emphasized. The same basic idea is found in the literature on the industrial district model and the local production systems, stressing even more the part of cooperation and partnership in the innovation process. Therefore, the innovative milieu and the industrial district, both with a strong focus on local institutional endogeneity, can be considered as a first family of TIM. A second tradition of territorial innovation models is more in line with the broader systems of innovation literature: a translation of the institutional coordination principles found in the sectoral and national innovation systems toward the regional level of development (EDQUIST, 1997) or an evolutionist interpretation of the regional learning economy (COOKE, 1996; COOKE and MORGAN, 1998). A third tradition stems from the Californian school of economic geography: the new industrial spaces (STORPER and SCOTT, 1988; SAXENIAN, 1994). A residual category, with little affinity to regional economics but close to Porter's clusters of innovation, is the spatial clusters of innovation.

We will now present the main features of most of these territorial innovation models as put forward by their protagonists. At the end of the next section, we will confront the various dimensions of their views of innovation: core of innovative dynamics; role of institutions; place of innovation in regional development; culture and types of relationship with the environment.

Innovative milieux

In the theory of the *milieu innovateur* developed by the GREMI, the firm is not an isolated innovative agent, but part of a milieu with an innovative capacity. In theoretical and empirical works, the GREMI authors seek to analyse the relationships between firms and their environment and to study modes of organization characterizing them (RATTI, 1992, p. 54). They distinguish between three functional spaces for the firm: the production; the market; and the support space. It is the support space that should empower the enterprise to face uncertainty. The support space is constituted around three types of relations: (1) qualified or privileged relations with regard to the organization of production factors; (2) strategic relations between the firm, its partners, suppliers and clients; (3) strategic relations with agents belonging to the territorial environment. In particular it is the support space that will determine the relations between corporate innovation and spatial development; it is this space that qualifies the nature of the 'milieu innovateur' (RATTI, 1989; 1992, p. 56). The current research agenda of the GREMI stresses the concept of apprenticeship, which means that the innovative capacity of the different members of the milieu depends on the capacity of learning. Learning enables them to perceive changes in their environment and to help them to adapt their behaviour accordingly. Today, the apprenticeship dynamics and the co-operative organization based on interaction constitute the core of the *milieu innovateur* theory; it converges quite well with the contemporary established theory of the 'learning region' (CAMAGNI, 1991).

Industrial districts (ID)

The theory of the industrial district (ID), starting with BAGNASCO, 1977, stresses the innovative capacity of SMEs belonging to the same industry and local space.[2] The industrial district is commonly defined as a geographically localized productive system, based on a strong local division of work between small firms specialized in different steps in the production and distribution cycle of an industrial sector, a dominant activity or a limited number of activities. There are multiple relationships between the firms, and between the firms and the local community, inside as well as outside the market. The latter relationships are based on trust and reciprocity. This hybrid mode of organization,

combining competition and cooperation, formal and informal institutional relations, cannot be understood without highlighting the role of historical and socio-economic factors crucial to the success of a district (BECATTINI, 1987; BRUSCO, 1986, 1992; DEI OTTATI, 1994a; MOULAERT and DELVAINQUIÈRE, 1994).

The modes of coordination (market, firm, cooperation) of agents, and particularly small firms in the economic system have received considerable attention in the ID literature (DEI OTTATI, 1994a, 1994b). The coordination of complementary activities among many small firms with specific roles and specializations in the production and distribution systems calls for greater information and exchange than the price system can grant: 'Local customs and particularly the custom of reciprocal cooperation ... play an important role in the ID by making possible transactions that would otherwise be blocked because they are too risky' (DEI OTTATI, 1994b, p. 465).

In many ways the industrial district comes quite close to the innovative milieu. BECCATINI, 1981, talks about the industrial district as a 'creative milieu' to which he, like BRUSCO, 1982, attributes features that are also typical of the *milieu innovateur* – especially those fostering the support space of firms (KAFKALAS, 1998, p. 6). The commonality of the industrial district and *milieu innovateur* approaches rests on the role of the local socio-economic community, based on cooperation and complementarity among functionally specialized agents. But the ID literature goes further in analysing relations of trust and opportunism, the role of culture as a vehicle of change and the way in which agents who 'behave incorrectly' with regard to the norms of community interaction are penalized (DEI OTTATI, 1994a, p. 531).

Localized production systems (LPS)

The LPS model can be considered as a generalization of the industrial district view of local economic development. As with industrial districts, LPS view industrialization as a specific process in urban or rural areas with an explicit artisan tradition (process of diffuse industrialization). In contrast with Fordist industrialization that seeks to shape (and shake!) space to the exigencies of industrial society, diffuse industrialization is a process of continuous evolution that, unlike the industrial district approach, fears ruptures in development trajectories. The LPS model also uses the notion of '*industrialization rampante*' as studied for the city of Sfax in Tunisia (BOUCHRARA, 1987). The LPS logic also paves the way for a local development approach that could be conceived as a dialectic between local diffuse industrialization rooted within a local community and the economic pressures from 'outside' (national and international conditions of development). LPS have taken the local–global tension on board from the beginning, which is different from ID that only acknowledged such a tension after having been criticized for local bias.

New industrial spaces

Storper and Scott launched the notion of new industrial spaces (NIS) in 1988. It combines insights from the literature on industrial districts (BRUSCO, 1986), the flexible production systems (PIORE and SABEL, 1984), social regulation (BOYER, 1986; LIPIETZ, 1986) and local community dynamics (STORPER and WALKER, 1983). STORPER and SCOTT, 1988, p. 24, identify flexible production systems by referring to 'forms of production characterized by a well developed ability both to shift promptly from one process and/or product configuration to another, and to adjust quantities of output rapidly up or down the short run without any strongly deleterious effects on levels of efficiency.' The authors link the efficiency of the flexible production system to locational agglomeration of a selected set of producers:

> This locational strategy enables them to reduce the spatially-dependent costs of external transactions. In flexible production systems, the tendency to agglomeration is reinforced not only by externalization but also by intensified re-transacting, just-in-time processing, idiosyncratic and variable forms of inter-unit transacting, and the proliferation of many small-scale linkages with high unit costs. (*ibid.*, p. 26)

Referring to the history of industrial districts and other spaces of activity, Storper and Scott observe that the flexible production system has bloomed in places unburdened by Fordist institutional legacies. New industrial spaces involve more than agglomerated production systems, but also a social regulation system providing: '(i) the coordination of interfirm transactions and the dynamics of entrepreneurial activity; (ii) the organization of local labor markets and social reproduction of workers; and (iii) the dynamics of community formation and social reproduction' (*ibid.*, p. 29).

While we observe that this list of challenges to regulation shows significant overlaps with the definition of the '*espace de soutien*' (or 'support space') of the GREMI, it is not evident that these three domains of regulation can be conciliated through an economic approach (see below).

Clusters of innovation

ENRIGHT, 1994, provides a good survey of publications on 'the [spatial or regional] clusters of innovation', that are often considered as an offshoot of the new industrial spaces literature. Unfortunately, the cluster of innovation approach offers no analytical 'family' coherence, except for its reference to MARSHALL's, 1920, analysis of the advantages of localized systems.

One of the most cited sources is Saxenian and her work on Silicon Valley (SAXENIAN, 1994), in which she underscores the role of local institutions and culture as well as industrial structure and corporate organization for economic performance. She contrasts the creative impact of the network based industrial system in Silicon Valley with the integrated corporate structure of Route 128 (cited from EHRENBERG and JACOBSSON, 1997, pp. 333–34).

In our opinion, the literature surveys (ENRIGHT, 1994; EHRENBERG and JACOBSSON, 1997) enforce an artificial relationship between Saxenian's work on regional innovation in Silicon Valley and Porter's notion of clusters of innovation. Saxenian's analysis combines agglomeration economies, industrial organization, flexible production systems and regional governance. It is much richer than Porter's original model, which emphasizes market and competition rather than networking and social interaction as success factors for clusters of innovation, and showed only a marginal interest in regional dimensions of innovation (PORTER, 1990). But, as with so many concepts in management science and economics, geographers have also embraced the notion of the cluster. Porter's view of the sources and nature of technological development, his short prayer to localized processes and the gradual 'networking of the clusters' lay the grounds for the spatial operationalization of the 'regional cluster' as the most practice oriented, but also the most market logic led version of the model of territorial innovation (see LAGENDIJK, 1998).

Other models of territorial innovation belong to the systems of innovation literature – a translation of the evolutionist view of economic development and of institutional co-ordination found in the sectoral and national innovation systems at the regional level (EDQUIST, 1997). Here we are mainly thinking of the regional systems of innovation (BRACZYK *et al.*, 1998) and the regional learning economy (COOKE, 1996; COOKE and MORGAN, 1998).

Regional innovation systems

The theory of regional innovation systems insists on the role of collective learning, which in turn refers to deep cooperative relationships between members of the system. This theory is indebted to the evolutionary theory of technical change. Rather than a result of a research activity, innovation is a creative process, with the following features: the interaction between agents of the process (built on feed-back); the cumulative aspect of, and increasing returns to, the innovative process; and the 'problem-solving' orientation, which shows the specific nature of the innovation. Moreover, innovation is not only a technological but also an organizational process. And it is this organizational part that is paramount and determines the technological innovation itself. There is little risk in arguing that the regional innovation system is a lower-scale offshoot of the national innovation system – whatever the latter's definition may be (EDQUIST, 1997, chapter 1). Still, as LAGENDIJK, 1998, indicates, there are in this theoretical corpus at least two basic interpretations of the region as an innovation system: either as a subsystem of national or sector-based systems; or as a reduced version of the national system of innovation, with its own dynamics.

The learning region

The notion of the learning region was launched by Cooke, Morgan, Asheim and others, and could be considered as an intermediate synthesis in the debate on the territorial innovation model (COOKE, 1998; MORGAN and NAUWELAERS, 1998). The model integrates innovation systems literature, institutional-evolutionary economics, learning processes, and the specificity of regional institutional dynamics. MORGAN, 1997, provides an excellent summary of the logic of the learning region. The purpose of his article, the author declares, is 'to connect the concepts of the network [or associational] paradigm – like interactive innovation and social capital – to the problems of regional development in Europe' (*ibid.*, p. 492). First, Morgan highlights the state of knowledge in evolutionary economics by stressing two of its main propositions: innovation is an interactive process; and innovation is shaped by a variety of institutional routines and social conventions (*ibid.*, p. 493). Together these propositions have helped 'to stimulate an interesting, and highly significant, debate about the nature of capitalism as a learning economy' – see below. On this issue, Morgan cites LUNDVALL, 1994, and claims that 'knowledge is the most important strategic resource and learning the most important process'. Then, Morgan underscores the importance of the growing interests of economic geographers, planners, etc. in innovation dynamics: 'Within economic geography a number of tentative efforts have been made to utilise some of the insights of evolutionary economic theory, especially with respect to learning, innovation and the role of institutions in regional development'. (*ibid.*, p. 494). Morgan especially refers to Storper's recent work as 'the fullest attempt to marry the two disciplines'. Storper recognizes 'the principal dilemma' of economic geography as the re-emergence of regional economies at this time of globalization. He explains this phenomenon by the association between organizational and technological learning within agglomerations, based on traded (input–output relations) and untraded interdependencies (labour markets, regional conventions, norms and values, public or semi-public institutions).

Table 1 summarizes the view of innovation represented in each of the TIM: (1) definition of innovation; (2) role of institutions and organizations; (3) view of regional development (evolution learning, role of culture); (4) view of culture; (5) type of relations

Table 1. *Views of innovation in territorial innovation models*

	Model		
Features of innovation	*Milieu innovateur* (innovative milieu) (MI)	Industrial district (ID)	Regional innovation systems (RIS)
Core of innovation dynamics	Capacity of firms to innovate through the relationships with other agents of the same milieu	Capacity of actors to implement innovation in a system of common values	Innovation as an interactive, cumulative and specific process of research and development (path dependency)
Role of institutions	Very important role of institutions in the research process (university, firms, public agencies, etc.)	Institutions are 'agents' and enabling social regulation, fostering innovation and development	As in the NSI, the definitions vary according to authors, but they all agree that the institutions lead to a regulation of behaviour, both inside and outside organizations
Regional development	Territorial view based on milieux innovateurs and on agent's capacity of innovating in a cooperative atmosphere	Territorial view based on spatial solidarity and flexibility of districts; this flexibility is an element of this innovation	View of the region as a system of 'learning by interacting/ and by steering regulation'
Culture	Culture of trust and reciprocity links	Sharing values among ID agents; trust and reciprocity	The source of learning by interacting
Types of relations among agents	The role of the support space: strategic relations between the firm, its partners, suppliers and clients	The network is a social regulation mode and a source of discipline. It enables a coexistence of both cooperation and competition	The network is an organizational mode of 'interactive learning'
Type of relations with the environment	Capacity of agents in modifying their behaviour according to the changes in their environment. Very 'rich' relations: third dimension of support space	The relationships with the environment impose some constraints and new ideas; must be able to react to changes in the environment; 'rich' relations; limited spatial view of environment	Balance between inside specific relations and environment constraints; 'rich' relations
	Model		
	New industrial spaces	Local production systems	Learning region (synthesis?)
Core of innovation dynamics	A result of R&D and its implementation; application of new production methods (JIT, etc.)	Same as for ID	As for RIS but stressing co-evolution of technology and institutions
Role of institutions	Social regulation for the coordination of inter-firm transactions and the dynamics of entrepreneurial activity	Same as for ID, but with focus on role of governance	As in RIS but with a stronger focus on role of institutions
Regional development	Interaction between social regulation and agglomerated production systems	Diffuse industrialization, i.e. socio-economic development based on an evolutionary process without rupture	Double dynamics: technological and techno-organizational dynamics; socio-economic and institutional dynamics
Culture	Culture of networking and social interaction	Role of local social-culture context in development	As in NIS but with a strong focus on interaction between economic and social cultural life
Types of relations among agents	Inter-firm transactions	Inter-firm and inter-institution networks	Networks of agents (embeddedness)
Type of relations with the environment	The dynamics of community formation and social reproduction	Close to MI	As in RIS

between different development agents (network concept); and (6) type of relations with the outside world.

Table 1 suggests a strong semantic unity and complementarity among the features of innovation. But this semantic unity of concepts is only superficial. This can be illustrated by considering the notion of innovation and the meaning of culture in the various TIM. None of them defines the purpose of innovation explicitly. Reading through the various contributions one concludes that the main shared purpose of innovation is the development of new technology and its implementation. There is more clarity but also diversity in the way TIM identifies the innovation process: capacity of firms to innovate (*milieu innovateur*); innovation as an interactive cumulative process (regional innovation system, learning region) or an R&D process (new industrial spaces). As to the driving forces of innovation – not included in Table 1 – most models refer to competition and improving the competitive position. There is no reference to improving the non-(market) economic dimensions of the quality of life in local communities or territories. This becomes particularly clear when the meaning of culture is considered: culture is 'economic culture' or 'community culture' to the extent that it is functional to improving the competitiveness of the local or regional economy. Of course, this functional link between culture and market economic performance means an impoverished view of territorial development since it is limited to only its economic dimensions.

The conceptual superficiality of the TIM literature is a consequence of several factors such as the immediate links with regional economic competition policy (many TIM were written to legitimize it), the general trend in today's scientific practice of 'fast theory building' and the confusion of analytical theory with normative modelling (see also LOVERING, 2001, pp. 349–350).

THE BUILDING BLOCKS OF THE TERRITORIAL INNOVATION MODELS

In the previous section we saw that territorial innovation models share a significant number of concepts. But well-known theories also belong to the common ground of TIMs: endogenous growth and development theory; innovation systems theory; network theories; etc. But is this 'sharing' of concepts and theories real? First of all, not all concepts and theories play a comparably significant role in all TIM. Second, their

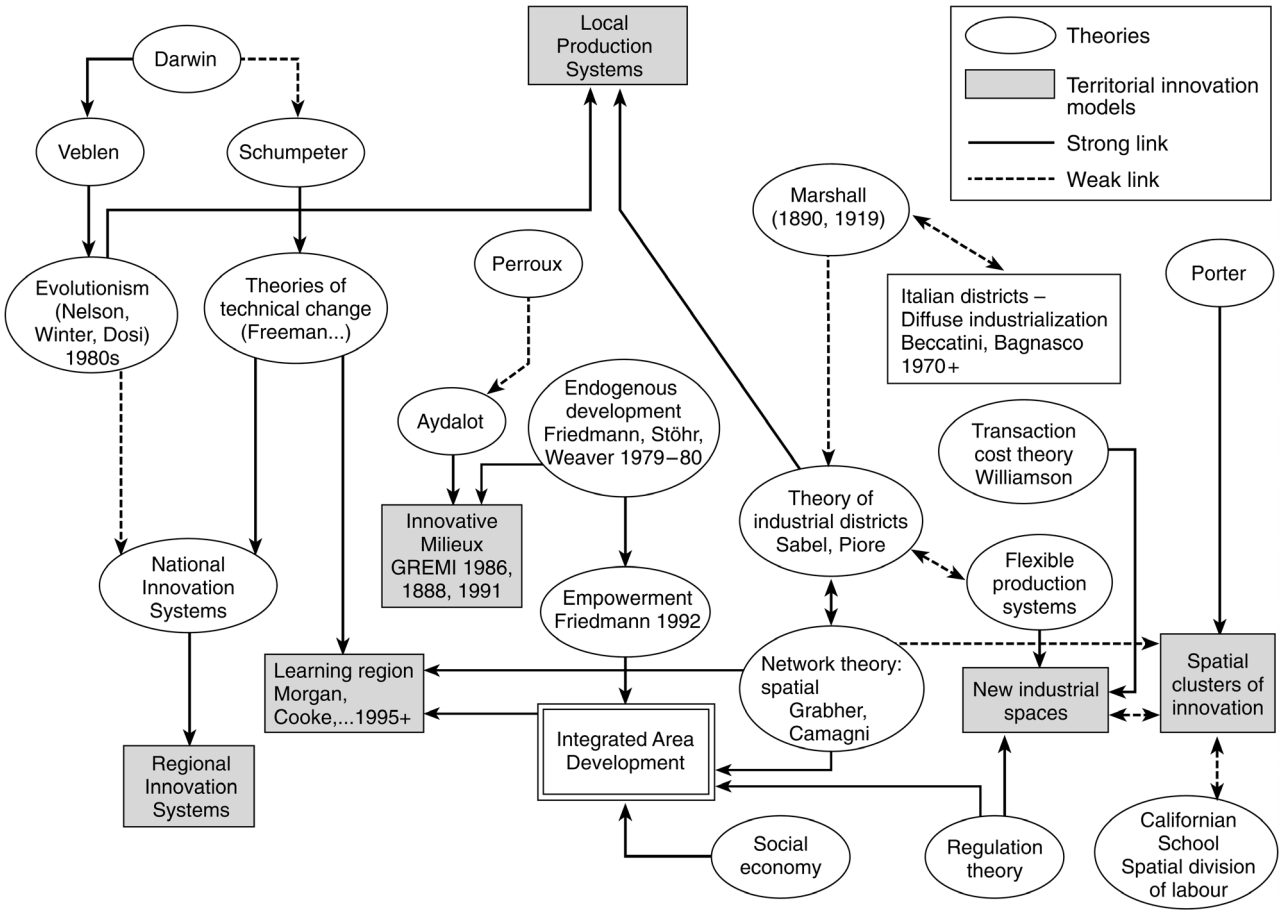

Fig. 1. *Territorial innovation models: theoretical roots and challenges.*

use is often diverse or ambiguous. The lack of clarity about the concept of innovation and its various dimensions also shows from the theorizing *'à la carte'* utilized in the various TIM. Let us look at the diversity in use of the most important concepts and theories.

Fig. 1 provides a 'tendially complete' survey of the strong and weak links between, on the one hand, the various economic, social, geographical and planning theories and, on the other hand, the TIM that rely on them. The TIM are presented in rectangular boxes, the theories in ellipsoids. Some of the main theories and their *conceptuarium* (i.e. the body of concepts that they mobilize) are discussed in the sequel to this section. 'Agglomeration economies' is portrayed as a generic concept, referring to a number of different theories. Unfortunately, this survey does not provide the space to analyse the detail of the relationships between the most generic theories of evolution and innovation (for example, Veblen, Nelson, Winter, Dosi) and the way they are used in the various (spatial) development theories. Suffice to say that the meanings of evolutionary metaphors (HODGSON, 1993) and of concepts of innovation (EDQUIST, 1997; and below) used in social science vary widely and do not allow a coherent theory of innovation dynamics to be formed. Observe that Fig. 1 also includes an alternative or extension to the TIM, i.e. the integrated area development model that is explained in the last section of this paper.

Economies of agglomeration

The debate on the appropriate content for the notion of economies of agglomeration in regional economics is far from finished. Various viewpoints oscillate today between the original Weberian formulation in terms of minimum transportation costs and industrial organization, the Marshallian external economies, the Hooverian reformulation in terms of localization and urbanization economies and the innovation process oriented revisiting of the concept mentioned in various TIMs. Recent contributions to the debate were offered by CAMAGNI and SALONE, 1993, and MOULAERT and DJELLAL, 1995, who made a plea to involve various spatial scales in the analysis; MALMBERG and MASKELL, 1997, who enrich the notion by a targeted qualitative analysis of the network dynamics in regionally specialized agglomerations; MOULAERT and DJELLAL, 1995, again by providing a qualitative interpretation of locational and urbanization economies; and several authors who in the tradition of the regional innovation literature pursue the 'qualitative calibration' of the agglomeration concept (MOULAERT and DJELLAL, 1995; MALMBERG and MASKELL, 1997). The counter position is given by PORTER, 1996, who argues that it is time to shed 'agglomeration economies' (p. 87, cited from Lagendijk) and concentrate on the nature of the network externalities.

The concept of agglomeration economies is explicitly used in the new industrial spaces and the non-Porterian version of the clusters of innovation model. In the district and the *milieu innovateur* model, the economies of agglomeration come in through the Marshallian backdoor, stressing the role of externalities for industrial organization. In general, when used in TIM, agglomeration economies tend to receive a rather qualitative content, with externalities stemming from local and regional business culture, learning by clustering and networking, and urbanization economies resting on the educational system and research infrastructure as well as culture industries in large agglomerations.

The use of the concept of economies of agglomeration for defining territorial innovation models leaves a tremendous ambiguity regarding their spatial character. We observe that even in the most culturally rooted institutional models (ID, *milieu innovateur*, LPS, systems of innovation, learning regions), the interpretation of local business culture varies according to the socio-political discourse in which the notion of district or of industrial space is used. Meanings range from institutional capability to carry technological innovation policy (technology determined institutional dynamics) to endogenous institutional dynamics of localities leading to strategic socio-political choices determining their future.

Endogenous development theory

Regional endogenous development theory combines the three principal dimensions of development: the economic dimension, found in the concept of economic growth using inputs that are at least partly available or generated locally; the socio-cultural dimension, which reflects cultural needs and community identity; and the political dimension, relative to political decision making and involvement of regional groups and individuals in the policy process. In the literature, a large range of interpretations and combinations of the three dimensions can be found. Endogenous inputs can be defined in a technical–economic way, looking at natural resources, human resources, entrepreneurial experiences, existence of an industrial structure, technical education, etc. (COFFEY and POLÈSE, 1984; GAROFOLI, 1984); or they can include the wider socio-cultural fabric of growth coalitions involving the educational system, chambers of commerce, professional associations, etc., leading to the definition of territory in terms of 'the clustering of social relations, the place where local culture and other non-transferable local features are superimposed' (FRIEDMANN and WEAVER, 1979; STÖHR, 1984; GAROFOLI, 1992, p. 4); or, from a more social anthropological point of view, they involve in the first place the institutional dynamics of all groups in the local population (FRIEDMANN, 1992). In this case endogenous development is derived from the empowerment of deprived groups whose needs are structurally alienated, and

which gradually manage to establish their bottom-up development models. Another important dimension of the plurality in interpretation of endogenous development is the relation of endogenous to exogenous development factors, and how significant the endogenous portion of the development assets should be (GAROFOLI, 1992).

The issue of spatial scale is an important area for debate in the endogenous development literature: how 'far' should a locality or a region go in its endogenous strategy? Is endogenous development a response to destabilizing external factors? (STÖHR, 1984). Beyond the polarization between self sufficiency (quite unrealistic) and complete openness to competing external resources (which means abandoning the political possibilities of self-determination) there is the analysis of the decision-making process about the type of local potential that should be valorized, and which external assets should be integrated into the regional development cocktail. STÖHR and TÖDTLING, 1977, speak in this respect of the 'selective regional closure', referring to a strategy aiming at spatial equity between groups of human beings, at the level of material well-being, but also with respect to the right of being different and seeking self-fulfilment. The strategy should not be autarkic, but rather a combination of territorial aspirations and functional exigencies. This means that endogenous development involves a dose of regional preferences with respect to production and exchange, as well as a selection of relations with the extra-regional environment. The Stöhr-Tödtling view implies a 'co-habitation' of two logics that are hard to reconcile: the functional logic – national or international, embodied in the strategies of TNCs (transnational corporations) at least till the first part of the 1980s; and the various logics (economic, socio-cultural, political) of local communities whose objective is to achieve their own development, based on their own identity. PECQUEUR, 1989, describes the local aspirations of the communities as an 'autonomous reaction' to the constraints originating from the extra-territorial environment (qualifying them as 'herenomous pressure'). The core of endogenous development theory is a new conception of space: territorial space replaces functional space. An internal dynamics of development replaces space as a 'simple' support of economic functions. In the territorial approach, in addition to (or in interaction with?) the usual economic attributes privileged by anterior theories of regional development, space is 'upgraded' with a new content of socio-cultural values and traces of the local history. Economic space is now differentiated, and contains the '*milieu de vie*' of a human community where the members are mutually linked by economic, cultural and historical values. Territorial space is a '*cadre d'action*' of a particular human group.

It is a small step from this ethical judgement to an ecological development approach. Human beings should live in harmony with their natural environment, in order to valorize local resources, in full respect of the environment. However, when employed in 'a practical' economic development context, this enriched view of territorial development becomes easily re-functionalized, as SACH's, 1980, eco-development approach illustrates.[3]

In territorial innovation models, the combination of the three dimensions fabricating endogeneity often receives a strong economic-deterministic flavour. The orientation is towards local and regional growth defined with reference to the dominating growth images: high technology production, new producer services, capital intensive cultural *filières*, etc. Forces of globalization and regionalization can be integrated in *innovative milieux*, as GENOSKO, 1997, argues. But contrary to this author's beliefs, when global market forces are followed, local dynamics are coloured by the dominant growth images. Only political forces could counter this dominance. But in reality politics legitimize and catalyse this globalized endogenous growth strategy. The growth coalition model is, therefore, the most celebrated conception of institutional dynamics within a locality or a region seeking to reconcile the global with the local: which institutional forces should be geared towards the appropriate (but usually 'exogenously' pre-cooked) endogenous development strategy? How can socio-political forces be adapted to the 'right' model? We are confronted here with 'institutional instrumentalism', whose sole endogenous ingredient is the capability to produce the 'orgware' and the human resources to accomplish the exogenously imposed or inspired economic growth targets. The other sides of the institutional dynamics such as participatory governance (AMIN, 1995a, 1995b), basic needs determination (FRIEDMANN, 1992), and bottom-up innovation in governance systems (MOULAERT *et al.*, 2000) are left out of the picture.

Systems of innovation, evolution and learning

The multi-faceted character of these dimensions of the 'innovation and learning process' has been discussed quite openly in the scientific literature and in particular in evolutionary economics (see, for example, EDQUIST, 1997). We may pick up some grains from the scientific exchanges related to these dimensions of the TIM, sufficiently forceful to show our argument.

The *first debate* about *the nature of the innovation process* led to the gradual recognition that innovation is neither a one-way diffusion process, nor a factor-impact relationship between the creative innovative entrepreneur and the firm, but a process or a system of innovation. One dimension of this debate was a confrontation between epidemic diffusion models and organizational learning processes (RATTI, 1992). A second concerns the various interpretations of Schumpeter's theory on the innovative entrepreneur (GALLOUJ, 1994). A third

dimension concerns the dynamic aspects of the innovation process, stressing retro-activity but also path dependency (EDQUIST, 1997, several chapters).

The second debate deals with the nature of national innovation systems, and especially the way institutional dynamics are interpreted (LUNDVALL, 1992). Here appears the whole range of views on the role of institutions, the opposition between technological and organizational determinism and the social and political dimensions of learning. There is a growing consensus in this literature that innovation is a socio-organizational process; but there remains some divergence of opinion on the relationship between technological and organizational innovation. And so far there is no answer to the question about what the role of social dynamics and democratic decision making in innovation trajectories should be. The socio-organizational dimension is now fully integrated in the technological innovation debate; but innovation remains in the first place subject to market laws and economic efficiency.

The third debate concerns the nature of the innovation process at the local and regional level. Most of the contributions on the nature of innovation in the territorial innovation model refer to innovative dynamics based on technological change, organizational learning and path dependency. We are here at the heart of the application of contemporary concepts of evolutionary economics. The theories of the technological paradigm and trajectory (DOSI, 1988) were a good starting point, but soon became criticized by the founding fathers themselves (DOSI and MARENGO, 1994), and by authors of the regulationist school for missing the proper dynamics of the social fabric within leading (innovating) firms and across territories (LEBORGNE and LIPIETZ, 1988; DJELLAL, 1993). Organizational selection, learning processes, path dependency, networks, institutions, governance, etc. became distinct elements of the new theories (CARLSSON and JACOBSSON, 1997), which probably managed to distance themselves from the economically determinist interpretation of the innovation process more effectively than the critical authors participating in the first and second debate (STORPER, 1997). It is explicitly recognized by economists of (evolutionary) innovation that: 'Learning and technological change are therefore rooted in the present economic structure; they are local in nature and include strong elements of path dependency' (CARLSSON and JACOBSSON, 1997, p. 267).

In any case, there seems to be more clarity about the role of the process of innovation used in the territorial innovation models than is the case for the concept of agglomeration economies or endogenous growth potential. Still the diversity in interpretation reaches far, ranging from technological determinism at one extreme of the scale to socio-organizational innovation trajectories at the other extreme. In particular the work of SAXENIAN, 1994; MALMBERG and MASKELL, 1997; and STORPER, 1997, stresses the socio-organizational dimensions of the regional innovation process. However, even for these authors, innovation remains a process obeying a market-economic logic.

An even more fundamental problem is that in theorizing innovation and learning, the biological metaphor of evolution is used all the time, but without clarifying which concepts and theories of evolution are used as sources of theoretical inspiration. Of course, a biological metaphor is not mandatory for a social theory of development or evolution; but when it is used, at least some clarity on the principles of genesis, heredity, selection, etc. must be provided (see HODGSON, 1993). Moreover in a social theory of evolution, other modes of social evolution like associativity, reciprocity and solidarity should be considered (KROPOTKIN, 1972).

Network theory

As can be seen from Fig. 1, many of the territorial innovation models cited in this paper use the network concept as a key-element. The district literature, the *milieu innovateur*, the Storper-Scott and Saxenian version of the new industrial spaces and the learning region use a network approach, which bypasses, more or less, the technocratic interpretation of the professional, technological or industry network. GRABHER, 1993, provides a good synthesis of the use of the network concept in socio-economics. According to Grabher, working in the footsteps of Granovetter, a generic form of exchange called 'network' can be identified, which obeys the following four basic features: (1) reciprocity; (1) interdependence; (3) loose coupling; (4) power. Some of the features are close to those in the ID (trust, reciprocity, loose coupling, etc.). But of course when we start analysing the interplay between the different features from the perspective of power within or imposed, and of the 'finality' of the network, we may end up with quite unbalanced configurations, which are more reminiscent of the relations of exploitation in the medieval putting out system (MASSEY, 1984) or the Japanese automobile production system (CHILD-HILL, 1989). If we confront the network concept with the blend of ideas present in the innovation literature (for partial surveys, see HANSEN, 1992; CARLSSON and JACOBSSON, 1997), we notice that networks are in the first instance introduced as intermediate organizational forms between markets and firms, when these fail in efficiency and efficacy. In particular trust (reliability on technical features, timing), demand or supply specificity and possibilities for co-operation are the basis of a choice for supplier–producer and buyer–subcontractor network relationships such as extended family networks or cooperative networks. These have formed the organizational structure of local small production systems where the market was unavailable for

this type of function (HANSEN, 1992, pp. 100–01). In the same way, SMEs in peripheral regions would have no access to advanced producer services if specialized networks, involving the public sector, were not purposely established (see CAVOLA and MARTINELLI, 2001, for the case of the Italian Mezzogiorno).

Governance

The discussion about 'networks' leads to the even more contemporary discussion about 'governance'. Fashionable in most social sciences, the term is (re) used to widen the debate about the administration of social entities (firms, organizations, groups, neighbourhoods, localities, cities, etc.) and the role of agents (workers, members, citizens, etc.) in the decision-making and 'governing' processes (KING and STOKER, 1996). The spectrum of interpretations is again wide. From market and hierarchy and intermediate forms initiated by Coase and others in neo-institutional economics, to the improvement of the 'urban growth coalition' in 'urban machine literature' (MOLOTCH, 1976; LOGAN and MOLOTCH, 1987; STONE, 1989) and the local governance debate at the regional and urban level (LE GALÈS, 1998; STORPER, 1997) emerges a wide array of notions of governance. These notions can easily be related to various views of planning or political theories (FAINSTEIN and FAINSTEIN, 1996) or to the theorizing of the relationships between structure, institutions and agency (social theories). This pluralism of governance types is again present in the territorial innovation literature, almost in the same way as for the notion of network. This is quite natural for those concepts of governance in which networking, in its different interpretations, stands central. Networking could be considered the most challenging concept for administration and the key notion in theories of government and public governance. However, it would be misleading to identify administration with a top-down approach; and networking with a democratic or horizontal approach to governance. In fact networking can be more alienating than top-down but justice-based administration.

TOWARDS A COMMUNITY-BASED CONCEPT OF TERRITORIAL INNOVATION

There is a broad field of tensions between the various TIM about how territorial innovation should be theorized. The apparent semantic uniformity and the shared theoretical sources hide a pluralism of interpretations of innovation dynamics and their theoretical inspirations. This pluralism could be interpreted in a positive way, as a creative stage in the building of a new theory. But for the time being, ambiguity predominates and there is a clear need to achieve some analytical clarity.

There appear to be two possibilities for the epistemological improvement of territorial innovation models. They are probably complementary. The first one is to admit that there is ambiguity, and to provide scientifically acceptable definitions of the various dimensions of market-led innovation at the local and regional level. As of today, none of the TIM provides such definitions. In the light of a shared definition of innovation, for example, there would need to be a detailed and systematic re-examination of all the ingredients of TIM. Such an endeavour may succeed if the observed confusion between normative innovation strategies and positive, sometimes less innovative, development strategies are disentangled. But that is a difficult working condition to impose on a community of scientists that is often deeply involved with regional and local policy and institutional sponsorship of their research. Moreover, thinking in terms of path dependency, this way out from the epistemological malaise is a bit counter-intuitive, because it is hard to reverse an established research trajectory and to reformulate the epistemological borderlines of territorial innovation that were each misspelled from the beginning. Path dependency theory shows the difficulty here. In fact, the revisiting of the various concepts and theories in the light of new epistemological boundaries may be much easier than resetting the boundaries themselves.

And this is what the second alternative puts forward; for there is a need to broaden the discussion on territorial innovation in all its dimensions, as a lead theme for the progress of humanity at the local level. In order to make the analysis of territorial innovation models useful for the development of local communities, a more comprehensive ontology of community development is needed. The integrated area development model in Fig. 1 goes in that direction. The model was first designed in the context of a scientific and political debate on urban regeneration strategies for European metropoles (MOULAERT *et al.*, 1994; MOULAERT *et al.* 2000). In more recent work (MOULAERT and AILENEI, 2002; MOULAERT and NUSSBAUMER, 2002) integrated area development is presented as an alternative for territorial development in general. It is considered innovative in two ways: in social relations of governance; and in satisfaction of needs that are not (no longer?) satisfied by the market. Like the industrial district, *milieu innovateur* or learning region, the IAD recognizes the key role of institutional dynamics in innovation and territorial development. But the IAD model rejects the narrowly defined instrumentality of institutional dynamics for the improvement of market competitiveness of a territory; IAD questions the restrictive existential finality of the TIM in following a market logic only, without caring about the outcomes of market failures for development, and argues that territorial development should be based on a multi-dimensional view of innovation, economic dynamics and community governance. Territorial development does not only mean enabling the local

and regional market economy, but also empowering the other parts of the economy (public sector, social economy, cultural sector, low-productivity artisan production) as well as community life (socio-cultural dynamics as a level of human existence by itself, political and social governance of non-economic sections of society, cultural and natural life).

The broader ontological view of territorial development in IAD has a number of epistemological consequences, including the reconceptualizing of social innovation and learning, culture as a mode of socio-economic integration and social change, community networking and governance.

Within this broader epistemological framework, the role of TIMs will be reduced to explaining the instrumentality of institutions to market-economic competitiveness and its meaning for economic growth. But beyond these, if we ever want to return to a multi-dimensional approach to territorial development, TIM will have to give way to the broader development perspective defended in the IAD model, based on a community ontology, with a multi-dimensional view of innovation in which the social primates and development agencies follow diverse but inter-culturally networked rationales (MOULAERT and NUSSBAUMER, 2002).

NOTES

1. For a theoretical analysis of the tension between competition and regional policy in the European Community, see MARTIN and STEINEN, 1995.
2. We should of course mention MARSHALL, 1919, 1920, as a precursory in the ID literature But the ID 'school' only started developing in the late 1970s, with the work of BAGNASCO, 1977.
3. SACHS, 1980, in his eco-development approach analyses the 'cohabitation' of two different logics as they are also portrayed in the theory of endogenous development. The author stresses that the eco-development approach 'allows us to solve the increasingly dramatic conflict between growth and the state of nature, in ways different from stopping growth ' (p. 12). One finds a similar analysis in regional economics in what PERRIN, 1983, calls the 'eco-ecological paradigm'. Briefly, this 'paradigm' illustrates the dialectical relation between economic organization and the ecological organization of human activity; these dialectics create the possibility of 'autonomous territorial organization'. In a similar analysis the theory of endogenous development, stresses that the process of development originates partly from the local capacity to organize, without wasting natural resources. However, despite the original link between the eco-development and the endogenous development approaches, the recent theory of sustainable development has been designed in complete independence from regional development theory.

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