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Innovation and the City

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Introduction

What is the relationship between the city and economic development and, more precisely, between the city and technological change? Today, this very ordinary question gives rise to a host of questions. The traditional opposition between urban and rural areas no longer applies. In modern-day Europe, farming accounts for only a small share of labour and it is not easy to know any more what sets rural areas apart from urban areas. Lifestyles, economic activities, income levels – the elements which in the past meant that the rural could be considered as the traditional and somewhat backward system – have become considerably homogenised.

Today, one may well wonder whether the difference between urban and rural economic systems is still a question of nature (e.g. rural areas specialising in certain activities) or simply one of degree (e.g. a proportionately greater number of tertiary activities in urban areas). In Europe as a whole, owing to the development of communication links and infrastructures in general, even traditionally remote regions have access to the largest international centres in just a few hours – and sometimes in even less time than it takes to get around in a big city. Today, 'rural' inhabitants have access to the same jobs, engage in the same leisure activities (most often television!), and enjoy similar education and training opportunities as city dwellers. Does this mean that there are no longer any differences between these two types of areas? Has the city imposed once and for all its logic made up of 'networking of networks' throughout Europe? The question of the economic specificity of the urban must therefore be posed once again today. Accordingly, this chapter puts forward the *hypothesis* that the city still plays a special role in technological change and processes of innovation as compared with other areas. It may be noted straightaway that what is involved is exploring the long-term development

processes of structural and relational change, not merely identifying the advantages in terms of flows – essentially of external economies of agglomeration – that firms derive from the city from the point of view of innovation and technological change.

The first part of the chapter shows how theories of development and technological change approach the urban. From the viewpoint of historians and for past centuries, matters seem clear. The city and development have historically been closely linked, in particular up to the Industrial Revolution. However, the analytical tools supplied by historians must be thoroughly rethought in order to take account of the present situation, for the transformations of the production system have imposed their logic more and more frequently on urban dynamics ever since the early 19th century.

Present literature on innovation and territorial development has today been clearly separated into two distinct currents, neither of which is satisfactory when it comes to the role of the city in innovation. On the one hand, thinking focuses on endogenous development (Becattini, 1990; Garofoli, 1992), industrial technopoles (Planque, 1985), innovative milieux (Maillat and Perrin, 1992; Maillat *et al.*, 1993), localised production systems (Colletis and Pecqueur, 1995; Courlet, 1994), learning regions (Asheim, 1996; Morgan, 1997), which virtually always ignore purely and simply both the urban and the non-urban dimension. Yet there is no gainsaying that the Italian industrial districts are based on an urban structure, that technopoles cannot be separated from the urban context and that the urban does in the final analysis play a role in the processes described. These approaches incorporate or ignore the urban in theories of development.

On the other hand, we find literature on metropolitanisation and global cities (Sassen, 1991; Scott, 1984; Veltz, 1996). These approaches describe accurately and theorise cogently the present development of cities – and in particular the largest cities – but do not in any event explain why these phenomena primarily take place in (large) cities. As a matter of fact, the city is postulated rather than explained. In such studies, the processes that are dealt with take place in a city. But does their location in a city play a specific role? The first part of the chapter discusses the ways in which these approaches incorporate or ignore non-metropolitan areas.

Why have these two currents remained isolated from each other until now? How can we conceive of development by implicitly postulating either that the urban plays no role or alternatively that it controls the entire process of development?

The question posed here is that of *the specific role of cities in technological innovation*. What role do cities play as compared with other areas that are only moderately or not at all urbanised? Since this is an old question which has already been amply covered with regard to previous historical periods, this study suggests that *very little effort has been put into explaining the role of contemporary cities in innovation and development.*

The second part of the chapter attempts to provide a more precise definition of these specific territorial characteristics. The *production system* develops and imposes its logic on territories based on innovation, the launching of new products on the market or the use of new technologies. The development of a city is grounded on a different logic. In what terms do we understand the (re)production of the city, in particular as compared with other areas?

The third part of the chapter puts forward the idea, based on Rémy and Voyé's (1992) work, that the city is characterised by a specific capacity to generate *interaction and learning sites* (ILSs) and foster their evolution. These are both constituent of the urban fabric and essential from the point of view of innovation in the production system. It will be shown that although the city is not necessarily the place where economic innovation occurs, it (re)constitutes a context which facilitates such innovation, thereby allowing considerable control over the evolution of the production system. In other words, the city is not necessarily the place most conducive to economic innovation; however, *it possesses a 'metacapacity' to develop ILSs* which generate resources and bring the economic actors who innovate into contact with each other. In the fourth part of the chapter, the specific role of cities is therefore characterised essentially by the various activities of bringing actors into contact with each other. It is suggested that this metacapacity is primarily manifested in two processes: *objectivisation of institutions* and *anchoring in the constructed.*

The Treatment of the Urban in Theories of Development and Innovation

Cities and Development: A Historical Viewpoint

For Braudel (1979), a number of characteristics are almost always attached to cities. Thus, there is no city without a somewhat complex division of labour. There is no city without a market, and there are no regional or national markets without cities. There are no cities without power which is both protective and coercive. Finally, there is no opening-up to the world and trade with faraway places without the city (p. 423). The city always dominates an area, a

hinterland. Braudel compares the city to an electrical transformer which turns faraway high-voltage networks into low-voltage regional networks and vice versa. The city structures its hinterland based on distant profit opportunities and asserts the value of local production in faraway places. As far as this hinterland is concerned, the development of cities and economic development are to a large extent the same thing.

Such distinctions are not satisfactory when it comes to dealing with contemporary relations between cities and economic development. Indeed, in the Western economies, the division of labour between urban and other activities can no longer be clearly established, unless it be from a relative point of view: cities feature a greater concentration of tertiary activities and less farming than non-urban areas. Clearly, however, commercial firms that do business on a worldwide level can be localised today in areas with a relatively low degree of urbanisation. Thus, although these categories are essential for understanding the historical role of cities, today they absolutely must be completely rethought.

Yet the element which most clearly militates in favour of re-examining relations between cities and economic development is *technological change*, which we primarily apprehend through innovation (as defined by Schumpeter, 1935). As far as the Industrial Revolution is concerned, Braudel clearly shows that it did not take place in the main cities of the day but rather in Manchester, Birmingham, Sheffield, etc. – cities which were the products, not the incubators of the Industrial Revolution. Thus, cities do not have a corner in innovation, contrary to what some authors, such as Pred (1977), maintain. The dynamics of the production system sometimes gains the upper hand, imposing its logic on the urban structure, without however subjecting it. *It is precisely this interaction between the dynamics of the production system and the urban dynamics which is at the heart of our reflection.* Moreover, Mokyr poses the question of the relationship between technological change and the urban context and concludes plainly: 'it is possible to show that easy generalisations about the positive role of cities in technological progress are historically false' (Mokyr, 1995, p. 5). And further on, 'a more careful examination of the evidence reveals that notwithstanding a priori arguments, urbanisation has been neither necessary nor a sufficient condition for technological change' (p. 19). Thus, the question of the relationship between technological innovation and cities remains open.

Contemporary Approaches to Regional Development

As far as regional development is concerned, the past twenty years have been marked by theories on industrial districts (Becattini, 1990), technopoles and innovative milieux (Maillat and Perrin, 1992; Maillat *et al.*, 1993) and other territorial production systems (Colletis and Pecqueur, 1995; Courlet, 1994). All these different approaches highlight the role of networks of SMEs and the local insertion of large firms in the innovation process. In these approaches, *territory* is deemed to be an essential motivating force of development: the relations between the different local actors, be they merchants or non-merchants, make it possible to identify and mobilise local resources for innovation (Crevoisier, 1996). Territory is thus constituted by a quantity of relations (Storper, 1995) all of which are assets that can be mobilised in the economic process. The *innovative milieu* is deemed to be a localised set of interdependent actors who on the one hand jointly develop their know-how with a shared view of innovation and on the other hand develop between themselves the rules of competition/cooperation which renew the territory (Crevoisier, 1993).

In the literature, however, these networks between local actors are almost never explicitly situated in an urban or non-urban setting. *The underlying conception of territory is fundamentally relational, but it virtually always leaves aside the distinction between cities and rural areas*. In an exception to this rule, Courlet and Pecqueur (1992) show how the industrial districts in the Rhône-Alps region have tended over the past twenty years either to decline or to turn towards new forms which make much more intensive use of research and training centres. Moreover, these traditional industrial districts coexist with more recent *technological districts* which mobilise urban resources much more intensively than industrial districts.

The virtual absence of commentaries on the urban in current theories of territorial development can give rise to two interpretations. The first possibility is that the dynamics of the production system and technological change does not rely on the urban. Thus, the urban/rural or urban/non-urban distinction is not a discriminant from this point of view. The second possibility is that the relationship between innovation and the city is less direct than was previously thought and that research must be pursued along these lines.[1] We shall focus on the latter possibility.

Current Theories of Metropolitan Development

Another body of work focuses on the current development of metropoles. Empirically speaking, it can be seen that the largest cities in the Western world tend to grow rapidly and to account for an ever-increasing share of high value-added activities. For example, Veltz (1996) notes that in France between 1982 and 1990, population declined in the most sparsely populated areas, whereas the Ile-de-France area accounted for more than half (370,000) of all jobs created nationwide (700,000). Moreover, various studies consider that the development of metropoles compensates for the possible problems related to economic globalisation: the establishment of world production and distribution networks is accompanied by the management and supervision of economic activities which are supposedly the exclusive right of 'global cities' (Sassen, 1991). In this view, these metropoles have generated exceptional capacities in these management and supervision activities and have therefore become centres for innovation in the field of services provided to companies and tied to the supervision and management of economic activities. This vision is interesting insofar as it does not speak of technological change and innovation in the traditional sense, i.e. as tied to industry, but rather puts forward the argument that they are tied to new types of services in which metropoles have specialised. To sum up, the large cities generate new forms of domination over their 'hinterlands' which correspond to the management and service activities required by globally competing firms.

A good deal of research focusing more closely on technological innovation has been done on production systems located in large cities. For example, Suarez-Villa and Rama (1996) show that the electronics sector in Madrid has survived and developed thanks to relations between R&D centres and companies in the city.

> The intrametropolitan clustering of some firms may, for example, facilitate the outsourcing possibilities, contacts and information that would not be readily available with dispersion. Locating in a central area of the metropolitan region, rather than in periphery, may help to create and support networks of co-production or subcontracting that can be vital to R&D activities, through the resource savings that they provide (Suarez-Villa and Rama, 1996, p. 1156).

Their findings clearly show that the fact that these activities are located inside Madrid favours innovative capacity. Yet is location in a city a prerequisite for this?

Traditional approaches in economics have explained the city by external economies of urbanisation and localisation. However, as far as technological change and innovation are concerned, such approaches remain unsatisfactory. When Marshall, the inventor of the concept, explained external economies, he illustrated them by the industrial districts of England in the late 19th century – yet these districts did not necessarily take the form of a city. Not every externality is a component of a city, even through the city is an area which can generate externalities. In this connection, studies on metropolitanisation have likewise failed to bring out clearly the role of urban specificities in innovation.

For Camagni (1995), *proximity and agglomeration do not necessarily coincide*. Authors like Scott (1988), however, associate proximity with agglomeration when speaking about California. This assimilation might be a consequence of differences between European and North American circumstances. In North America, outside major urban agglomerations, few regions feature the same population density and activity characteristics that are found in corresponding areas in Europe (e.g. in Germany, Northern Italy, Switzerland, Benelux).

Thus, explanations of technological change in metropoles highlight the advantages of proximity but fail to specify exactly why and how proximity would serve innovating actors in the city specifically. The following sections aim to clarify this missing link in explanations of the location of innovative activities.

The Territorial Characteristics of the City

How can the distinction between urban and non-urban areas be reintroduced in theories of innovation? Here, the best method consists of starting off on the basis of both the material and social characteristics of the city which unmistakably differentiate it from non-urban areas. Using this as a starting point, we will explain the relations between urban dynamics and innovation based on the notion of *interaction and learning sites* (ILSs). These sites are *simultaneously* generated, developed and destroyed by the city and they participate in the process of innovation, in particular by bringing economic actors into contact with each other and enabling the transfer of know-how. Thus, the relationship between city and innovation is not a direct one. Instead, first, the specific nature of the city lies in its ability to *generate ILSs*. Second, ILSs produce and maintain the *resources for innovation*.

A Territorial Approach to the City

Rémy and Voyé (1992) define the city as a social and material unit. In this context, we may understand 'social unit' as a set of actors related by institutions as defined below. The city is:

> ... a social unit, made up of a set of interrelated social functions which, through the convergence of products and information, plays a special role in exchanges, be they material or other; a material unit, characterised by a certain density as well as a continuity of the constructed, within which one observes a series of constituent oppositions (centre/suburbs, private/public areas, etc.). When viewed from this morphological perspective, the city derives its specificity from the fact that it is neither the place where a specific function is exercised (as is the case for a house, a school, a hospital, a firm) nor the place where these specific functions are juxtaposed, but rather the place which interrelates these various functions, through the spatial relationship (Rémy and Voyé 1992, p. 8).

This definition views the city first of all as an area constructed in a continuous fashion, which clearly distinguishes it from other kinds of territories. Second, it describes the city as a place which interrelates these different functions. The city appears as a setting or more exactly a 'meta-place' of interaction, with both a social component (made of actors interrelated by and generating institutions) and a material (constructed) component. Thus, it is the articulation and the superimposition of these different functions in an area which characterises *the city as distinct from non-urban areas*.

Relations between the City and Innovation

Interaction and Learning Sites How then can these characteristics of the city be linked to innovation? As a working hypothesis, I propose that these two components, the social (the institutional) and the material (the constructed), can be joined by using the notion of *interaction and learning sites* (Figure 3.1). In concrete terms, these ILSs may be research and training centres, professional associations (lobbies, trade unions, sectoral bodies, employers' associations), trade fairs, centres for technology transfer, specialised media, and sometimes libraries or museums. Sometimes, they may be mere meeting places: for example the hotel where the heads and the key decision makers of firms in a specific business meet in an informal setting.

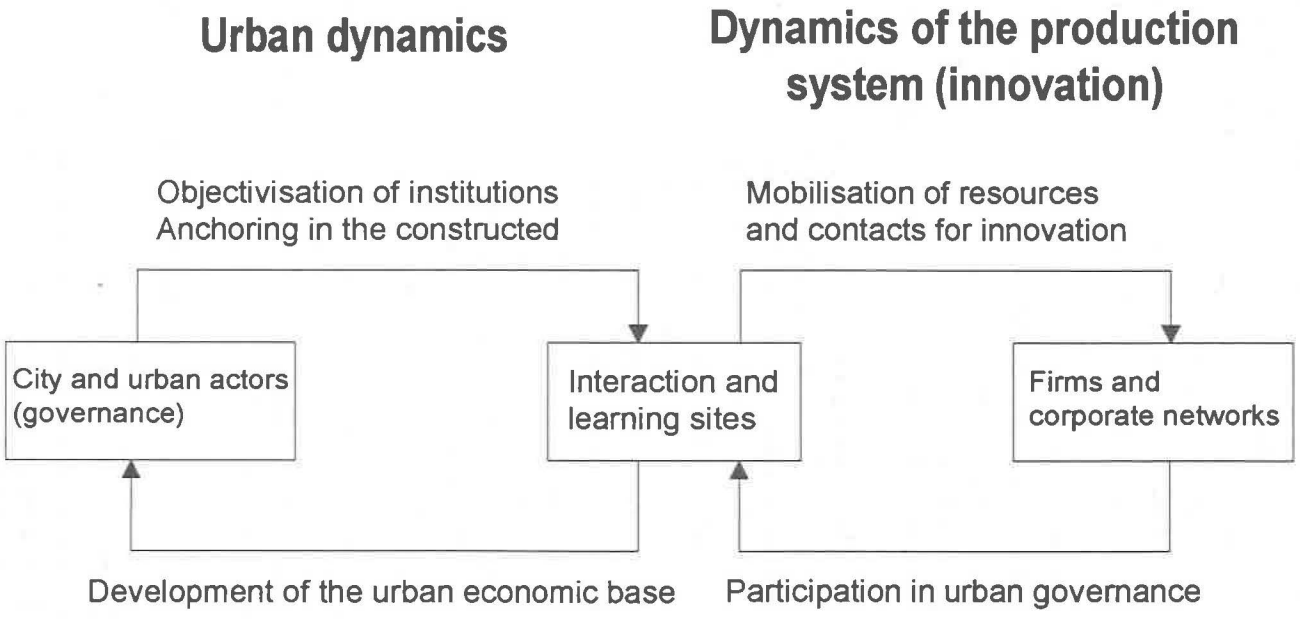

Figure 3.1 **The interactions between urban and innovative dynamics through ILSs**

The Role of ILSs in Innovation: Establishment of Contacts and Creation of Innovative Resources The concept of ILSs injects an essential element to explanations of the role of cities in innovation. Innovating firms are not necessarily located in a city but parts of the innovation process almost always pass through the city at one stage or another. The city is not necessarily the place most conducive to innovation as such. However, *the function cities serve in innovation processes is that they develop various types of ILSs where some of the resources required in innovation processes develop and come into contact with each other.* These thoughts dovetail with those of Keeble (1993) and, to a lesser extent, those of Tödtling (1990, 1995), which show that firms located in rural areas or in small towns are innovative – sometimes even more so than firms located in big cities – provided that they enjoy satisfactory access to urban centres.

Different ILSs play different roles. They can be the places where new types of know-how are developed, such as research centres. Naturally, the people who work in such centres do more than just develop technical skills: they also establish contacts with colleagues, corporate customers, and others. Trade fairs play a very important role in this connection as well. They give firms operating in a given (specialised) sector an opportunity to see what their competitors are doing, what their suppliers are offering, and to meet a very broad range of customers. They offer an exceptional occasion to make contacts, come up with ideas and identify potential partners. In sum, ILSs supply two essential components of innovative milieux (Crevoisier, 1993; Maillat *et al.*, 1991): new resources in terms of know-how, as well as essential contacts and interactions to ensure that these resources can be incorporated and developed in a process of innovation.

The Materialisation of ILSs in the City As far as the city is concerned, ILSs reinforce the two essential aspects of the city: its capacity to bring different functions into contact with each other, and its constructed component. They may be materialised differently in the urban fabric:

- permanently or temporarily: for example, some major cities have large trade fair facilities, with permanent staff and buildings; conversely, some trade fairs, such as the ones in the Italian industrial districts, are held in temporary facilities (such as tents) or multi-purpose facilities (such as concert halls) and are run by staff temporarily assigned to such events;
- on a regular or irregular basis;

Institutions are at the same time embedded in individual economic actors and shared by a certain number of them. In the line of this idea, we suggest that territories may be characterised by their institutions, following different degrees of *objectivisation*, that is to say the degree of autonomy that a specific institution has relative to given individuals. On the one hand, the least urbanised milieux are governed by institutions based on interpersonal or inter-group relations. The institutions are strongly related to individuals up to the point at which it is difficult and meaningless to differentiate relations between individuals and institutions. On the other hand, the urban context seems to be particularly conducive to a process of *objectivisation*, to a disconnection between individuals and institutions. Institutions are more 'external' to individuals; they get a stronger autonomy towards individuals who created or animate them. Of course, this process occurs very often in parallel with a process of formalisation of institutions, but it cannot be reduced to it. The urban context facilitates the passage from relations strongly embedded in particular individuals or groups to more independent structure. For example, a body which starts out as a group of industrialists who meet once a week informally in a relatively non-urbanised setting is rapidly attached to an already existing formal association endowed with an address, a budget, an organisational structure, and a staff, in a more urbanised context.

The urban context provides ready-to-use institutions which allow the passage between interindividual action to collective and organised action. A training programme set up by a group of firms in a non-urbanised setting is subsequently entrusted to an existing organisation in the city. A regional trade fair, set up by firms, is likely to be run subsequently by people specialised in organising this type of event in a city. A survey by Corolleur *et al.* (1996) showed that projects originating in different professional milieux ended up taking the form of new organisations (such as training centres for given industries or professional associations) in cities. This is how the majority of training and research institutions, professional associations, and other organisations come into being. First, there is an informal project backed by a few individuals. These individuals seek to interest more and more actors so as to give concrete form to their project. Inasmuch as the urban context is receptive, these projects take the form of organised societies with an organisational structure, stable financial resources, and so on. The objectivisation of institutions essentially takes place via the interaction between the various urban actors and pre-existing associations or institutions. Thus, it is the *multiplicity of urban actors* and their capacity for interaction which facilitate the integration or consolidation of new actors.

Accordingly, the city, through its capacity to objectivise institutions, facilitates the passage from occasional actions based on voluntary participation and a militia system to organised, continued actions carried out by professionals. From the point of view of its impact on capacities for innovation, the city systematises interactions and learning by structuring the framework and stabilising its funding. These organisations and institutions can in turn become a factor of attraction for new organisations thanks to the interplay of economies of scale, reputation and image effects, and above all by junction and complementarity effects which are particularly strong in view of the fact that the urban fabric has numerous active actors. Along the same lines, this appearance or consolidation of urban actors thus is one of the key characteristics of 'the urban'.

The urban context is particularly conducive to this process of objectivisation of institutions. At the same time, it would appear that this is linked to an *anchoring in the constructed*, i.e. to a location in a city, often in a building, and not on an *ad hoc* basis.

Anchoring in the Constructed The objectivisation of institutions may be projected onto the constructed. The city, as a material unit characterised by a certain density and continuity of the constructed area (Rémy and Voyé, 1992), plays a special role in the (re)production of capacities for innovation by centralising this activity or even giving it a material infrastructure on an *ad hoc* basis.

This anchoring facilitates the perpetuation of institutions and fosters the passage from diffuse actions to actions which are organised and perhaps centralised. Moreover, because buildings are a characteristic element of cities, they in turn constitute an essential characteristic of the city itself. The development of new buildings and new sites also facilitates the emergence of new organisations by giving them a constructed basis. For example, economies of scale have appeared for buildings in training, research, trade fairs, ocupational associations or public bodies. Physical proximity within a given city can also favour junction and complementarity effects with other ILSs. Often, cities become involved in the setting-up of the ILSs by making premises or land available. The emphasis on these two functions is close to the conception of Rémy and Voyé (1992, p. 8), for whom, as noted above, the city derives its specificity from the fact that it is a site of interaction, with both a social (institutional) and a material (constructed) component, which integrates different functions through the spatial relationship.

The Blocked City All cities do not fulfil these two functions in the same way. In an ideal case, relations between actors are such that neither the objectivisation of institutions nor the anchoring in the constructed poses a problem. The existence and the effective implementation of these processes are always subject to the interplay of actors, to the form of government of a city, to the relations between different bodies, between public and private sectors, in short, to what is now called *governance* (Stoker, 1998). The competitive and/or cooperative relations between actors influence urban dynamics and the dynamics of innovation.

Cities which have not managed to ensure enough collaboration between local actors to facilitate the processes of the objectivisation of institutions and the anchoring in the constructed can be called *blocked cities*. There are many different types of blockages: separation of the political and economic spheres, competition between the various organisations, competitition between existing organisations and projects under way, indifference, blockages in processes involving the regeneration of urban sites and the reallocation of land and buildings. Such blockages can have various effects, such as weakening of innovative dynamics and the positive impact of the city, or decisions to locate ILSs in other cities.

Conclusions: Rethink the Urban in Technological Change

This chapter has focused on a very specific aspect of cities, namely, their role in innovation and technological change. This is an important issue from several points of view.

First, we suggest in this paper that there exists a division of labour, hence complementarity, between cities and less or non-urbanised areas. Technological change and innovation do not occur more easily or more frequently in cities than elsewhere, at least in countries where infrastructures and public services are well developed throughout the territory. Nevertheless, this does not mean that cities do not have a specific role in innovation processes. Cities seems to provide *interaction and learning sites* that provide the resources for innovation and allow connections for innovation to occur. Consequently, innovative firms do not need to be located in cities, but they need to have good connections with ILSs. In terms of regional or urban planning, this idea may be of considerable importance.

Second, we underlined the importance of the process of generation of ILSs. We may distinguish two classical cases: exogenous and endogenous

development. On one hand a certain number of cities fight each other to attract such ILSs. There exist a fierce competition at national and international level in order to get the most important research centers, universities, international fairs, professional bodies, media, libraries, etc. All cities are not able to get a part of these. Only the best endowed in terms of public services, geographical location, finances and overall political support may receive some types of ILSs. In this case, representing the exogenous development process, ILSs provide standardised services, not specifically suited to the needs or characteristics of local firms. One the other hand, according to the logic of endogenous development, cities can support their existing innovative milieux and industrial districts and extend the innovative dynamics of firms located in their hinterland by supporting the development of sites active in the same specialisation as local firms. Depending on how active cities are in this regard and on how local governance is developing, they can be engines or blockages for development as far as the innovative dynamics of their own and their surrounding regions are concerned. This is the logic of the specialised city as opposed to the metropolitan city (Cattan and Saint-Julien, 1996).

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Note

1 This latter possibility is currently being explored within the framework of the European Research Group on Innovative Milieux (GREMI).

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