

From Space to Territory:
Relational Development and Territorial Competitiveness.

The GREMI Approach within the Contemporary Debate

De l'espace au territoire:
Développement relationnel et compétitivité territoriale.

L'approche du GREMI dans le débat contemporaine

by Alberto Bramanti
Senior Lecturer
Department of Economics
Bocconi University
Via U. Gobbi, 5
20136 MILAN - ITALY

E-mail: alberto.bramanti@uni-bocconi.it

Key-Words: Innovation, learning, networking, governance, innovative milieus

Mots-clés: Innovation, apprentissage, réseaux, gouvernance, milieux innovateurs

Paper presented at the conference : « SMEs and districts: hybrid governance forms, knowledge creation & technology transfer », Castellanza, 5-7 November 1998

Abstract

The paper reviews the scientific GREMI's research path confronting its main results with different approaches relating to a dynamic theory of territorial systems of production and innovation (TSPIs). Four main concepts - innovation, learning, networking and governance - guide the reflection: they are focal points in the new emerging paradigm of territorial development.

Theoretically justifying why proximity matters, the paper ends stressing the need for a right balance of the two dimensions of internal synergy (embeddedness) and external energy (openness) in reproducing relational development and territorial competitiveness.

Résumé

Ce papier résume le parcours de recherche du GREMI. Il compare les principaux résultats de l'approche avec différentes démarches reliées à une théorie dynamique des systèmes territoriaux de production et d'innovation.

La réflexion s'articule autour de quatre concepts - innovation, apprentissage, réseaux et gouvernance - qui représentent les éléments centraux du nouveau paradigme émergent du développement territorial.

En justifiant pourquoi la proximité est importante, le papier termine en soulignant la nécessité d'un juste équilibre entre les deux dimensions de synergies internes (enracinement) et énergies externes (ouverture) dans la reproduction du développement relationnel et de la compétitivité territoriale.

From Space to Territory: Relational Development and Territorial Competitiveness. The GREMI Approach within the Contemporary Debate

1. Introduction: space and territory^{*}

Recently, the spatial and territorial dimensions of the organisation of production has once again caught the attention of economists after having been ignored for so long by the economic mainstream.

To mention something significant and interesting regarding the spatial localisation of economic activities, we must step away from a reference point constructed around constant scale returns and perfect competition. The rationality of localised economic behaviour can re-emerge only if we let go of the interpretation of the firm as an optimiser in resource allocation, in return for one in which the firm becomes the strategic co-ordinator of a pool of internal and external resources whose objective is not only to respond to competitive threats but also to generate new added value creatively.

In the economic theory of the 1980s increasing returns, imperfect competition, multiple equilibria, historical role and path dependency, became rapidly accepted ideas although they didn't give rise to a 'theoretical corpus' of regional and spatial economy consistent with such an acceptance.

It is therefore imperative to identify the causes behind the permanence of systematic and localised differences in production and transaction costs and, most importantly, to highlight the different and subsequent explanations of the dynamic competitive advantages of territorial regions.

Renewed attention is thus paid to the (internal/external) organisational dimension of the firm and its spatial repercussions. It is the progression — usefully pointed out by Veltz (1993) — from a (static) cost geography to a (dynamic) organisational geography.

Various approaches exist today — synergetic and complementary to GREMI's scientific itinerary, started by Philippe Aydalot in 1984 — which show the way in which the complex interaction of demand, increasing returns, transport costs, as well as learning processes and other relevant elements, yield to performances even spatially differentiated, with areas which become losers or winners in the new competitive environment (Benko and Lipietz, 1992; Salais and Storper, 1993; Sabel, 1996; Braczyk, Cooke and Heidenreich, 1998; Cooke and Morgan, 1998). These approaches merge into various issues centred around the notion of territory:

- a) as the birthplace of technology and innovation — i.e. the progress from given resource allocation processes to a collective build-up of specific resources (Gaffard, 1990);
- b) as a place for co-ordinating industrial activities, a link between external territorial economies and organisational and inter-organisational firm trajectories (Veltz, 1993);
- c) as a political decision-making unit governing localisation, able to create and redistribute resources, and expressing specific governance structures in the relations between actors (Storper and Harrison, 1991).
- d) as a place in which untraded inter-dependencies (means through which the actors grow technologically and organisationally, and co-ordinate themselves) form, express themselves, and evolve (Storper, 1995; Cooke and Morgan, 1998).

Space is thus not merely a container for economic activities, nor is it just a production factor. It is also *relational space*, capable of implementing and breaking down the stimuli, the ways of diffusion and the dynamics of adjustment in a broad sense (Camagni, 1991; Bramanti and Miglierina, 1995).

2. The idea of *milieu innovateur*: the starting pointⁱ

For an entire decade, about twenty European and North American teams belonging to GREMI (*Groupe de Recherche Européen sur les Milieux Innovateurs*), have decided to focus their own research on technological innovation and the development of productive systems, starting off with an intuition, expressed from the founder, which then turned into an actual paradigm, initially and accurately expressed in the following quote.

The firm is no heaven-sent agent free to ‘choose’ an environment; it is secreted by its environment: the milieux are the ones who initiate and innovate (...). The hypothesis was therefore made from the determinant role played by the local milieux as incubators of innovation, as a prism through which penetrate pushes toward innovation and which yield it its form on the territory; the firm is not an isolated innovative agent; it is part of the milieu which makes it act. (Aydalot, 1986).

GREMI thus grew paying specific attention to the role of space in innovative and localised processes. A region’s development is not merely subordinated to its capacity to attract external firms, but it also depends on its capacity to promote local initiatives, to create a weave of new forms and to activate a territorial dynamic of innovation. The accent is therefore placed on the endogenous dimension of the creative (innovative) process and on an active role of space, in which the region is

integrated in a process of creation/destruction, of diffusion/concentration of technological innovation.

The methodological approach chosen by GREMI, and used throughout the four empirical enquiries (GREMI I, II, III, and IV), is divided in three phases:

- a) elaboration of the objectives and articulation of a common analytical framework for the different territorial teams (with ample articulation covering metropolitan and peri-metropolitan areas; areas like the industrial district; areas of old industrialisation in decline; areas of weak or rising industrialisation; technopolitan-type areas)ⁱⁱ;
- b) development of a direct field analysis;
- c) analysis of the results and elaboration of the elements of theoretical synthesis and policy.

2.1 The first three phases in GREMI's work

During the first phase (Aydalot, 1986; Aydalot and Keeble, 1988), the accent was placed on relations between the firm and its environment, while paying close attention to the impact of the territory's structure and policies on the dynamics of the firm. The milieu, defined as a set of territorial relations, groups into a coherent whole a productive system, various social actors, a specific culture with its own system of representation, giving rise to a dynamic learning process which requires co-ordination/integration of the production and innovation processes in both time and space. Such a co-ordination implies a reciprocal exchange of information and needs even a physical proximity. The milieu thus operates as a sort of organised market in which not only prices and quantities are exchanged, but also information, codes, languages, routines, visions of the world, and strategies.

The second research programme — GREMI II — starts off from the firm's dynamics in order to delineate more clearly the way in which their innovation path modifies spatial organisation (Camagni, 1991; Maillat and Perrin, 1992).

The objective was to highlight what, in an innovation process, reinforces or restructures the territorial fabric or, on the opposite, contributes to destructure it. In fact, all along this process, the firms may end up utilising or creating territorial networks and reinforcing their proximity ties, or, on the contrary, breaking the logic of existing territorial networks and provoking or accentuating their opening-up to extra-territorial spaces.

The results have allowed us, first of all, (and far from any eccentric temptation of the milieux approach) essentially to consider the innovative process in an internal-external dialectic.

Whatever the phase of the innovative process — product conception, development, fabrication or commercialisation — the firm's motivation for innovation has both internal as well as external origin.

The internal component aims to highlight the firm's specific knowledge: its *savoir-faire*, its R&D capacities, its attention to technology, its organisational capacities. The external component involves those factors which contribute to set off innovation outside the firm: clients, suppliers, consultants, specialised magazines, research laboratories, etc.

The importance of the non-market collaborations in the innovation process is of extreme significance though often under-developed in traditional enquiries, owing to the lack of an appropriate method. It is all the more significant when trying to define the spatial modes of these relations between firm and specific environment. These may develop:

- as co-operation networks among firms, following a logic of discrete functional spaces;
- as externalities, determined in a contiguous territorial space.

In conclusion, the interdependencies of the elements at the heart of a milieu do not exclude those outside the milieu, that is the extra-territorial ties. The peculiarity of the *milieux innovateurs* is that of generating organisational processes which facilitate the encounter between territorial organisational forms and extra-territorial functional networks.

Only in the end, halfway between the GREMI II exercise and the next round, the notion of milieu has acquired a nearly final connotation, and only here does the need arise for a better definition of the mechanisms with which the reciprocal relation 'innovative firm'—'innovative milieu', crucially determined by the network's strategy.

The innovative milieu is a territorialised whole, in which the interactions of economic and local agents develop, by learning, from multilateral transactions which generate externalities specific to innovation, by the convergence of learning on more and more advanced forms of common resource management.

The concepts of *milieu innovateur* and innovation network (Maillat, Quévit and Senn, 1993) bring to our attention an essential aspect of the territorial dynamics of the new techno-industrial system, the modes of articulation among forms of coherence internal to the local milieu (endogenous capacity) and external elements which at the same time feed and overwhelm such an internal coherence ('the global') in a perspective of dynamic adjustment.

The results of the enquiries of GREMI III have shown, on the one hand, the multiple factors regarding the genesis of innovation networks and, on the other, the fertile nature of the interrelation '*milieu innovateur*'— 'innovation network'.

As for the 'milieu-network' interrelation, we observe a whole combination of situations and trajectories, once we note how, through cross-fertilisation, milieu and network become innovators in the newly defined sense .

By creating an opening to the outside, the *milieu innovateur* helps a network to turn into an innovation network integrated into a globally competitive context, capable of understanding and mastering the innovative processes. It also supplies it with an organisational and/or institutional picture favourable to change and to externalisation practices oriented toward innovation projects, as well as toward new productive combinations.

2.2 The present state of GREMI's research path

If phase I focused on the relations between the firm and its environment (local milieu), devoting itself to the impact of territorial structures and policies upon the firm's dynamic; phase II thoroughly examined the innovation processes, by showing how these can reinforce or desegregate and restructure the territorial fabric. Phase III is centred around the crucial articulation milieu-network. It is, in fact, the extra-territorial networks which pass onto the milieu experience of organisational and learning forms, enabling it to sort out the constituent elements of the innovation process. Phase IV, having fully recognised the simultaneous founding presence of the local and the global dimensions, has the declared task of exploring the dynamic of the *milieu innovateurs'* development, their territorial trajectories, the possible emergence of their *laws of motion* (Ratti, Bramanti and Gordon, 1997).

Evolutionary processes appear, in which the decreasing performance of the milieu in time may be interpreted through schemes like the milieu's life cycle. In other situations we hit bifurcation points deriving from considerable external shocks. In both cases it is clear that the historical dynamics and trajectories of evolution are not linear, nor entirely spontaneous. The question, therefore, arises of the reproduction of the milieu: how can its specific advantages be renewed while still preserving the cohesion of the whole? In its evolutionary process, the milieu is, in fact, systematically subjected to tight restrictions: a compatibility constraint - the milieu is rooted in an environment with which it dynamically interacts - and a coherence constraint - with particular emphasis on the aspects regarding know-how and rules (Maillat, 1995).

For the most part, change (created or undergone, anticipated or caught up with) is analysed along two privileged axes: technology — or more generally the innovative processes — and market — not

just the productive, but the financial and labour markets. Three characteristics or attitudes of the actors seem critical for responding to the structural modifications resulting from the above-mentioned changes:

- the capacity for external contact; functions such as gateway, bridge, technological windowing enable the milieu to be linked up to the most significant international dynamics;
- the capacity to conceive a strategy, both on the part of the entrepreneurial actors and that of ‘second level’ actors representing the interests of the economic organisations, or with specific planning functions;
- the formation, modification and diffusion of the actors’ *mental maps* (Kamann, in Ratti, Bramanti and Gordon, 1997), which involve the ability to anticipate, that is, to forecast the milieu actors’ future (this sort of expectation is always conditioned by the constituents of the milieu itself: norms, opening to the outside, relational capital). The stronger the common vision of the world, the more convergent the expectations of the different actors, which powerfully stimulates their ability to learn and create specific resources.

The same actors are neither fixed nor immutable in time. Frequently, major changes give new protagonists the opportunity to come on the scene, be it new entrepreneurs, or new coalitions (progressive coalitions) which follow and become part of the change, or be it new institutions. The institutional actor forces the reflection toward the role of milieu politics. The motion toward new dynamics of a local accumulation base can be articulated along different priorities:

- the development of new local productive capacities through the ‘socialisation’ of the costs of change, as well as organisation and commercial costs for the milieu’s firms;
- the regeneration of local human capital through the renewal of processes of collective learning, and anticipation of new needs of the firms;
- politics which favour a diversification and higher complexity of the local accumulation base.

Lastly, the very forms of structural change seem to move in different, not necessarily alternative, directions, beginning from different contexts and starting points (history matters):

- the increasing complexity/enrichment/diversification of the milieu;
- the hierarchization of the milieu, which is in turn distinguished in the growth processes of certain actors according to internal or external levels.
- the external reticulation of the milieu, with either an internal or an external centre of gravity.

The correct balance between ‘internal synergies’ and ‘external energies’, prepares that complex system known as *milieu innovateur* for the positive circuits of self-enforcement and the ability to reproduce itself in time. From this point of view, the milieu is mainly the ‘relational space’ of that

development leading the innovative agents, while allowing them to innovate and co-ordinate each other with the other agents.

3. Confronting with the recent international debate: the offer of a ‘territorial’ research programme

Beginning in the mid-1980s, the development of GREMI’s theoretical approach has now lasted ten years. It has been a tumultuous decade even for the study of many of the main themes dealt with so far. This debate has found stimuli and enrichment from different directions, and GREMI’s theoretical and empirical growth hasn’t happened in an isolated or self-referential way.

The aim of the next four sections is to explore, within the recent international debate, a number of points of contact, complementarity, and difference with GREMI’s parallel path (see previous sections).

Even if it is stimulating the idea of classifying the rising number of contributions within different schools of thought or approaches, which have accumulated reflections for a dynamic theory of the territorial systems of production and innovation (TSPIs) in a parallel and complementary wayⁱⁱⁱ, we prefer here not to follow this pathway.

In the most recent phase, a number of scholars have produced an impressive quantity of works (which cannot possibly be included in the bibliography), with frequent overlapping and reciprocal cross-fertilisation which make attribution to any school of thought quite impossible or pointless.

So, we opted for a critical presentation of (a part of) the rich and articulated debate along four main concepts — *innovation* (§ 3.1), *learning* (§ 3.2), *networking* (§ 3.3) and *governance* (§ 3.4) — which are focal points in the new emerging paradigm of relational development and territorial competitiveness.

Obviously the four concepts chosen are deeply inter-linked and mutual reinforcing. We can hope to give the idea of the overall frame through the following ‘oversemplificistic’ diagrammatic presentation (see *Figure 1.1*). The core of the Figure captures the puzzling and controversial subject of those epochal changes variously described as ‘shrinking space’, ‘time-space compression’, shift from ‘space of places’ towards ‘space of flows’ and the paradoxes of the nexus of global-regional relationship, regionalisation, the role of proximity.

Figure 1.1 - Approximatively here

Even if the actual debate has not yet come to a unified and widely accepted ‘general theory’ on the role of geography in the arrangement of human affairs, there is a growing evidence that *proximity matters* for the surviving and prospering of territorial clusters of actors and activities, at least on a three-fold basis:

- firstly, due to path-dependence and cumulative causation mechanisms;
- secondly, in respect to diminishing transaction costs without rising co-ordination costs; and
- thirdly, connected with the role of infrastructure of norms, rules and routines sustaining economic activities.

The explanation of the dynamic adjustment of economic agents, their organisational competencies, their locational setting, and their collective outcomes (i.e. competitive territories) call for the four main concepts (or building blocks) in the diagram, strongly inter-linked and affecting each-other from within.

3.1 Innovation: the engine of growth

The primary cause, the motor of growth in the TSPI is innovation; this is consistent with a dynamic, competitive, and self-generating view of growth which put together the explanation offered by the ‘new growth theory’ with the evolutionary approach. The innovative process may be understood in terms of the following four propositions, simultaneously considered:

- innovation is fundamentally a collective process (Bianchi and Miller, 1994), occurring through exchange amongst social interlocutors rather than by single, heroic entrepreneurs;
- innovation is a complex and interactive process in which the firm depends on the expertise of a number of private and public economic and scientific agents (Amendola and Gaffard, 1988);
- innovation stems from a creative combination of generic know-how and specific competencies (Becattini and Vaccà, 1994);
- territorial organisation is an essential component of the process of techno-economic creation (Malecki, 1991; Bramanti and Miglierina, 1995), whatever the specific kind of ‘innovative milieu’ would be — dirigiste approach; local or ‘grassroots’ approach; network approach (Cooke and Morgan, 1998).

The strong emphasis on innovation — which GREMI has made its own from the very beginning — takes into account both the Shumpeterian intuition relative to the ‘creative destruction’ process of the innovative entrepreneur and the most recent elements of the debate relative to institutions, social norms, governance structures, and the ways in which interactive behaviour produces and modifies social organisation and spreads innovation (Maillat, 1996).

Only from a dynamic and evolutionary viewpoint does it in fact seem possible to consider space as the decisive factor ‘internal’ to the process of creation and diffusion of innovation and no longer merely ‘extradimensional’ in relation to exogenously given innovation.

Innovation is first and foremost, synonymous with overcoming, change, break; for the firm, innovation is essential to competitiveness and constitutes the way in which to anticipate, live with, or reach to change. Innovation therefore comes within the sphere of the firm’s strategic actions and contributes to shaping its development choices.

As far as the firm itself may be considered as a crucial repository of knowledge — significantly embedded in their operational routines — and due to the almost partial tacitness of the firm-specific knowledge, the relevant information and knowledge on which innovation is rooted are frequently very ‘sticky’, difficult to transfer from place to place and anyway only costly transferable.

All this goes to show the need for coexistence between the two differentiated, highly complementary circuits: the one internal to the firm and its closest environment, where production is rooted, and the external one which arises from the transnational networks of production, science and technology (see section of ‘networking’).

Hence the need to focus on the interaction between agents for whom learning processes of technological change are decisive. These very considerations bring relevance to some important issues on which the international debate is set (and, we feel, still in the phase of increasing returns). The questions relative to: *a*) the structuring of learning processes; *b*) the cumulative mechanisms and their plausible limits connected with the congestive-competitive issues; *c*) the different role of the single actors with regard to the ways in which a system learns ‘collectively’.

3.2 Learning

To understand learning processes we have to preliminary focus on different types of knowledge. One of the most convincing explanations for the relevance of the territorial dimension (the local milieu) in the development of the innovative capacities of a productive system (local milieu + innovation

networks = innovative milieu) is still the original reflection on the production of knowledge due to Michael Polanyi (1962).

Following his seminal contribution a distinction is made between ‘objective’ and ‘tacit’ knowledge, the former being abstract, communicable and conveyed by symbols and language, the latter being incommunicable and embedded in practice, people and organisation, specific to particular problem-solving activities, somewhat idiosyncratic.

The separation of the explicit and implicit focus of knowledge^{iv} cuts across a further debate about ‘collective’ forms of knowledge — developed by social entities (institution and organisations) — distinguishable from ‘individual’ forms of knowledge.

The interaction of these two analytic distinctions suggests a four-fold typology of organisational knowledge (Spender, 1998).

Table 1.1 The different types of knowledge in organisational analysis

	Individual	Social
Explicit	<i>Conscious</i> Possessed, articulated and manipulated by individuals, not yet public	<i>Objectified</i> Explicit, captured and communicated in language and symbols
Implicit	<i>Automatic</i> Known by individuals without they are able to make it explicit	<i>Collective</i> Social facts, such as culture, professional cultures built up within ‘communities of practice’

Source: Spender (1998: 420).

Real organisations contain all four types of knowledge and by the mean of social interaction among them individuals within organisations are able to create and expand knowledge through what Nonaka has called ‘knowledge conversion’.

The assumption that knowledge is created through the interaction between tacit and explicit knowledge allows the Japanese scholar to postulate four different ‘modes’ of knowledge conversion:

- (1) from tacit knowledge to tacit knowledge, which we call socialisation;
- (2) from tacit knowledge to explicit knowledge, or externalisation;
- (3) from explicit knowledge to explicit knowledge, or

combination; (4) from explicit knowledge to tacit knowledge, or internalisation. (Nonaka and Takeuchi, 1998: 220).

We can easily recognised that within the multi-years empirical analysis of GREMI all the four different mechanisms have been carefully scrutinised. *Internalisation* process (closely related to learning by doing) mainly occurs within the firm; *combination* (the process of systematising concepts combining different bodies of explicit knowledge) is more easily performed through network relations — territorial concentrated or spatially scattered depending on the specific technologies and industrial production considered; *externalisation* (the process of concept creation which is triggered by dialogue or collective reflection) and *socialisation* (the process of sharing experiences) are the types of knowledge conversion where the ‘milieu’ plays its major role.

The combination and re-combination of the different types of knowledge conversion gives origin to territorial-specific *learning mechanisms* — the two extremes being represented by completely adaptive learning processes (all existing agents evolve together) or by absolutely selective learning processes (heavily based on a biological model of change, the dynamics may best be described as ‘survival of the fittest’ in which those who adapt to change survive). As long as this second alternative is the chosen focus, strong *regressive coalitions* — individuals united by a common interest in opposing a negative selection process — against innovation tend to emerge. On the contrary, if the first alternative is adhered to, *progressive coalitions* emerge which generate an increased transformation of the capabilities and skills of the individuals resulting in complementarity of actions among them.

New mechanisms of *learning by interacting* appear in the innovative milieu highlighting original competitive formulas in which both environmental factors (proximity) and entrepreneurial ones (the guiding role undertaken by certain actors) concur to promote and sustain the innovative process (Lipparini and Lorenzoni, 1995).

Such learning processes follow the premise of the opening of the system towards the outside: ‘contamination’ allows the system to learn and to keep up with more or less formal links, which are reduced to units through the use of appropriate governing mechanisms for relations.

It is not by chance that the most pervasive form of learning by interacting takes place at the interfirm level, between firms in the supply chain (Morgan, 1996).

To some extents one of the crucial point in the reproduction of innovation over time is the requirement of informational and knowledge ‘redundancy’, i.e. the existence of information than goes beyond the immediate operational requirements of organisational members.

While redundancy is largely present in the 'production space' in a number of European local milieux (due to a fragmented division of labour among entrepreneurs and a meaningful presence of high quality craftsmanship), it seems much more rarefact within the 'knowledge production sphere' and this makes the difference between old fashioned industrial district and outward oriented innovative milieux.

Obviously, different types of knowledge have also different international mobility as convincingly stressed by Porter and Sölvell (1998). Even if there is a strong and unresolved debate about the relationship between diffusion of the new technologies, agglomeration economies and location (what can ensure that diffusion require physical proximity?), we find a growing number of scholars claiming for a specific role for 'home-based clusters' or territorial embeddedness.

However, it is also central to the question of how easily knowledge embedded in one local cluster can be imitated by outside actors. If diffusion is indeed rapid and can be accomplished at low cost, globalisation forces would override earlier locally confined innovation processes. If, on the other hand, diffusion in effect is sluggish, costly and involves long lead times, then localised innovation processes will remain essential. (Porter and Sölvell, 1998: 446).

If TSPIs and *milieux innovateurs* are seen as places for the integration of contextual and codified knowledge, or as production places for specific resources, for the elaboration and diffusion of innovation and change (and that's exactly where GREMI's contributions allowed the debate to move further), then we can immediately grasp the need for the opening and innervation of TSPI through different-level webs and with the different sites of codified knowledge production. Meanwhile, TPSI requires continuous modifications, while maintaining a few recognisable elements to guarantee identification: it is the difficult challenge of converting into a collective identity without freezing structures and behaviour.

3.3 Networking

The analysis of networks has flourished in recent years offering an original and suggestive framework for strategic competition of firms and territories.

Different schools have provided crucial insights and have stressed complementary aspects of this issue. Among others, we should mention the Swedish and Anglo-Saxon tradition, which emphasises the notion of 'industrial network' (see, *inter alia*, the works of Axelsson and Easton, 1992 and Batten et al., 1995) as well as the business and organisational approach (Eber, 1997).

At the level of local development phenomena, focusing both on inner interrelations between local actors and on their outward connections, a growing attention has been paid by Italian scholars to widening and deepening the old concept of Marshallian industrial district (beyond the seminal work of Becattini, 1987, it is worth to refer to two recent volumes edited by Varaldo and Ferrucci, 1997, and Bramanti and Maggioni, 1997); and, obviously, by GREMI researchers, particularly within the GREMI III project (Maillat, Quévit and Senn, 1993).

The real economy has witnessed a dramatic increase in the relevance of phenomena such as informal relationships, face-to-face contacts, productive interdependence, putting-out systems, subcontracting arrangements, co-operation agreements, and strategic alliances. They are all new but enduring relationships designed to reduce dynamic uncertainty and improve the territorial competitiveness of firm. However, whilst the firms' perspective has been widely analysed in both economic and business science literature, much work is still to be done at the meso-economic scale.

Economic networks, i.e. reciprocal structures of co-operation and risk sharing between independent actors, are being established in order to deal with the new forms of complexity. Certainly the goal of network analysis is to increase our understanding of flow patterns in a modern differentiated society, where new forms of barriers, mobility, accessibility, complexity and self-organisation caused by interaction through links seems not to be directly connected with geographical distance of territorial adjacencies.

At the same time we discover that globality, however, is not a synonym for universality and homogeneity but, rather, for the interdependence of parts in a whole, of parts which use such interdependencies to increase their own individuality and opportunities. The evolution of the industrial economy is therefore seen as the emergence of diversity: the one best way for capitalism to win has had its day.

Beside the globalisation of markets, the process of resource localisation complementarily promotes local contexts to the role of 'meso-entities', by rediscovering the importance of a variety of context acting upon the generation of competitive advantages of firms and countries. The modification and complexification of competitive contexts in which the firm operates increase the processes of interaction among firms and other external subjects (other firms, institutions, contexts). At the same time, we notice an increasing need for the firm to innovate its forms of organisation of externalities (OECD, 1996).

Among these forms, the 'web' gains in importance. The industrial economists define it as an efficient and effective way to organise relations among productive units, so as to increase the level of innovative capacity of the single firm participating in the web. Networks, so, act as a powerful tool

to reduce uncertainty — complementary to *milieu innovateur* — but it can hardly prosper if it loses its social rooting in a specific territorial context.

Confronted by the new competitive scenario of the 1980s, firms have been forced to develop new business strategies mainly based on the increase of the quality and ‘service’ contents of their products. At the same time, innovation has radically changed its characteristics, being no longer incorporated only in capital assets but also requiring that ‘systemic capabilities’ be profitably adopted. The above-mentioned reasons explain why the increased financial, commercial, and technological thresholds present in international global markets are no longer coherent with the still prevailing small size of Italian individual firms. In this framework, the local milieu can play a strategic role by controlling market access, by organically connecting and managing the upstream and downstream phases of production activities: finance, research & development, engineering, advertising, control of commercial networks, and so on.

The path of increasing competitiveness often goes through an articulated process of development of the firm itself, including the growing size of firms and a change in local productive systems towards a more hierarchical^v structure.

As already said, proximity matters — not only for reasons linked to the interactive dimension of learning processes — but also because in the formation of inter-organisational networks three main dimensions play a relevant role (Eber, 1997): activity links, trust, and catalysts (i.e. informational intermediaries who reduce communication costs, diminish uncertainties, and facilitate better coordination for network members); and among these three elements the second two are very frequently territorial embedded.

Network relations identify selected and explicit linkages with preferential partners in the firms’ space of complementary assets and market relationships.

We are witnessing the rising of a ‘networked economy’ in which the dominant locus of value creation consists of interrelated and flexible architectures that allow for the aggregate management of individual relationships (Grabher and Stark, 1997).

The economic analysis of networks matches with the GREMI’s research path in the sphere of innovation networks which constitute an appropriate organisational response to the complexity of the innovation process.

As far as ‘milieu connections’ are concerned, they draw heavily on their actors’ culture, on their capacity and willingness to create long-lasting linkages — although very often not codified in ‘legal form’ — where reputation, friendship and interdependence become the building blocks of the relation. The ‘technical culture’ defined by Crevoiser and Maillat (1991) as a key feature of milieu

means a common language related to technical matter, some contracting rules and a standardisation process. Thus spatial proximity becomes important in terms of easy information exchange, similarity of cultural and psychological attitudes, frequency of interpersonal contacts and co-operation, and density of factors mobility within the limits of the local area (Camagni, 1991).

At the same time innovation strategies must extend outwards to the global economy. The imperative to gain access to the 'relational capital' inherent in trans-regional networks reveals the limitations of the self-contained territorial milieu under changing global conditions of innovation. So, networks seem a 'necessary condition' (even not sufficient) for transferring heterogeneous skills, knowledge and information into the region as sources of innovative renewal.

3.4 Governance

The rising attention towards the way the world economy and economies have responded to globalisation — and, the most interesting for our approach, to the spatial outcomes of these processes — has produced the apparent paradox of rediscovering significance of geography with the consequence of stressing the importance of place and location.

In the light of the compression of the space-time relations region's competitiveness seems to be linked to the development paths of other regions around the world.

An important consequence of this search for a new global order is that: *a*) the sovereign state is under enormous stress; and *b*) at all the different territorial levels (supranational, national, regional, urban, local ...) the structure of government administration is called into question (Whitley and Kristensen, 1997). Re-thinking the modes of social regulation claims about the necessary formation of collective governance mechanisms in contemporary capitalism under the pressure of shifting sovereignties and loyalties at all levels.

Traditionally, localism and rootedness have been considered backward, if not reactionary, attitudes, since history seemed to unfold towards cosmopolitanism, universalism and mobility. But neo-localism (the new form of localism in the era of globalisation) represents one on the possible ways out of anomy, alienation and identity loss, typical of modernity. Neo-localism is different from old localism.

The essential differences are two. The first is that while old localism was 'primordial', unthinking, the new one is the outcome of free will, conscious choice; the former is 'necessary and natural', the second 'voluntary and intentional' (rational). The second difference is that the old localism tended to minimise

contacts with the exterior, to maintain a strong closed boundary, while the new localism is quite aware of the rest of the world, and is quite open to interactions with it. (Strassoldo, 1992: 47).

Among the new contributions to this open question one of the most interest is certainly the 'associational model', based on a more social and collaborative mode of economic organisation (Cooke and Morgan, 1998). The strong emphasis on governance is due to the fact that interaction plus share history and culture facilitate the development of trust based social capital in local business communities. Social capital is a metaphor to describe the embeddedness of economic activity in the social structure.

Even the regulationist approach (Lebourgne and Lipietz, 1992) has been paid recently renewed attention to the territorial dimension of the regulatory processes; this cultural parabola is clearly defined by the title of a recent essay (Benko and Lipietz, 1995) on '*De la régulation des espaces aux espaces de régulation*'. The field of encounter with the reflection developed by GREMI is wide since the theme of the self-reproduction of local territories (Aydalot, 1986; Aydalot and Keeble, 1988) sets the stage for local regulation. As a matter of fact it exist a strong interrelation among learning processes, organizations' role and the nature of institutions as far as firms and market produce constantly new knowledge organising learning.

Despite the wide differences in the co-operative and hierarchical forms between firms which disomogeneous territories are sperimenting we find a widespread agreement on the existence of a new organisational plurality.

New forms of industrial organisation have appeared — quasi-enterprise, quasi-vertical integration, constellations, *filières*, hollow corporation, network-companies, etc. — forcing the examination of an idea of enterprise as a complex organisation, with specific resources and specific strategic behaviour options. (Conti et al., 1995: 61).

The territories in which the capital/work ratio is most flexible often involve brutal mercantile relations among firms, while those in which 'fidelity' between capital and work prevails mostly lead to partnerships among firms. To these diversified forms of territorial evolution correspond defensive or offensive strategies on the part of the élite.

The word *governance* has been applied to the regulation of such relations, in general resulting from the combination of different forms: hierarchy, sub-contracting, partnership, 'milieu', public and non-public agencies. Storper and Harrison (1991) show the great variety of governance forms, and a recent GREMI work successfully applies this very scheme to the analysis of a certain number of Italian productive systems (Bramanti and Maggioni, in Ratti, Bramanti and Gordon, 1997) to show a

trend in the process of power re-concentration whose goal is to overcome successfully the competitive threat from outside the milieu.

Salais and Storper (1993) analyse the different forms of economic co-ordination among subjects, activities and conventions, and the 'possible worlds' of production resulting from them, by confronting these abstractions with the real worlds of different contexts.

The sub-national spaces (regions, districts, milieux, etc.) are increasingly structured by local and regional public institutions. Although local regulation can be only partial, it is identifiable through three complementary aspects: a type of governance, an institutional context, social compromises. Hence the birth of the concept of institutional proximity (Kirat, 1993), which ensures the social cohesiveness of the local productive systems, which are based upon a logic of collective action founded on local conventions and institutions created, adapted and participated by the participating actors themselves.

From the geographical point of view a major open question is related to how the administrative space is bounded.

The ideal is of an activity space which is precisely matched by administrative boundaries; that is 'truly-bounded'. In this case people's personal lives and contact patterns give a natural 'sense of community' which encourages in a direct way a high level of participation in administration: the two reinforce each other. (Bennet, 1989: 34).

The theory of organisations becomes a necessary step to characterise industrial dynamics. The concept of organisation is interpreted as a place for the co-ordination of different agents; a place for competencies set to overcome the problems caused by a changing environment — and in particular as a means of conversion of individual learning to collective learning —; a place for power in the management of conflicts and experimentation of new procedures for the distribution of locally produced added value. On these grounds, the possible encounters and cross-fertilisation with the evolutionary approach seem ample and promising.

What are these governing mechanisms? Which steps are taken to promote a stability that is not simultaneously innovative inertia? What are the roles, or the actors, which characterise the necessary process of change in order to compete?

In order to deal with the increasing complexity of a set of highly innovative relations, it is necessary to develop selection, aggregation coalitions and re-combination capacities of the different actors even within organisational architectures.

This is particularly evident within the evolving patterns of European governance where the cohesion policy has already evidenced that it is impossible to point to a dominant actor. Many times

there is no dominant actor, control is shared in such a way that actors are mutually dependent. Each player needs to exchange resource with other actor in order to exert power. Compelling all players to consolidate their relationship in more or less durable arrangements.

All that, in turn, give horigine to the new policy network concept defined as a set of resource-dependent organisations.

The relationships in a policy network could vary from a tightly integrated policy community to a loosely coupled issue network, depending on the type needed for a policy problem, and the resulting degree of interdependence among the players. (Hooghe, 1996: 17).

There is increasing evidence for the fact that modifications in the learning processes, and in the governance structures sustaining them, are not the result of a spontaneous dynamic of territories and milieux; there is a growing need for *system integrators*. It is worthnote to report the Schon's (1973) itemisation of necessary conditions for successful systems of strategic learning to occur.

For Schon, learning systems create new 'network roles' of:

- systems negotiator—the middleman who sensitises others to system-guidance issue;
 - underground manager—maintains and operates informal personal networks to keep system coherence;
 - manoeuvrer—mobilises internal resources to shift projects in new directions;
 - broker—mobilises external resources to smooth transactions requirement trust;
 - network manager—provides resources needed for such networks to function in the 'official' system;
 - facilitator—provides interface relations with distinctive 'regional enterprises'.
- (From Cooke and Morgan, 1998: 67)

These should be natural leader operators, or public-private agencies, or lobbying associations. Whatever form they take, they will have to operate as a 'clearing-house'. Power of single actors will have to be balanced against the provision of certain public goods, and particularly *relational goods*, on the basis of which the exchange of knowledge production and informal know-how may be implemented.

4. Getting to the core: towards a law of motion of milieux

Going back to the diagram reported in *Figure 1.1* it is now more clear, hopefully, the strong coherence among the four conceptual 'building blocks' together with the awareness that only those territorial milieux able to exploit and balance all the four blocks may experience a positive development path.

The history of different TSPIs — success stories as well as declining and languishing ones — may be read as a lackness, or shortage, or unresolved bottleneck, in one or more of the main building blocks (Courlet and Dimou, 1995).

Comparing the stylised facts and theoretical systematisation rising from the four steps in the GREMI's scientific trajectory with the international debate reviewed is a source of satisfaction, for two reasons. First, because GREMI's reflections have significantly contributed to systematising and gathering many intuitions and stimuli issued from the international debate; secondly, because of the emergence of a converging corpus of 'stylised facts' and coherent theorisation as the basis for a new theory on spatial economic development, long out of the picture.

The conditions which allow agents and milieux to compete appropriately can be summed up as follows: *a)* strong potential for self-organisation within the relations between subjects; *b)* dynamic balance between actors and environment, which facilitates the creation of viability trajectories; *c)* possible modular structure of the sub-systems interacting with a certain degree of redundancy.

To evolve positively, a TSPI should then be able dynamically to balance the degree of internal strength within its web (social rooting or internal synergy) with that of its opening to the world (participation in a-spatial networks or external energy). Any 'unbalanced' solution leads, in the medium term, to the dissolution of the TSPI as such; alternatively, to 'death from entropy' or to a disintegration of the system, along with the elimination of the spatial effects of proximity.

The very challenge and chance of the milieu to prosper and evolve is to be found in a proper mix of the two dimensions, robustness and openness, reported on the axis in *Figure 1.2*: the never got once-and-for-all 'blending' of internal sinergy and external energy.

The complex interplay among three main elements previously introduced — learning mechanisms, network relationships, and governance structures — brings a 'potential innovation' into an 'effective innovation' allowing the innovative milieu to stand competition and grow and reinforcing its internal cohesion, and supportive tissue of social practice and institutions.

The concluding question concerns therefore the elements and interactions which allow (or don't) the realisation of that 'right mix' which alone will keep the *milieu innovateur* on an appropriate growth path.

What helps the TSPI to stay on an appropriate growth path, while balancing internal ties and external connections? What is the outcome of the harmonious fusion of world culture with the *genius loci*?

A definite answer hasn't been found yet, even if the GREMI's empirical analysis have offered significant contributions.

Beyond the four ‘building blocks’ discussed in detail in the previous sections we suggest here a fifth element: the policy issue (or ‘supporting space’).

Figure 1.2 - Approximately here

These five, strongly overlapping elements, represent several courses of reflection along which it will be possible (and necessary) to articulate a response to the dynamic of ‘relational development and territorial competitiveness’.

- a) The *industrial production system*, is a departure point and, at the same time, the result of the interplay between ‘innovation processes’ and ‘networking relations’. It encompasses the specific context of exchange between firms: input-output relations, degree of specialisation, sectorial mix, presence or absence of a dominant firm, etc. The recent evolution of several TSPIs showed that the modification of the local milieu tends to be the outcome of specific and original evolutionary paths followed by leader firms who detach themselves (for reasons of culture, strategic means and capacities) from the firms which, in the same environment, persist in the same behaviour. The knowledge of the developmental courses of leading firms^{vi} thus becomes a prerequisite for the understanding of the developmental course of the entire milieu. Situations defined as most conducive to development are those in which the leading firm holds great co-ordinating capacities and lucidity in the planning of organisational assets which, from the beginning, require a firm and an informed orientation to the outside (Chandler, Hagström and Sölvell, 1998).
- b) The structuring of *learning processes* within the system, determines, in turn, the rise of progressive or regressive coalitions, depending on the power relations between actors who are capable of metabolising change and actors who are excluded from these processes (Bianchi and Miller, 1994). The problem of how the innovative process allows an economic system to grow does not lie in the technical dimension of the process itself. It lies, rather, in the ways — always social and political — in which a group of individuals react to change. It is, in fact, through social norms — i.e. norms which regulate the behaviour of non-isolated individuals — that individual choices are moulded. Learning processes are, at least in part, facilitated or inhibited by the types of coalitions which form within a local productive context. A ‘progressive context’ is thus of fundamental importance for a system of actors to be able to benefit (collectively) from the

innovation processes, whatever the propelling mechanism behind them (Camagni and Rabelotti, in Ratti, Bramanti and Gordon, 1997).

c) The emerging of 'dedicate' *governance structures* allows the appropriate use of power in the TSPI. Many researchers from different backgrounds have come to agree on the importance of co-operative forms of regulation of the economy. During the evolution towards territorial reticular systems (formalised milieu), the normalisation of collaborations in the economic sphere progressively arose from the need to compensate for the weakening of traditional trust factors, tied to the belonging to a common social environment. Space and resources thus become crucial for regulation, which strikes a difficult balance between the lack of localised regulation and the crisis of the centralised neo-corporative model (the Italian case). Hence a new interest in the intermediate territorial levels (regions) and, in particular, in appropriate ways of preserving or ensuring homogeneity also through specific voluntary 'bargaining tables' among social parties (Braczyk, Cooke and Heidenreich, 1998).

d) The *support space* responds to the planned dimension of development and is enforced by appropriate local policies (Ratti, 1991; Bianchi, 1992; Bramanti and Odifreddi, 1995; Alberton and Ratti, in Ratti, Bramanti and Gordon, 1997), which allow the system to open up without dispersing its accumulated competencies, and which help to build up contacts between local leaders and the most progressive agents. The control span in local development choices (Bennet and Krebs, 1991) takes on a primary role while, at the same time, expresses the complex issue of the 'right boundary' in the choices of local development.

The supporting space of the local economy arises out of the grouping of common interests and a process of common strategy identification, which leads to a new flexible approach:

Flexible decentralisation to the smallest and most basic units in which the demand for participation, legitimacy, representation, and community identity can be met; and flexible aggregation of basic units into collectives, co-operatives and associations for which efficient sizes of administration can be achieved to allow the internalisation of externalities and technical-bureaucratic efficiency. (Bennet, 1989: 54).

As the 'open innovative milieu' (GREMI IV) may be seen as a cognitive and relational system, it seems fruitful and stimulating to study and explore it as a *multi-level neural network*, which learns and evolves dynamically — a neural network in which privileged attention is paid to inter-firms relations and to the institutional environment surrounding the milieu (Pilotti, 1998).

Here, we may forecast a new development of studies on the evolution of open innovative milieux, which would dwell essentially on the contextualisation/de-contextualisation of knowledge and

learning processes. A positive response from the milieu (in terms of resilience and evolution) may be encouraged by the appropriate supply of 'endogenous' policies.

Such policies seem to be more frequently the outcome of locally based policy networks - i.e. informal or semi-formal organisational mechanisms underacting around specific issues and programmes. So territory, once again, becomes foundative of such agreement as the lowest strategic level at which to sustain a regular interaction among public and private individuals, groups, organisations and associations, able to combining local and global languages, as well as flexibility elements, with network externalities.

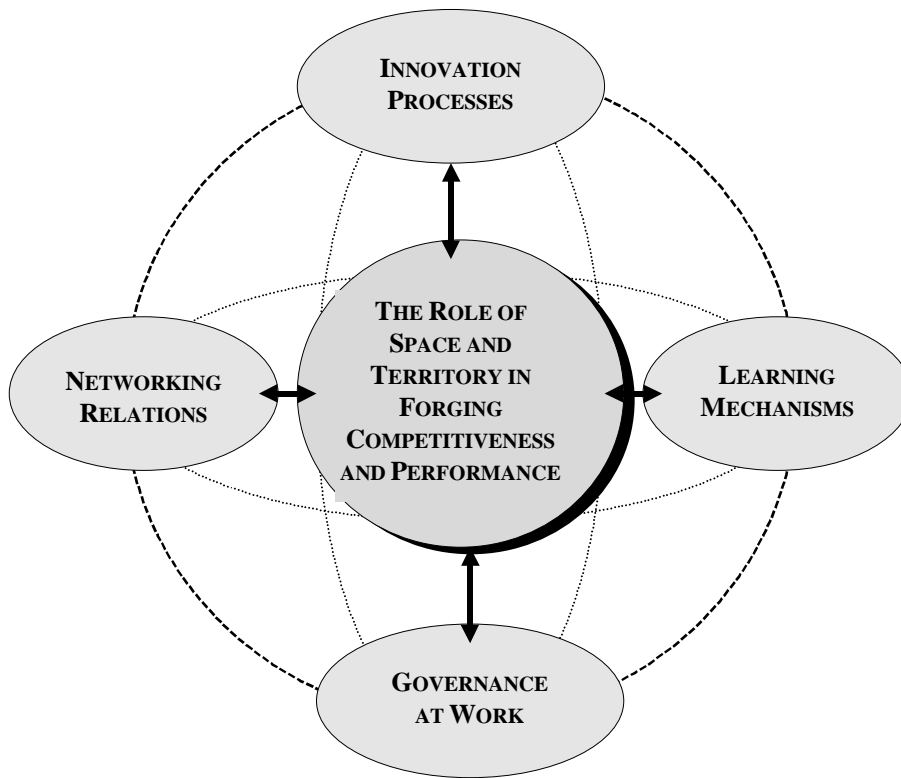


Figure 1.1 The emerging role of geography:
a diagrammatic view of the four 'building blocks'

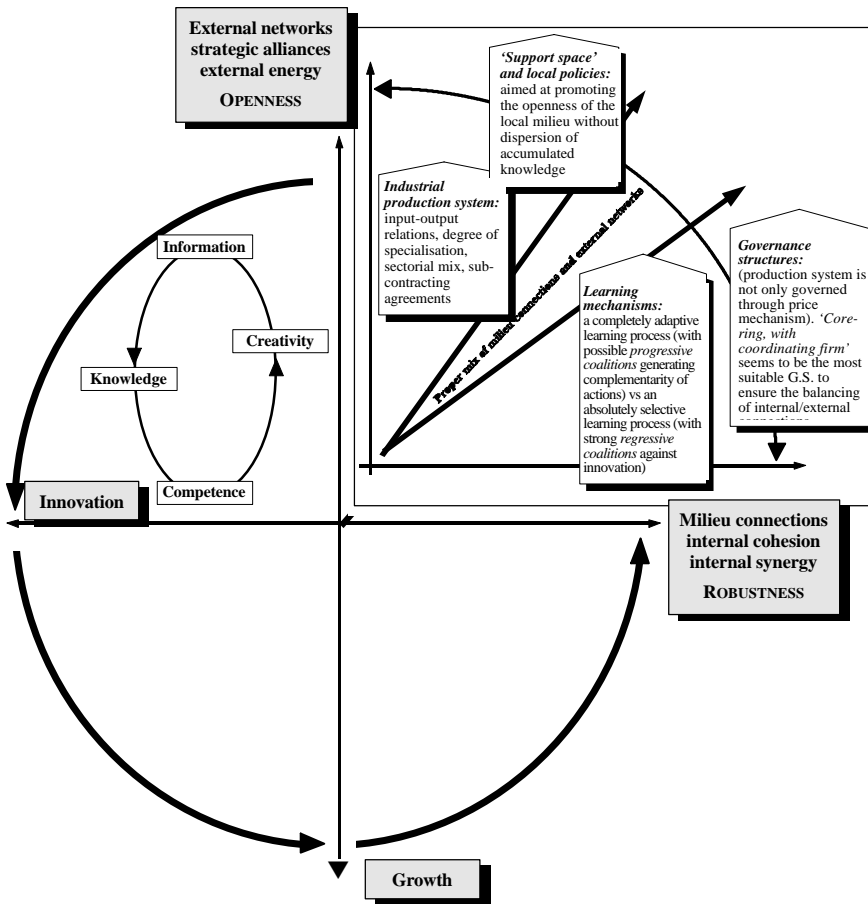


Figure 1.2 The dynamic of innovative milieu: a diagrammatic model

Source: adapted from Bramanti and Senn, 1994.

Notes

*I am deeply indebted with Remigio Ratti and Mario Maggioni for having discussed with me many points. I also benefited of their precious contributions in previous co-authored published works. Anyway, I remain the sole responsible of the present work.

ⁱSection 2 represents a reworking of some paragraphs, written with R. Ratti, in the chapter *'The multi-faced dimensions of local development'* (Ratti, Bramanti and Gordon, 1997).

ⁱⁱIn the course of its work, GREMI has investigated the impact of innovation and new technologies on industrial change in some 15 European regions plus the 'Silicon Valley' in the U.S. The former include old, heavy industrial regions (Newcastle, Charleroi, Poznan, St. Etienne), traditional industrial regions (such as Bergamo, Italy) or regions based on lighter, small-firms industries (watch-making and mechanical engineering in the Swiss Jura and Besançon), less-industrialised but developing regions (Aix-en-Provence, Côte-d'Azur, the Ticino region of Switzerland), diversified metropolitan regions (Paris, Milan, Amsterdam, Barcelona), and peripheral semi-industrial regions (Northern Greece, Portugal).

ⁱⁱⁱActually, we have developed a preliminary presentation of four different schools in Ratti, Bramanti and Gordon (1997), comparing: the Italian district school; the Californian school of new industrial geography; the French regulationist school (in its most recent spatial orientation); and the evolutionist-industrialist school, which shows less compactness and a greater interdependence of issues, approaches and contributions.

Another survey is available in Bramanti and Maggioni (1997) in which the authors pass through: the Italian district school; the GREMI approach; the Italian industrial economics; the Californian school; the Porterian 'competitive advantage' approach; the 'New economic geography' of Krugman.

^{iv}It is worth noting to observe that tacit and explicit knowledge are not totally separate but mutually complementary entities. They interact with and interchange into each other in the creative activities of human being.

^vHierarchisation is the term used to describe the process whereby power tends to become concentrated in a network.

^{vi}We consider 'leading firms' those which express an elevated strategic freedom — with the selection of their competitive placement — and which, simultaneously, develop distinct competencies in many managerial areas: from project planning to its industrialisation, from sub-supplier co-ordination of phases and quality for the instalment of a distribution policy, etc.

References

- Amendola, M. and Gaffard, J.-L. (1988) *The Innovative Choice: An Economic Analysis of the Dynamics of Technology*, B.H. Blackwell, Oxford.
- Axelsson, B. and Easton, G. (eds) (1992) *Industrial Networks. A New View of Reality*, Routledge, London.
- Aydalot, Ph. (ed.) (1986) *Milieux innovateurs en Europe – Innovative Environments in Europe*, GREMI, Paris.
- Aydalot, Ph. and Keeble, D. (eds) (1988) *Innovation, High-Technology Industry and Local Environments: The European Experience*, Routledge—GREMI, London.
- Batten, D., Casti, J. And Thord, R. (eds) (1995) *Networks in Action. Communication, Economics and Human Knowledge*, Springer-Verlag, Berlin.
- Becattini, G. (ed.) (1987) *Mercato e forze locali: il distretto industriale*, Il Mulino, Bologna.
- Becattini, G. and Vaccà, S. (eds) (1994) *Prospettive degli studi di economia e politica industriale in Italia*, Franco Angeli, Milano.
- Benko, G. and Lipietz, A. (1995) 'De la régulation des espaces aux espace de régulation', in R. Boyer and Y. Saillard (eds), *Théorie de la régulation. L'état des savoirs*, La Découverte, Paris.
- Bennet, R. (ed.) (1989) *Territory and Administration in Europe*, Pinter Publishers, London.
- Bennet, R. and Krebs, G. (1991) *Local Economic Development: Public-Private Partnership Initiation in Britain and Germany*, Belhaven Press, London.
- Bianchi, P. (1992) 'Sentieri di industrializzazione e sviluppo regionale negli anni 1990: strategie politiche di intervento pubblico nella nuova fase competitiva post-fordista', in F. Belussi (ed.), *Nuovi modelli d'impresa, gerarchie organizzative e imprese rete*, Franco Angeli, Milano.
- Bianchi, P. and Miller L.M. (1994) *Innovation, Collective Action and Endogenous Growth: An Essay on Institutional and Structural Change*, Dynamis, no. 2/94, Idse-Cnr, Milano.
- Boyer, R. and Saillard, Y. (eds) (1995) *Théorie de la régulation. L'état des savoirs*, La Découverte, Paris.
- Braczyk, H.-J., Cooke, P. and Heidenreich, M. (eds) (1998) *Regional Innovation Systems*, University College London, London.
- Bramanti, A. and Maggioni A.M. (eds) (1997) *La dinamica dei sistemi produttivi territoriali: teorie, tecniche, politiche*, Franco Angeli, Milano.
- Bramanti, A. and Miglierina, C. (1995) 'Alle radici della crescita regionale: fattori, fenomeni, agenti', *L'Industria*, vol. XVI, no. 1.
- Bramanti, A. and Odifreddi, D. (eds) (1995) *Lo sviluppo delle 'aree avanzate'. Apertura e identità nei sistemi economici territoriali: Varese come caso nazionale*, Franco Angeli, Milano.
- Bramanti, A. and Ratti, R. (1997) 'The Multi-Faced Dimensions of Local Development', in Ratti, R., Bramanti, A. and Gordon, R. (eds) *The Dynamics of Innovative Regions. The GREMI Approach*, Ashgate—GREMI, London.
- Bramanti, A. and Senn, L. (1994) *Dynamic Uncertainty, Structural Changes and Milieux: Challenging for the Future in North-Western Lombardy*, Colloque GREMI IV 'Dynamique d'ajustement structurel des milieux', Ascona, 29-31 October.
- Camagni, R. (ed.) (1991) *Innovation Networks: Spatial Perspectives*, Belhaven Press—GREMI, London.
- Chandler, A.D. Jr., Hagström, P. and Sölvell, Ö. (eds) (1998) *The Dynamics Firm. The Role of Technology, Strategy, Organization, and Regions*, Oxford University Press, Oxford.
- Conti, S., Malecki, E.J. and Oinas, P. (eds) (1995) *The Industrial Enterprise and its Environment: Spatial Perspectives*, Avebury, Aldershot.
- Cooke, P. and Morgan, K. (1998) *The Associational Economy. Firms, Regions, and Innovation*, Oxford University Press, Oxford.
- Courlet, C. and Dimou, M. (1995) 'Les systèmes localisés de production: une approche de la dynamique longue', in A. Rallet and A. Torre (eds), *Économie industrielle et économie spatiale*, Economica, Paris.

-
- Crevoisier, O. and Maillat D. (1991) 'Milieu, Industrial Organisation and Territorial Production System: Towards a New Theory of Spatial Development', in Camagni, R. (ed.) *Innovation Networks: Spatial Perspectives*, Belhaven Press—GREMI, London.
- Eber, M. (ed.) (1997) *The Formation of Inter-Organizational Networks*, Oxford University Press, Oxford.
- Gaffard, J.-L. (1990) *Économie industrielle et de l'innovation*, Dalloz, Paris.
- Grabher, G. (ed.) (1993) *The Embedded Firm. On the Socio-economics of Industrial Networks*, Routledge, London.
- Grabher, G. and Stark, D. (eds) (1997) *Restructuring Networks in Post-Socialism. Legacies, Linkages, and Localities*, Oxford University Press, Oxford.
- Hooghe, L. (ed.) (1996) *Cohesion Policy and European Integration. Building a Multi-Level Governance*, Clarendon Press, Oxford.
- Kirat, T. (1993) 'Innovation technologique et apprentissage institutionnel: institutions et proximité dans la dynamique des systèmes d'innovation territorialisés', *Revue d'Economie Régionale et Urbaine*, no. 3.
- Lebourgne, D. and Lipietz, A. (1992) 'Flexibilité offensive, flexibilité défensive. Deux stratégies sociales dans la production des nouveaux espaces économiques', in G. Benko and A. Lipietz (eds), *Les régions qui gagnent*, PUF, Paris.
- Lipparini A. and Lorenzoni G. (1995), *Le organizzazioni ad alta intensità relazionale. Riflessioni sui meccanismi di 'learning by interacting' nelle aree ad alta concentrazione d'impresе*, Ricerca di Base 'Modelli di sviluppo e regional competition', Quaderno no. 5/95, Università Bocconi, Milano.
- Maillat, D. (1995) 'Milieux innovateurs et dynamique territoriale', in A. Rallet and A. Torre (eds), *Économie industrielle et économie spatiale*, Economica, Paris.
- Maillat, D. (1996) 'Regional Productive Systems and Innovative Milieux', in OECD, *Networks of Enterprises and Local Development*, Territorial Development, OECD, Paris.
- Maillat, D. and Perrin, J.-C. (eds) (1992) *Entreprises innovatrices et développement territorial*, GREMI—EDES, Neuchâtel.
- Maillat, D., Quévit, M. and Senn, L. (eds) (1993) *Réseaux d'innovation et milieux innovateurs: un pari pour le développement régional*, GREMI—EDES, Neuchâtel.
- Malecki, E.J. (1991) *Technology and Economic Development*, Longman Scientific & Technical, Harlow.
- Morgan, K. (1996) 'Learning-by-Interacting: Inter-Firm Networks and Enterprise Support', in OECD, *Networks of Enterprises and Local Development*, Territorial Development, OECD, Paris.
- Nonaka, I. and Takeuchi, H. (1998) 'A Theory of Firm's Knowledge-Creation Dynamics', in Chandler, A.D. Jr., Hagström, P. and Sölvell, Ö. (eds) *The Dynamics Firm. The Role of Technology, Strategy, Organization, and Regions*, Oxford University Press, Oxford.
- OECD (1996) *Networks of Enterprises and Local Development*, Territorial Development, OECD, Paris.
- Pilotti, L. (1998) 'L'evoluzione dei sistemi industriali del nord-est: un modello «quasi renano»', *Finanza, marketing e produzione*, no. 1.
- Polanyi, M. (1962) *Personal Knowledge: Towards a Post-Critical Philosophy*, Chicago University Press, Chicago.
- Porter, M.E. and Sölvell, Ö. (1998) 'The Role of Geography in the Process of Innovation and the Sustainable Competitive Advantages of Firms', in Chandler, A.D. Jr., Hagström, P. and Sölvell, Ö. (eds) *The Dynamics Firm. The Role of Technology, Strategy, Organization, and Regions*, Oxford University Press, Oxford.
- Ratti, R. (1991) 'Small and Medium-Sized Enterprises, Local Synergies and Spatial Cycles of Innovation', in R. Camagni (ed.), *Innovation Networks: Spatial Perspectives*, Belhaven Press—GREMI, London.
- Ratti, R., Bramanti, A. and Gordon, R. (eds) (1997) *The Dynamics of Innovative Regions. The GREMI Approach*, Ashgate—GREMI, London.
- Sabel, C. (1996) 'Learning-by-Monitoring: The Dilemmas of Regional Economic Policy in Europe' in OECD, *Networks of Enterprises and Local Development*, Territorial Development, OECD, Paris.

-
- Salais R., Storper M. (1993) *Les mondes de production. Enquête sur l'identité économique de la France*. Éditions de l'École des Hautes Études en Sciences Sociales, Paris.
- Schon, D. (1973) *Beyond the Stable State: Public and Private Learning in a Changing Society*, Penguin, Harmondsworth.
- Spender, J.-C. (1998) 'The Geographies of Strategic Competence: Borrowing from Social Education Psychology to Sketch and Activity and Knowledge-Based Theory of the Firm', in Chandler, A.D. Jr., Hagström, P. and Sölvell, Ö. (eds) *The Dynamics Firm. The Role of Technology, Strategy, Organization, and Regions*, Oxford University Press, Oxford.
- Storper, M. (1995) 'The Resurgence of Regional Economies Ten Years Later: The Region as a Nexus of Untraded Interdependencies', *European Urban and Regional Studies*, vol. 2, no. 1.
- Storper, M. and Harrison, B. (1991) 'Flexibility, Hierarchy and Regional Development: The Changing Structure of Industrial Production Systems and their Forms of Governance in the 1990s', *Research Policy*, no. 5.
- Strassoldo, R. (1992) 'Globalism and Localism: Theoretical Reflections and Some Evidence', in Mlinar, Z. (ed.) *Globalization and Territorial Identities*, Avebury, Aldershot.
- Varaldo, R. and Ferrucci, L. (eds) (1997) *Il distretto industriale tra logiche di impresa e logiche di sistema*, Franco Angeli, Milano.
- Veltz, P. (1993) 'D'une géographie des coûts à une géographie de l'organisation. Quelques thèses sur l'évolution des rapports entreprises/territoires', *Revue économique*, no. 4.
- Whitley, R. and Kristensen, P.H. (eds) (1997) *Governance at Work. The Social Regulation of Economic Relations*, Oxford University Press, Oxford.