

11 URBAN MILIEUX: FROM THEORY TO EMPIRICAL FINDINGS

Roberto Camagni and Roberta Capello

11.1. Introduction¹

The aim of this chapter is to present a theoretical reflection on the relationships between the concept of Innovative Milieu (I.M.) and that of the city interpreted in economic and spatial terms, and to provide empirical evidence on the existence of urban milieus.

The concept of the innovative milieu was developed extensively during the 1980s among regional scholars²: it interprets phenomena of spatial development as the effect of innovative processes and synergies which occur over limited territories. The Innovative Milieu is comprised of a set of relations which unite a local production system, a set of actors and representations and an industrial culture. Together, these generate a localized dynamic process of collective learning. Space, assumed as mere geographic distance, is replaced by territory (or relational space), defined through economic and social interaction. Time, usually understood as a mere sequence of intervals on which to measure quantitative variations of smooth variables, is conceived here as the pace of learning and innovation/creation processes (Camagni, 1995). The *milieu innovateur* functions like a microcosm in which all those elements which are traditionally considered as the genetic sources of development and economic change operate as if they were *in vitro*, highlighted and enhanced by spatial proximity and by those economic and cultural homogeneities which allow the *milieu* itself to exist. There are Smithian processes of division of labour among units belonging to the same productive cycle, processes of learning-by-doing and learning-by-using *à la* Arrow, amplified beyond each enterprise by the high mobility of the specialized labour force inside the local area. Then there are Marshallian or Allyn Young-type externalities, generated by a common industrial culture and intense input-output interactions, the formation of Schumpeterian entrepreneurship, facilitated by specific historical competences, sectoral specialization and ample possibilities of imitation and cross-fertilization processes *à la* Freeman, which generate systems of integrated and incremental innovations. All these are essential components of the *milieu innovateur*.

At first glance, the concept of the milieu innovateur as defined above does not seem to share many characteristics with the city: the only similarity, in theoretical terms, resides in the agglomeration and proximity element³. However, if one proceeds to a more accurate consideration, and in particular if one abstracts from the consideration of the physical element which is more easily attached to the common image of the 'city', presenting it as a built environment, more similarities emerge. In fact, taking up a theoretical perspective in terms of *relational capital, spatial interaction and learning processes*, one could easily find that the genetic elements of the City and the Milieu are not so distant. They are in fact at least commensurable, comparable, although they have a different level of complexity.

Under the generic conceptual umbrella of the agglomeration principle, which we consider as a common genetic principle of both phenomena, lies a wide spectrum of different elements/ processes/effects, which span from the development of a common identity and sense of belonging to the 'socialized' production of human capital and know-how. These elements and processes - which are not deterministically, but only probabilistically linked to the pure agglomeration fact - prove, when empirically established, to be at the heart of both the innovative nature of the Milieu and the 'progressive' role of the City.

Our thesis is that:

- a) under certain conditions, the comparison of the two concepts, I.M. and City, is legitimate;
- b) the two concepts, or theoretical archetypes, share many characteristics; the City is a more complex form of Milieu, as it intrinsically encompasses economic differentiation (vs. the natural specialisation of the Milieu) and the entire sphere of residential and life activities of the population (which are only considered by the Milieu concept when they generate synergy and learning effects directly useful for the innovation process);
- c) from a conceptual perspective, the relationships between City and Milieu can take place in two distinct forms:
 - Urban Innovative Milieus: I.M. located in cities and exploiting the urban atmosphere;
 - City as Innovative Milieu: the entire city behaving as a Milieu.

The aims of the chapters are twofold:

- to develop a conceptual comparison of the two concepts in order to underline common features and mutual theoretical relationships (Section 11.2);
- to provide quantitative empirical evidence on the existence of 'urban milieus'. The empirical evidence is based on a database of firms located

in five European cities, namely London, Paris, Amsterdam, Stuttgart and Milan (Section 11.3 and 11.4).

11.2 Cities as milieus

11.2.1 *The conditions for a comparison*

A word of caution and prudence is necessary from the very beginning when dealing with such a multifaceted realm as the city. In fact:

- a) the city is a complex phenomenon, probably the most complex product of mankind. It is “*un territoire particulier, ..., le dispositif topographique et social qui donne leur meilleure efficacité à la rencontre et à l'échange entre les hommes*” (Roncayolo, 1990). Therefore it can be analyzed under different perspectives: “*comme structure matérielle, comme système d'organisation sociale, comme ensemble d'attitudes et d'idées, comme costellation de personnes s'impliquant dans des formes types de comportement collectif*” (Wirth, 1938);
- b) cities have evolved in history, performing different functions and even nowadays they are undergoing fast structural changes. In particular, the form of the city is rapidly evolving and its boundaries with respect to the non-city are blurring (Remy and Voye, 1992): forms of low density peri-urbanization, processes of ‘metropolisation’, edge-city developments on one side; evolution of the countryside in terms of infrastructure, social equipment, lifestyles on the other (Camagni, Gibelli, 1996);
- c) there are different kinds of cities: of different size (therefore performing different functions within the spatial division of labour), different specialization, different location (ports, ...);
- d) cities are linked together differently within wider regional spaces (urban systems, hierarchies, city-networks) and therefore their role and functions cannot be fully interpreted through the consideration of the isolated, standalone city;
- e) cities are indicated by great historians (Braudel, Pirenne) and sociologists (Weber, Sombart) as the birthplace of innovation (economic, political, cultural), although other functions are characteristically performed by the city, giving rise to an economic advantage: defence (once), control and power, cultural interchange.

As a consequence of the theoretical complexity and the empirical diversity of the object of this reflection, the limits and the characteristics of the approach

have to be made clear:

- i) we limit ourselves in a first approximation to economic aspects: the city as a particular and efficient form of organisation of economic relationships (though by the term 'economic relationship' we mean a much wider set of factors and interactions than the mainstream economic textbooks do). The interpretation we are going to give of the city's role and performance is therefore partial, though not trivial;
- ii) the main dimensions under which the city is analysed are:
 - a relational one (the city as a set of territorial and social relationships),
 - a dynamic one: the city as a learning system;
- iii) we assume, at least initially, an abstract and archetypal approach to the city - the City with a capital 'c', abstracting from geographical or historical differentiation, theorizing the characteristics of the urban environment which:
 - have an impact on economic phenomena and economic performance, and
 - explain the genesis of the city as an efficient form of organization of economic relationships. As already mentioned, these economic functions are not the sole functions performed efficiently by the city, but are nevertheless (very) important;
 - explain its innovative character, a character that historians and economists usually assign to it.
- iv) we do not consider different, non-economic aspects, which have strong feed-back effects on the economic performance of the city: city size, form, environmental quality ...

11.2.2 The economic role of the city and a taxonomy of urban agglomeration advantages

An economist looks at the city as a self-organising system (Camagni, 1996), whose competitive advantage resides in i) agglomeration (the city as a 'place'), ii) accessibility (the city as a 'node' in global networks), iii) interaction (the city as 'relational capital'), focused on the achievement of collective goals such as economic efficiency, welfare (at least for ruling classes), territorial power and control.

In history, the success of this form of social organisation was striking and it allowed the achievement of further general goals like cultural development, quality of life, individual freedom and more generally democracy, progress, modernisation of the society and innovation in the economy.

In a sense, we can affirm that the I.M. realizes a short-circuit between the general characteristics it shares with the City (agglomeration, accessibility, interaction) and the specific outcome, namely innovation, reducing the complexity of the full process of urban development and its high degree of roudaboutness, and forgetting about the other possible outcomes.

It is important to note that the characteristics of innovativeness that in the abstract scheme is directly attributed to the City or the M.I. may well be absent in many (or most) empirical circumstances. In fact, the existence of a City or of a Milieu is only a relevant precondition for innovativeness, although its actual manifestation depends on finer local specificities and, on average, is subject to stochastic processes.

Starting with the agglomeration element which characterises the urban environment and which in some respects may also encompass the other two elements - external accessibility and networking goes hand in hand with urban size and the same happens to internal interaction potential, a direct function of size and differentiation of urban activities - we can devise a taxonomy of the single sub-elements on which agglomeration advantages reside.

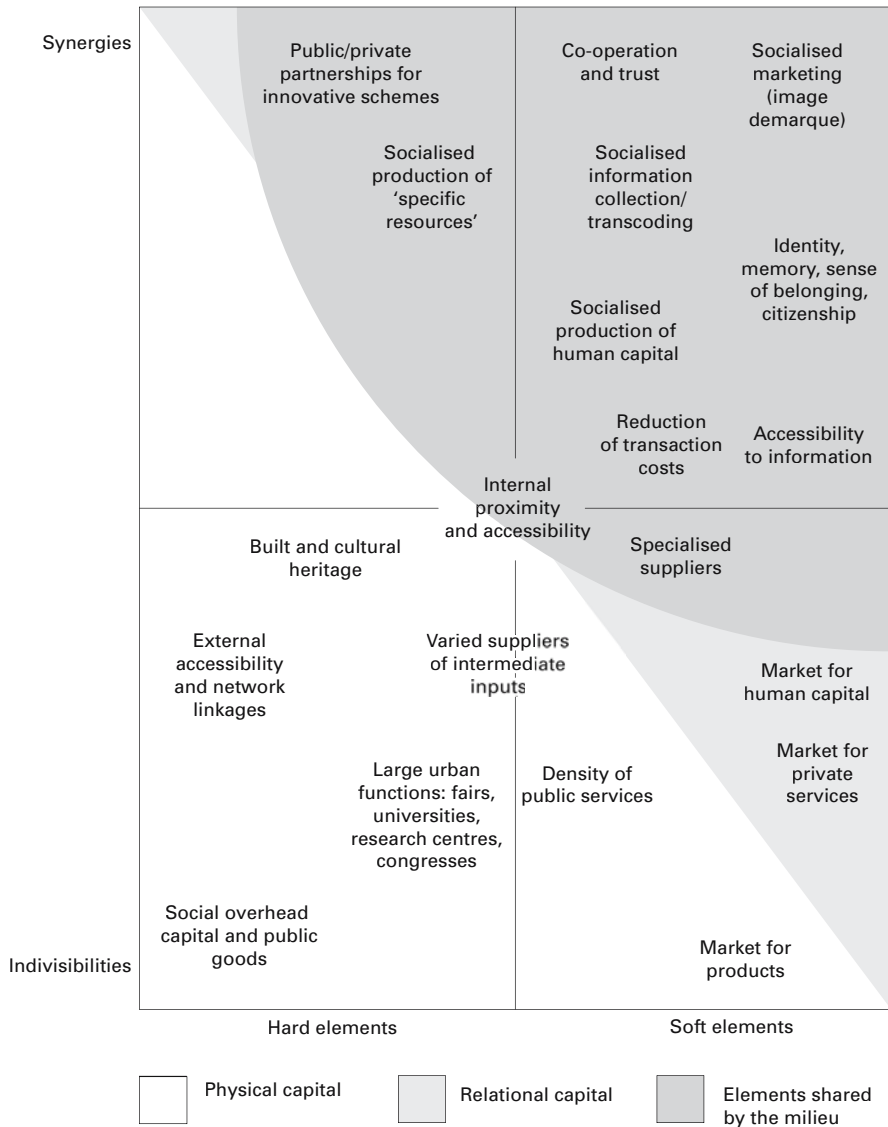
On the one hand, a distinction can be made, in a quite traditional way, between 'hard' and 'soft' elements of agglomeration advantage and, on the other hand, less traditionally, between the two main sources of the same advantage, namely *indivisibilities*, stemming from city size and *synergy*, facilitated by more subjective elements like interaction, cooperation, synergetic processes (Fig. 11.1).

In the lower left side of the table, we find the advantages which are derived from the provision and concentration of public goods such as infrastructure and overhead capital, public services, large urban functions like fairs, congress facilities, universities and the cultural heritage. On the other hand, on the lower right side, we find advantages connected with the nature of big market of the city:

- market for products, market for human capital, market for private services on the demand side,
- market for a diversified supply of intermediate inputs, on the supply side.

On the upper right side of the picture we find the elements which are, in my opinion, more interesting and which were pointed out in the recent past: elements connected with the synergetic action performed by the city. In fact we find (Camagni, 1991, 1995):

- accessibility to information - which is inherently a cooperative good - through informal, face-to-face and inter-personal contacts,



Source: Camagni, 1999

Figure 11.1 Sources of urban agglomeration advantages

- explicit cooperation among actors, stemming from trust, a common sense of belonging to a community sharing the same values,
- implicit cooperation among actors, in the form of socialized production of:

- skilled labour,
- human capital for high-level managerial functions,
- marketing (*'image de marque'*)
- information transcoding.

Some of these functions may be embodied in the provision of physical or 'hard' elements like dedicated infrastructure or important urban projects realized through private/public partnership. Therefore we find in the upper left part of the graph the socialized provision of 'specific resources', used typically by urban productions or functions.

The lower triangle of the table encompasses what could be labelled as the 'functional capital' of the city, which is of a mainly physical nature. The upper right triangle on the other hand may be seen as representing the 'relational capital' of the city.

In our opinion, it is on the theorisation of the relevance of the relational capital of territorial systems that the contribution of this kind of reflection brought the most advanced results. In fact, the Innovative Milieu shares with the city many of the abovementioned characteristics, stemming from proximity (the grey area in Fig. 11.1) and may provide a lot of theoretical and analytical tools which can be used to interpret the city. In fact, territorial relational capital resides in different elements:

- a) the synergy and cooperation element, embedded in the local 'milieu effect' and in territorial cooperation networks (Aydalot, 1986; Maillat and Perrin, 1992; Maillat et al, 1993). These elements were subsequently theorized by the French proximity school⁴ and by Storper with the concept of 'untraded interdependencies' (Storper, 1995);
- b) the socialized nature of the production of specific resources, as skilled labour and human capital, or the socialized production of market signals (Gordon, 1989; Camagni, 1991);
- c) the reduction of dynamic uncertainty, inherent in processes of technological innovation and economic transformation, through:
 - socialised management/transcoding of information,
 - ex-ante coordination and control over competitors' moves (Camagni, 1991).

One important element that differentiates the I.M. from the City resides in the relevance of size, which is crucial in the urban environment, as was shown earlier through the indivisibility element. The nature of the City being a big market for products and for production factors, and particularly for

labour, was stressed by Veltz (1993) as representing an important locational advantage of the City over the I.M., another way of achieving the reduction of uncertainty (*'ville-assurance tout risque'*).

11.2.3 *The theoretical relationships between the milieu and the city*

On the basis of arguments developed so far, the theoretical similarity between the City and the Milieu emerges with relative clarity. They share the elements of proximity, strong internal integration, synergy and psychological and cultural identity. Furthermore, they share the functions of collective and socialized production of specific resources, human capital and market signalling and of supplying the substrate for collective learning processes.

Their special characteristics may be described as follows:

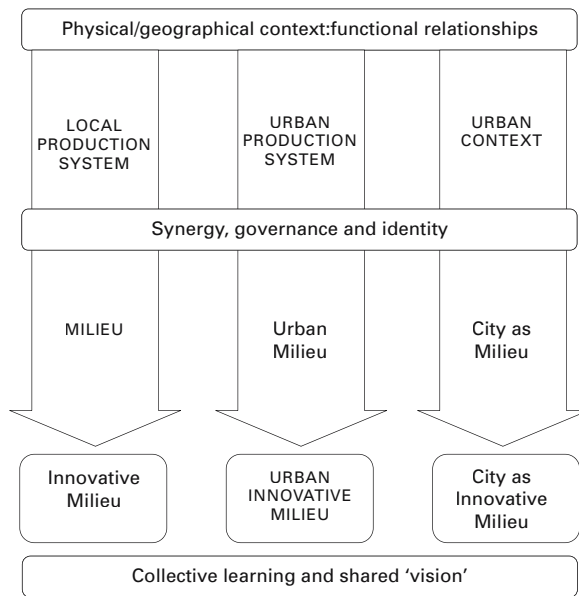
<i>Cities</i>	<i>Milieus</i>
<i>mostly de-specialized</i>	<i>mostly specialized</i>
<i>important physical agglomeration</i>	<i>important proximity, even without agglomeration</i>
<i>general-purpose infrastructures</i>	<i>oriented infrastructures</i>
<i>private services with intersectoral market</i>	<i>private services integrated in filières</i>
<i>social heterogeneity</i>	<i>social homogeneity</i>
<i>identity defines productive 'vocation'</i>	<i>productive 'vocation' defines identity</i>

As stated above, the City is a much more complex system, focusing on major social goals which are not relevant to the Milieu and which have a physical dimension (built environment, size, built and cultural heritage) which is alien to the Milieu.

Another logical path that can be traced in the case of both concepts regards how to pass from the functional aspects of the territory to the innovative milieu aspects.

In the same way as the Milieu represents the relational capital of local territorial systems, adding the elements of synergy, governance and identity, so the City like the Milieu represents the relational capital of the Urban Context (Figure 11.2). The innovative element of both the Milieu and the City derives from the existence of collective learning processes and the development of a common 'vision' for the evolution of the local milieu.

However, in the case of the City, another relevant situation may emerge (represented by the central column in Figure 11.2), namely the presence of an



Source: Camagni, 1999

Figure 11.2 The Urban Milieu and the City as a Milieu

Urban Milieu, a network of informal or selected linkages developed around a specialisation sector or *filière* and growing inside the Urban Context or the Urban Production System. Empirical evidence suggests that many cases exist of such Milieus or Innovative Milieus which characteristically exploit an urban atmosphere (and therefore an urban location), without implying that the entire city behaves like a Milieu. The cases of the financial milieu in cities like Zürich, Geneva, Frankfurt, the innovative milieus developing around the fashion creation *filière* in Milan or Paris and the media or the communication milieus in Hamburg and Milan are important examples.

While still adopting a dynamic approach and the aim of interpreting innovation processes, existing literature attributes to the City some characteristics that may assign to it a dynamic comparative advantage. In fact, urban competitiveness and its continuous recreation in time may be linked to the following elements:

- a) the city is the natural location site of *production services* (to an extent which is proportional to their quality and rarity), a sector which is responsible for the level (and growth rate) of the efficiency of the local (urban, regional) industrial sector. According to Thompson (1968): “the

economic base of the larger metropolitan area is the creativity of its universities and research parks, the sophistication of its engineering firms and financial institutions, the persuasiveness of its public relations and advertising agencies, the flexibility of its transportation networks and utility systems, and all the other dimensions of infrastructure that facilitate the quick and orderly transfer from old dying bases to new growing ones”⁵. In the empirical analysis, we will refer to these kinds of advantages, which are typical of urban areas and which support innovative activity in cities, using the label ‘dynamic urbanisation economies’;

- b) the city is the natural location site of small and medium-sized businesses (incubator hypothesis) which are, by definition, the schumpeterian innovation agents;
- c) the city is the natural location site of industries and products in the early, pioneering phases of their lifecycle⁶;
- d) similarly to c) another hypothesis is that metropolitan areas play a mayor role in the phases of radical renewal and rejuvenation of products, when strict interaction is required among different functions of the firm, usually spatially dispersed such as engineering (mastering of technologies), R&D (mastering of products) and marketing (mastering of demand) (Camagni, 1988): a large city supplies a barycentric location for all these functions.

All these reflections were developed in the context of location theory; they may be easily utilised in an evolutionary context characterised by synergetics and learning processes.

11.3 Empirical evidence: milieu behaviours in metropolitan cities

The relationship between the two concepts presented above acquires greater emphasis if it is tested at an empirical level. For this reason, the present work aims to provide empirical evidence which tests:

- the existence of any milieu behaviour in firms located in metropolitan regions and whether it is reasonable to speak of an urban milieu or an urban production milieu (the present section);
- whether milieu economies (i.e. the advantages stemming from milieu behaviours) are more conducive to innovative behaviours than dynamic urbanisation economies, which are typical externalities of urban areas (Section 11.4)

The first theoretical hypothesis to be tested is therefore the existence of a ‘milieu’ behaviour in firms located in metropolitan regions.

The empirical analysis is based on a database which contains 159 observations, more or less equally distributed among five cities, namely London, Amsterdam, Milan, Stuttgart and Paris⁷. The firms interviewed belong to both high-tech and low-tech sectors, with a higher share for the low-tech sector. The size of firms interviewed differs greatly from small to medium and large firms, with an equal distribution of firm size among the cities. Both private and public sectors are involved in the analysis, although there is a higher representation from the private sector (88.7% of the total sample firms belong to the private sector). All the cities have a high share of firms developing product innovation, while one third of the sample firms are involved in process innovation.

A common questionnaire was submitted to firms, with the intention being to collect information on:

- the innovation developed;
- the geographical location of customers, suppliers and competitors;
- the forms of cooperation developed for the innovation activity;
- the sources of information used for the innovation activity;
- the sources of knowledge for their innovation activity;
- the importance of localisation factors in their innovation activities.

Most questions provided discrete information on the degree of appreciation of the different sources of information, knowledge, cooperation and locational advantages of each firm. The methodology used to transform them into continuous variables and to reduce their high number is factor analysis⁸.

The first hypothesis, i.e. whether milieu behaviours exist among firms located in urban areas and support their innovative activities, is tested through a descriptive statistical exercise, called cluster analysis, which allows for the identification of groups of firms with similar structural characteristics in terms of innovation behaviour, being run with variables characterising innovative behaviours such as the type of innovation, sources of information, of knowledge, of cooperation for the innovation activity and the locational advantages which are valuable for the innovation activity.

Table 11.1 shows the results obtained; four different typologies of innovative behaviours emerge, which are characterised by the size of the firm and by the relative sectoral specialisation of each firm.

a) small firms in specialised sectors

A first cluster depicts the behaviour of *small firms in specialised sectors*, characterised by 94 observations, nearly 60% of the firms sample. In this cluster a typical milieu economy and networking behaviour prevails,

	Small firms (<99 employees)		Large firms (>99 employees)	
	<i>Small firms in specialised (94 observations = 5.9.1% of the sample)</i>		<i>Large firms in specialised sectors (45 observations = 28.3% of the sample)</i>	
Specialised sectors (q1 > sample mean)	<i>Market size:</i>		<i>Market size:</i>	
	• National	0.11	• Non-European	-0.44
	• European	0.16	• Non-international	-0.24
	• International	0.03		
	<i>Innovation:</i>		<i>Innovation:</i>	
	• imitative	0.05	• breakthrough	0.53
	<i>Sources of knowledge:</i>		<i>Sources of knowledge:</i>	
	• local innovative suppliers	0.05	• external suppliers	0.32
	• consultancy services	0.004	• ex-colleagues	0.26
			• scientific research centres	0.06
<i>Sources of cooperation:</i>		<i>Sources of cooperation:</i>		
• cooperation with innovative local customers	0.06	• cooperation with external suppliers	0.1	
• cooperation with innovative local suppliers	0.22	• cooperation with innovative local suppliers	0.22	
• cooperation with other firms	0.05	• cooperation with innovative R&D centres	0.4	
		• cooperation with other firms	0.74	
<i>Sources of information:</i>		<i>Sources of information:</i>		
• information from scientific journals	0.59	• internal information	0.38	
		• information from R&D centres	0.4	
		• technological information	0.59	
		• information from scientific journals	0.99	
<i>Locational advantages:</i>		<i>Locational advantages:</i>		
• presence of ex-colleagues and friends	0.03	• presence of ex-colleagues and friends	0.49	
• proximity to infrastructure	0.03	• proximity to supp. and customers	0.45	
• proximity to services to firms	0.06	• proximity to information	0.02	
• proximity to suppliers and customers	0.01	• proximity to high-quality public services	0.21	
		• proximity to R&D centres	2.8	
	<i>Small firms in non-specialised sectors (14 observations = 8.8% of the sample)</i>		<i>Large firms in non-specialised sectors (6 observations = 3.8% of the sample)</i>	
Non-specialised sectors (q1 < sample mean)	<i>Market size:</i>		<i>Market size:</i>	
	• local and regional	0.23	• local and regional	0.015
	<i>Innovation:</i>		<i>Innovation:</i>	
	• breakthrough	0.26	• no particular innovation	
	<i>Sources of knowledge:</i>		<i>Sources of knowledge:</i>	
	• external customers	0.29	• external customers	0.28
	• consultancy services	0.17	• ex-colleagues	0.07
			• scientific research centres	0.05
			• qualified labour market	0.09
	<i>Sources of cooperation:</i>		<i>Sources of cooperation:</i>	
• cooperation with external suppliers	0.08	• cooperation with R&D centres	0.007	
• cooperation with other firms of the group suppliers	0.18	• cooperation with other firms of the group	0.4	
		• cooperation with innovative R&D centres	0.4	
		• cooperation with other firms	0.74	
<i>Sources of information:</i>		<i>Sources of information:</i>		
• information from ex-colleagues	0.07	• information from ex-colleagues	0.01	
		• internal information	0.03	
		• information from R&D centres	0.07	
<i>Locational advantages:</i>		<i>Locational advantages:</i>		
• proximity to R&D centres	1.65	• proximity to competitors	0.15	
• proximity to customers and suppliers	0.18	• high life quality standard	0.14	
• proximity to infrastructure	0.11			
• proximity to services to firms	0.14			

Values = deviance from the sample mean

Source: Capello, 2001a

Table 11.1 Results of the cluster analysis

witnessed by:

- local innovative suppliers, a channel through which collective learning takes place is one of the sources of knowledge for innovative activity;
- innovative local customers and suppliers are the main sources of cooperation, together with cooperation with other firms, comprising the importance of local economic interactions and networking mechanisms in innovation processes at small firms.
- an industrial atmosphere, suggested by the presence of ex-colleagues and friends, and by the proximity of suppliers and customers, describes the locational preferences of these firms. This suggests that even the most appreciated locational advantages of these firms reflect a 'milieu' approach. However, these firms also appreciate proximity to infrastructure and to services to firms, more related to their urban location.

b) small firms in non-specialised sectors

A second cluster depicts the behaviour of *small firms in non-specialised sectors*, characterised by 14 observations (8.8% of the sample): interestingly enough, this group of firms behaves in a completely different way to the previous one. These firms seem to represent small branches of large firms, choosing an urban location for different purposes:

- to control the final market (proximity to customers);
- to control specific suppliers (proximity to suppliers);
- to take advantage of a large urban location (proximity to services to firms, to consultancy firms);
- to take advantage of an advanced scientific environment (proximity to R&D centres).

The interaction of this group of firms with local actors and local institutions is so weak that it is hard to envisage any territorial embeddedness, any kind of spatial interaction among local economic actors:

- customers external to the area are envisaged as being the main sources of knowledge;
- the most appreciated channels for cooperation are external customers and suppliers, or with other firms of the same group;
- the locational advantages are envisaged in traditional urbanisation economies.

c) large firms in specialised sectors

A third group depicts the behaviour of *large firms in specialised sectors*, which represent nearly 9% of the firms sample (14 observations). These

firms exhibit a third sort of behaviour which is also rather peculiar in that they behave as large firms, generally appreciating their urban location and taking advantage of the scientific environment of the large metropolises. However, they also seem to appreciate 'milieu economies', determined by the high specialisation and concentration of the sector in which they operate. The sources of knowledge and the strategic information sources for their innovative activity are typical of large firms:

- external suppliers and scientific research centres are the main sources of knowledge;
- internal information is the primary source of information;
- the scientific environment in which firms operate plays a key role in their innovative activity. One of the most appreciated sources of knowledge are R&D research centres, which are also appreciated as locational advantages;
- the presence of highly qualified public services (schools, hospitals and public facilities), already envisaged by previous studies as one of the main reasons for a metropolitan location of multinationals.

The importance of 'milieu economies' for large specialised firms emerges from some elements like:

- the appreciation of proximity to customers and suppliers as important locational advantages;
- cooperation with innovative local suppliers (a traditional collective learning channel) is a way through which firms feed their innovative activity.

d) large firms in non-specialised sectors

The fourth cluster is characterised by six *large firms in non-specialised sectors* (3.8% of the firms sample). These firms reflect the typical behaviour of a large firm which appreciates the central location through:

- information from scientific research centres;
- knowledge from cooperation with scientific research centres;
- a highly qualified labour market.

The sources of development and creative activity of these firms do not stem from the local environment but:

- either from knowledge internal to the firm;
- or from external resources: external customers, external suppliers, cooperation with other firms of the group.

The reasons for the choice of a metropolitan location of these firms seem to be related to:

- a high standard of living, as also applies to large specialised firms as mentioned above;
- a control on the competitors and on market shares.

The definition of these four different behaviours provides two important results for our analysis. The first important element achieved via this descriptive analysis is that a milieu behaviour can also exist in urban areas; some firms appreciate and take advantage of the interaction with local economic actors and of cooperation with suppliers and customers which stimulate their innovative activity. One can easily argue that these firms appreciate the existence of mechanisms of socialised knowledge which feed their innovative capability and push them towards innovative behaviour⁹.

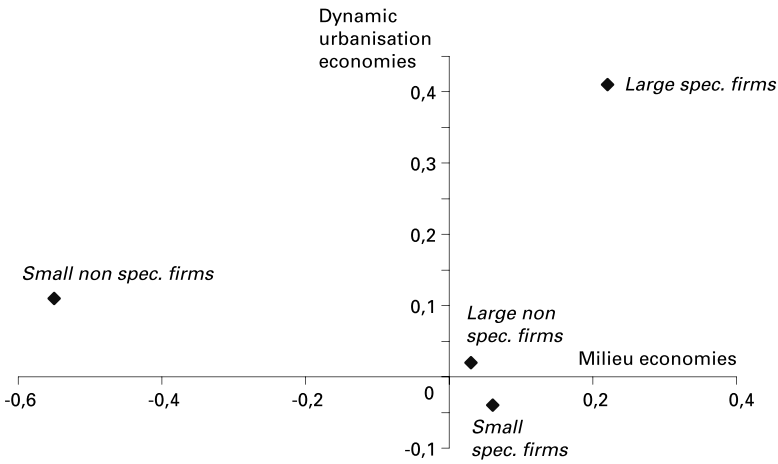
The second rather interesting result of our analysis is that firms appreciating this kind of spatial economies can be defined according to:

- on the one hand, their size;
- on the other hand, the degree of specialisation of the sector in which they operate.

As far as the size of the firm is concerned, small firms generally appreciate milieu economies more than large firms do. The latter, on the contrary, benefit more from dynamic urbanisation economies (cooperation with research centres, a highly qualified labour market). However, when the specialisation of the sector in which firms operate is also taken into consideration, another perspective emerges: large specialised firms tend to feed their innovative activity with local specialised knowledge and seem to appreciate not only urbanisation economies but also milieu economies which stem from the high degree of specialisation of the sector in which they operate. In contrast, small firms operating in non-specialised sectors do not seem to appreciate milieu economies and tend rather to benefit from their central location.

The interaction of the two above-mentioned elements explains the behaviour of firms. Figure 11.3 summarises this important result by showing the importance of the interplay of the two above-mentioned elements depicting the behaviour of firms in the different spatial economies. Two indices are calculated, namely the cooperation with research centres and the cooperation with innovative suppliers, as proxies for dynamic urbanisation economies and milieu economies (i.e. collective learning) respectively and giving rise to the following results:

- both non-specialised and specialised large firms take advantage of dynamic urbanisation economies;



Source: Capello, 2001a

Figure 11.3 Dynamic urbanisation economies vs. milieu economies for the four clusters

- milieu economies are appreciated by both large and small firms operating in more specialised sectors;
- small firms, which by definition operate in non-specialised sectors, do not take advantage of milieu economies, but instead tend to appreciate dynamic urbanisation economies in their innovative activity.

The cluster analysis presented above shows that small specialised firms located in metropolitan cities appreciate milieu economies for developing their innovative activity. Another interesting suggestion put forward by the milieu innovateur theory is that within the milieu, two kinds of co-operation processes are at work (Camagni, 1991):

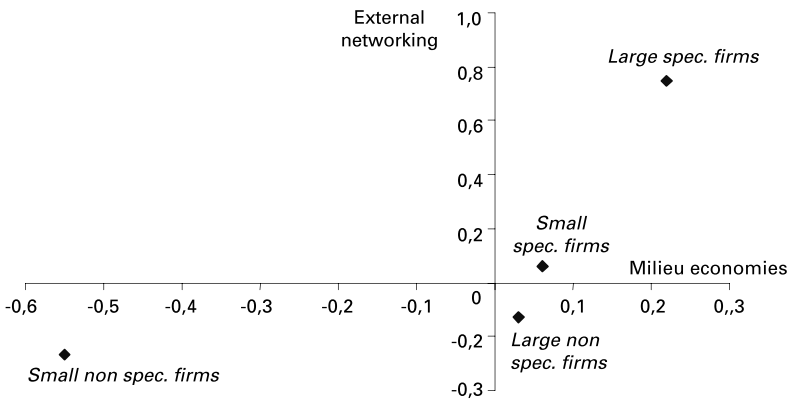
- a set of mainly informal, 'non-traded' relationships - between customers and suppliers, private and public actors - and a set of tacit transfers of knowledge taking place through the individual chains of professional mobility and inter-firm imitation processes;
- more formalised, mainly trans-territorial co-operation agreements - among firms, collective agents and public institutions - in the field of technological development, vocational and on-the-job training, infrastructure and service provision¹⁰, which represent an organisational model between pure market and hierarchy.

The former kind of relationship is in fact the ‘glue’ that creates a milieu effect. It is complemented by the latter, more formalised kind of relationship called ‘network relationships’. Both sets of relationship may be regarded as tools or ‘operators’ that help the (small) firm in its competitive struggle, enhancing its creativeness and reducing the dynamic uncertainty intrinsically embedded in innovation processes.

In particular, the second kind of cooperation, networking behaviour, seems to be an efficient way for small firms to overcome extremely turbulent and innovative economic phases, representing a way to obtain information and knowledge outside the area.

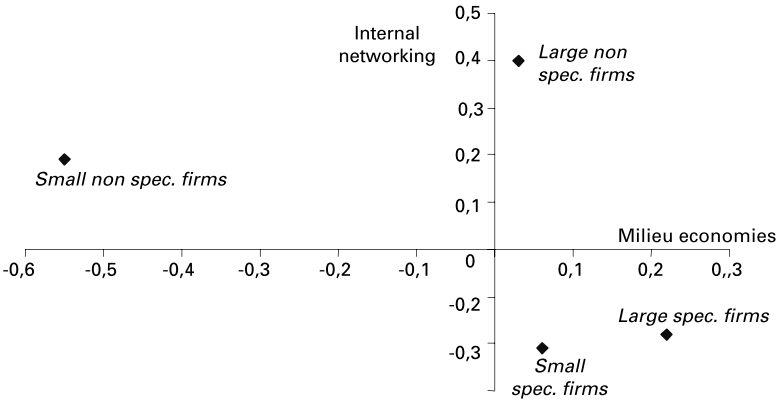
We have attempted to test this hypothesis in the case of our metropolitan firms as well. Two proxies have been constructed, one for the existence of the milieu relationship (cooperation with innovative suppliers), the other for the network (cooperation with other firms), and presented in Figure 11.4.

The results are quite interesting. Specialised firms take advantage of both milieu economies and external networking, reflecting a typical behaviour of innovative firms in milieu areas. By contrast, non-specialised firms, despite their size, do not develop any kind of inter-firm innovative cooperation activity. The latter, on the contrary, seem to rely on internal networking, measured through the degree of cooperation with other firms of the same group (Figure 11.5).



Source: Capello, 2001a

Figure 11.4 External networking and milieu economies for the four clusters



Source: Capello, 2001a

Figure 11.5 Milieu economies and internal networking for the four clusters

11.4 Empirical evidence: Dynamic urbanisation economies vs. milieu economies in innovative activity

One of the main results of the previous analysis is that both milieu economies and dynamic urbanisation economies play a role in the innovative activity of firms, the latter being the traditional externalities that support innovation in urban areas. However, the previous analysis also shows that the size of the firm and the sectoral specialisation help to explain the choice of firms for ‘milieu economies’ rather than ‘dynamic urbanisation economies’. Small specialised firms are more inclined to exploit milieu economies while large firms are more in favour of dynamic urbanisation economies. In this part of the analysis our aim is to measure:

- on the one hand, the impact of milieu economies and dynamic urbanisation economies on firms’ innovative capacity;
- on the other hand, how this impact changes according to the size of firms and the sectoral specialisation in which firms operate.

For this purpose, we estimate the following two models:

$$I = \alpha_1 + \beta_1 \ln ql + v_1 \ln S + \varepsilon_1 due + \phi_1 me + \eta_1 (me * ql) + \lambda_1 (me * S) \tag{1}$$

and

$$I = \alpha_2 + \beta_2 \ln ql + v_2 \ln S + \varepsilon_2 due + \phi_2 me + \eta_2 (due * ql) + \lambda_2 (due * S) \tag{2}$$

where:

I = the innovation capacity of a firm,

ql = the location quotient of the sector in which the firm operates,

due = dynamic urbanisation economies,

me = milieu economies,

S = size of the firm.

The two models differ as regards the terms of interaction between dynamic urbanisation economies or milieu economies and the firms' size or location quotient. In this case, with the estimate of the first model (equation 1), one can capture the role of milieu economies as regards innovation activities of firms and the way in which this role changes according to different firm size and degree of sectoral specialisation. The second model, in turn, captures the same effect for dynamic urbanisation economies since it relates the impact of dynamic urbanisation economies to the innovation capacity of firms of different sizes and degrees of sectoral specialisation (equation 2). Measuring such a role simply required a calculation to be made of the first derivative of innovation activities for respectively dynamic urbanisation economies and milieu economies, namely:

$$\frac{\delta I}{\delta me} = \phi_1 + \eta_1 ql + \lambda_1 S \quad (3)$$

and

$$\frac{\delta I}{\delta due} = \varepsilon_2 + \eta_2 ql + \lambda_2 S \quad (4)$$

and a calculation of the way in which this varies according to the different size or location quotient of firms. The models are estimated by using the following proxies:

- as regards size we used the turnover of firms (in euro) (expressed in logarithmic terms). Turnover was available only for 126 firms, limiting this part of the analysis to these 126 observations;
- for the specialisation index we used the share of employment in one sector in a city compared with the same share of employment at the national level (location quotient, expressed in logarithmic terms);
- for the dynamic urbanisation economies we used the cooperation with scientific research centres and universities strategically for the innovation activity (factor 5 of factor analysis b);

- for the milieu economies we used the cooperation with local innovative suppliers for the innovation (factor 3 of factor analysis b).

<i>Independent variables</i>	<i>Model 1</i>	<i>Model 2</i>
<i>Constant</i>	1.65 (3.63)	-0.24 (-1.95)
<i>Location quotient (ln)</i>	0.38 (3.22)	0.31 (2.38)
<i>Turnover (ln)</i>	-0.09 (-3.63)	-0.06 (-2.40)
<i>Milieu economies</i>	0.97 (2.12)	0.21 (2.47)
<i>Dynamic urbanisation economies</i>	-0.17 (-2.20)	-0.60 (-1.70)
<i>Service firms</i> (1=service firm)	-0.47 (-2.53)	
<i>Milieu economies * turnover (ln)</i>	-0.04 (1.70)	
<i>Milieu economies * location quotient (ln)</i>	0.21 (1.79)	
<i>Dynamic urbanisation economies * turnover (ln)</i>		0.03 (1.26)
<i>Dynamic urbanisation economies * location quotient (ln)</i>	-0.24	(-1.95)
<i>Goodness of fit (R-square)</i>	0.24	0.20
<i>Number of observations</i>	126	126

T-student in brackets

Dependent variable: Imitative innovation (factor 2 of factor analysis a)

Milieu economies = Cooperation with local innovative suppliers for the innovation (factor 3 of factor analysis b)

Dynamic urbanisation economies = Cooperation with scientific research centres and universities (factor 5 of factor analysis b)

Table 11.2 Innovation, milieu economies and dynamic urbanisation economies (Linear regression models)

The results of the estimates of equations (1) and (2) are presented in Table 11.2, while the results of equations (3) and (4) are presented in Figure 11.6. The estimated models underline that:

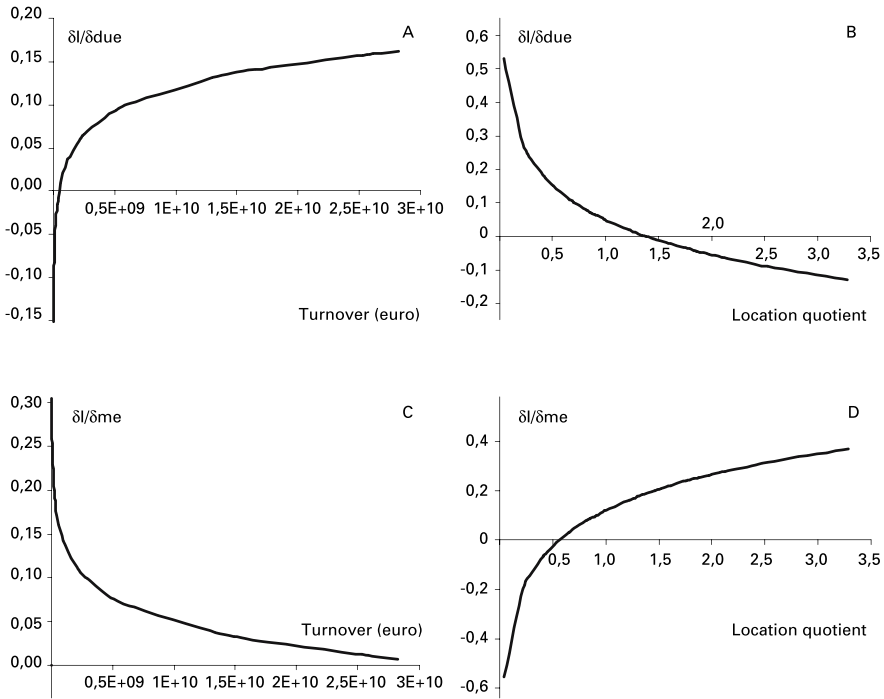
- imitative innovation activity (measured as the capacity of firms to introduce a new innovation) is developed by small specialised firms, operating in the industry sector, taking advantage of milieu economies and, in particular, of collective learning mechanisms (model 1, Table 11.2). Dynamic urbanisation economies do not provide any sort of help and are even negatively correlated;
- interestingly enough, the interaction terms between size, specialisation and agglomeration economies are statistically significant, with opposite indications; milieu economies are related negatively to the size of firms and positively to the degree of sectoral specialisation (model 1), while dynamic urbanisation economies are positively linked to the size of the firm and negatively to the location quotient (model 2).

In Figure 11.6 we present the results of equation (3). Interesting results emerge:

- the impact of dynamic urbanisation economies on firms' innovative activities increases with firm size, i.e. larger firms appreciate dynamic urbanisation economies more than small firms (Figure 11.6.a);
- on the other hand, the impact of dynamic urbanisation economies on firms' innovative capacity decreases when the degree of specialisation of the sector in which the firms operate increases. Highly specialised firms tend to get quite a low externality from an urban environment (Figure 11.6.b).

As far as equation (4) is concerned, the following results were established:

- the impact of milieu economies on firms innovative capacity decreases with the firm size. This, once again, shows that milieu economies are appreciated more by small firms (Figure 11.6.c);
- more interestingly, the impact of milieu economies on firms innovative capacity increases when the location quotient increases. This shows, once again, that in cities milieu economies take place only in specialised sectors and give rise to what has been labelled as an 'urban production milieu'. They are in fact confined to specialised sectors, where firms recreate the sort of industrial specialised territorial atmosphere typical of a milieu (Figure 11.6.d).



Source: Capello, 2001a

Figure 11.6 Impact of dynamic agglomeration economies on firms' innovation activities according to firms' size and sectoral specialisation

11.5 Conclusions

The most important conclusion that can be drawn from this chapter is related to the proof of the relevance of the milieu approach for a modern and renewed interpretation of the City as a spatial archetype. Cities and Milieus share many characteristics, not really in their geographical form but in their intrinsic role in shaping the spatial economy. This role is related, according to the milieu innovateur's theory, to the reduction of dynamic uncertainty and the supply of the durable substrate for learning processes and for the tacit transfer of know-how and non-codified non-material assets among territorial actors.

This conclusion is proven by quantitative empirical evidence. The old debate on urbanisation versus localisation economies and on urban productivity is, in this case, reinterpreted in terms of milieu economies (expressed

in the capacity of the city to produce knowledge in a socialised way, through a strong and innovative interaction among economic actors) versus dynamic urbanisation economies (i.e. channels of knowledge acquisition typical of the large city, like innovative interaction with universities and research centres).

Thanks to the existence of a database on firms innovative behaviour in five European cities, some results have been achieved which suggest that:

- in the metropolitan cities analysed, urban production milieus exist, in that in these cities some firms take advantage of milieu economies, in the form of collective learning. For these firms, in fact, innovative cooperation with local suppliers and customers is one of the main determinants for their innovation activities. This is verified by the importance attributed to sectoral specialisation in the definition of both the innovative behaviour of firms and the determinants of innovation activities;
- according to these results, the reply to the question of whether dynamic urbanisation economies or milieu economies are more conducive to innovative behaviour is misleading. From the results acquired, it seems that the reply very much depends on the size of the firm and on the sectoral specialisation in which it operates. Small specialised firms, probably part of an industrial filière, take advantage of the traditional dynamic synergies typical of a milieu behaviour while large firms, by contrast, seem to prefer dynamic urbanisation economies, oriented towards the acquisition of knowledge stemming from their urban location. These results are witnessed by a quantitative analysis on the impact of dynamic urbanisation economies and milieu economies and on the way this impact changes according to the different size of firms and degree of sectoral specialisation.

Notes

- 1 Though the chapter is the result of a common research effort, R. Camagni wrote sec. 1 and 2, while R. Capello wrote sec. 3, 4 and 5.
- 2 On the “milieu innovateur” theory see, among others, Aydalot, 1986; Aydalot and Keeble, 1988; Camagni, 1991; Maillat and Perrin, 1992; Maillat et al., 1993; Ratti et al., 1997; Camagni, 1999; Crevoisier and Camagni, 2000. The concept has recently been inserted into textbooks on Regional Economics (Capello, 2004), witnessing the scientific strength of the theory. Lambooy participated actively in the first rounds of the GREMI analyses. See Lambooy, 1986.

- 3 Lambooy has largely provided contributions to the debate on agglomeration economies. For some of his works on the subject, see Lambooy, 1997.
- 4 See, among others, Bellet et al., 1993; Dupuy and Gilly, 1995; Rallet, 1993; Rallet and Torre, 1995; Gilly and Torre, 2000.
- 5 Please note the dynamic element constituted by the term ‘transfer’, meaning the continuous shift of local specialization and the re-launching of the local competitiveness through it.
- 6 This idea was first developed by Vernon with reference to a spatial setting in 1957, long before his well-known 1966 article referring to industrial evolution.
- 7 The empirical analysis on the above theoretical reflections is based on a database built within an ESRC research project led by Oxford Brookes University and carried out by a research group composed of national subcontractors, one for each case study city, namely Amsterdam, London, Milan, Paris and Stuttgart. In each ‘metropolitan city’ (NUTS 3 level), firms of different sectors were interviewed with a common questionnaire related to their innovation activity. The results for each city are contained in Simmie, 2001. For Amsterdam, Jan Lambooy has directly participated in the work, providing useful, thorough and stimulating ideas, contained in his paper written with Manshanden and Endendijk. See Manshanden et al., 2001.
- 8 Factor analysis is in fact a statistical technique used to identify a relatively small number of factors that can be used to represent relationships among sets of many interrelated variables. The basic assumption of factor analysis is that underlying dimensions, or factors, can be used to explain complex phenomena. The goal of factor analysis is thus to identify the non-directly-observable factors based on a set of observable variables, reducing their number without losing too much of their explanatory power. The results of the factor analysis are contained in Capello, 2001a.
- 9 A similar result has been found for the innovative behaviour of firms in the metropolitan area of Milan (see Capello, 2001b).
- 10 “Regional milieux provide collective learning processes essential to innovation, but increasingly these informal mechanisms are insufficient either to initiate or to sustain creative activity as technical-economic complementarities force production chains to incorporate extra-regional sources of innovation”. (...) Far from constituting an alternative to spatial dispersion, localized agglomeration becomes the principal basis for participation in a global network of regional economies” (Gordon, 1993).

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