

Cities, systems of innovation and economic development.

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Abstract

Innovative cities are essential for the economic growth and development of countries. At the same time, however, social and environmental problems related to city growth can be serious threats to the full realisation of the socio-economic contribution that cities can make. In this paper it is argued that the notion of a “system of innovation” is helpful in understanding the factors that shape the processes of innovation and that determine the extent to which problems related to city growth may be solved. It is also argued that it is in cities, especially big cities that the power of innovation to promote economic growth and development will be tested, and that in this context, institutional innovation and political innovation as compared to technical innovation are of special importance.

INTRODUCTION

Cities play a vital role in the social and economic development of countries. Dynamically efficient and productive cities are essential for national economic growth and strong urban economies are essential for generating the resources needed for public and private investment in infrastructure, education and health, improved living conditions and poverty alleviation. Nowadays sustainability has joined the list of tasks cities will need to address. The road to sustainable development will go through administrative, organisational, institutional and technical innovation. Cities have often been described as the cradles of creativity innovative and as innovative environments and their problem solving capacity has often, but by no means always, been impressive. This paper addresses some issues about how and why some cities are innovative and argues that cities must develop sustainable systems of innovation if they are to solve major questions of sustainability.

Cities have long been thought of as innovative centres. Giovanni Botero (1544-1617) probably first expressed this clearly. In *The Magnificence and Greatness of Cities* (originally published in Italian in 1588 and in English in 1606), Botero described the importance of great cities for countries and their rulers. He suggested that neither the pleasures of living in a great city nor the necessity of the protection provided to its people explained its magnificence. What matter most, he said, are the city’s diversity of industry, trades and crafts, interaction with surrounding agricultural districts, the presence of a community which accepts and includes immigrants, has an efficient and effective justice system, schools and studies, and a physical location with access to good ports, which makes trade with other cities and countries possible. Only cities can provide the necessary environment for increasing incomes and power, he thought.

Discussing the origins of the now strong evolutionary alternative to mainstream thinking about economic development, Reinert (2007: 73) observes that ‘...it was very clear to people early on that most wealth was to be found in the cities, and particularly in certain cities’ and argues that Antonio Serra’s 1613 observation that

the larger the number of different professions present, the richer the city is still valid (Reinert 2007: 281).

More than 300 years later, Jane Jacobs (1969) used similar arguments about the importance of diversity of trades and crafts to explain how cities may stimulate innovation and economic growth. Even agriculture was developed in cities, she says, since only in densely populated area, where people from different places, with different competencies and trades, met to interact were there possibilities for the new combinations and insights that led to the transition from hunting and gathering to settled agriculture in the neolithic revolution.

In his book *Cities in Civilization*, Peter Hall (1998) takes the argument further, describing great cities in their golden ages as 'innovative milieus' and 'cradles of creativity' of many kinds, where artistic/cultural, technological, and organisational shifts take place and provide the intersections that can lead to the combinations of artistic and technological creativities involved, for instance, in the new fields of movies, recorded music, television and multimedia displays. The factors that shape cultural and artistic creativity are to a large extent the same as the ones that shape technological innovation, Hall argues, and these are largely found in cities.

CITIES ARE DRIVERS OF INNOVATION BUT WHAT MAKES THEM INNOVATIVE?

The reasons given for the location of innovation in cities by Botero, Serra, Jacobs, and Hall and other scholars who view cities as engines of income and growth all rely on supply side arguments. The conditions for production and growth, they say, are better in cities than in less urbanized areas because the factors of production (capital and labour) are relatively available, abundant, efficient and complementary and because cities offer relatively good infrastructure for productive activities. In addition, the production structure is more diversified, which supports the development of synergies and hence the innovation which makes the economy robust and dynamic.

More recently, some demand side arguments have been added to the analysis. These centre on the presence of a diverse population that includes people with not only different occupations, competences and social background but also with the higher wages and tastes that create a high and differentiated level of consumer demand. Fast consumer learning supports the growth of this demand over time.

In addition, cities are complex and often disordered places, where interactions create all kinds of problems which involve private players but also public authorities. City governments have to constantly redesign and rebuild urban order and especially the infrastructure of streets, water supply, sewage systems, solid waste disposal, energy, transport and so on. The constant recreation of urban order adds a potentially high and increasing level of public demand to the private one. In this sense, the demand side in the economy of cities harmonizes with the supply side and gives cities a higher growth potential than other places (Johnson and Meuller 1973).

Cities are not endlessly creative, however, and innovation levels are not constant or evenly distributed over space and time. The term 'creativity' here refers to the ability to produce, combine and recombine knowledge and competences in ways, which lead to something new, such as new technologies, organisations and institutions. Even if the majority of economically important institutional and technological changes have been initiated and developed in city-like areas, this does not mean that all cities are creative. Cities alone are innovative spaces but not every city is innovative and most

cities are never noted for their innovativeness - there has to be a combination of specific factors at specific times for urban innovation to be strong. The failure of other cities to develop and maintain growth and innovation may result from difficulties in matching technology with institutional arrangements and supply side factors with demand side factors.

Production can be usefully described as a result of three basic factors of production – materials, energy and knowledge (Boulding 1981) which together transform materials from one form to another, a transformation which requires energy and is controlled and directed by knowledge. Since the industrial revolution, energy use, knowledge and materials have grown explosively and the relative importance of knowledge has increased via the globalizing learning economy (Lundvall 2002). In particular, it is increasingly important to note that most of the environmental problems that accompany economic growth are connected to the use of energy and materials but the solutions hinge on the utilization and development of knowledge. Cities have always been the locations of the main producers of knowledge and vehicles for economic growth and development, bringing these two production factors together.

Diversity and turbulent creativity

Processes of communication, transaction and interaction are key phenomena in city dynamics. These processes are not necessarily harmonious and balanced. On the contrary, in describing the dynamics of cities, Hall (1998) uses expressions such as structural instability, mismatch, lack of equilibrium and asynchrony. Cities are turbulent; *turbulence rather than comfort is the cradle of creativity*. When economic expansion has developed or followed from creative outbursts, it has not been in the form of balanced, incremental growth but rather in the form of what Schumpeter (1942) called ‘creative destruction’, fundamentally discontinuous change including the emergence of qualitative novelty and not simply quantitative change. Long run development is not a continuous and steady process but is rather ‘uneven and combined’ (Mandel 1975) process and the ‘golden periods’ of cities’ are often ‘in-between’ times, in which some activities expand and others decline faster than normal and where perspectives and outlooks change. Often these periods of transitions are culminations of long gestation periods in which contradictions and tensions have built up. The ability to manage these conflicts is important for the sustainability of the city’s development.

The existence of variety within a city’s population and activities is a critical element of urban innovation because innovation is highly interactive, building on the recombination of different elements of knowledge and competence. Variety may be seen in the population’s age structure, culture, occupation, skills, competences and tastes, in the organisation of production in terms of firm size and mode of organization, in the city’s institutional variety and in the diversity of the production and supply of public as well as of private goods and services.

Variety creates the potential for innovation. Whether this potential is utilized or not depends basically on two further factors. First, it requires some kind of *proximity* between the persons and organizations that have the potential to interact and recombine different kinds of knowledge as the costs of interaction must not be too high. The relatively short physical distances and dense communication networks of well-functioning cities support face-to-face as well as other types of communication, which support interactive learning and innovation.

Second, realisation of the potential provided by variety requires investments in the development of knowledge. Knowledge may be intangible but it does not recombine without costs; innovation requires expenditures on materials, equipment, testing, training, education and associated matters. The need for investments is obvious for technical innovation (process and product innovation) but the necessary associated organizational innovation also requires investment of resources, at least in terms of human capital. Economically vibrant city economies provide both demand for these kinds of investment and the resources to invest - spending propensities are high in cities (Johnson and Mueller 1973). Development has been described as the mobilization and utilization of 'hidden, scattered and badly utilized resources' (Hirschman 1958); cities are relatively good at such mobilisation and utilisation, both on the supply and demand side.

Innovation and urban order

Cities are good at generating problems and the city fabric is problem-rich. Large groups of people living and working in close proximity put strains on natural resources and energy. Congestion puts transport systems under stress and the high costs of land mean intense land use. While individual consumption of land and the natural environment may be relatively low, total consumption in cities is very high. Air pollution, insufficient waste treatment and high contamination levels may engender health problems, for example. Furthermore, in cities, redistribution of income and power between persons and organizations with different innovation and learning capabilities lead to conflicts and undermines social capital. This is a general phenomenon in the globalising learning economy, but it is accentuated in cities.

Creative periods of city development are often characterised by the recognition of such long term problems, the development of solutions for them and an enhanced acceptance of change, although selecting and implementing solutions also often bring to the fore social conflicts and contradictions and changes in the distribution of income, wealth and power.

Big congregations of people are intrinsically complex and cities are messy and disordered places. People in cities have had to be creative in developing urban order which is the framework for city life. Urban order is a central concept in understanding the operations of cities and can be thought of as an arena in which problems emerge and become visible but as a place which also includes possibilities for their solution.

Urban order includes physical infra-structure - streets, water supply, sewage systems, solid waste disposal, energy and transport but also a moral and social order backed by an institutional order composed of routines, norms, rules and regulations. The institutional order must serve as a platform for solving, or at least alleviating, the major environmental and social problems generated by city growth if further development is to take place.

It is clear that development and maintenance of an appropriate urban order requires both private and collective action and administrative and institutional innovativeness as well as technological development. Innovative private and public firms, organizations and agencies need to take regular and effective steps to solve deficiencies and problems in the existing urban order. By forming problem-solving environments, cities have been crucial engines of change both for themselves and their survival and for their countries.

Historically we can sometimes see that when environmental and health problems have grown to critical dimensions, radical innovations in both technology and administration have emerged (Johnson and Hansen 2007) in cities and contributed to urban growth and further innovation in a virtuous circle.

The sewage system of ancient Rome is a well-known example. Much has also been written about how the fast population growth and the cholera epidemics in the middle of the 19th century led to the construction of sewers in many cities in Europe. In Copenhagen a sewage system was built in the 1860s almost 10 years after a cholera outbreak had killed many thousand people. The engineering challenge of the project, the size of the investments and the conflicting interests between the citizens (who wanted the problems solved as quick as possible), ground-owners (who had to carry some of the costs and whose property rights were infringe) and farmers (who lost a valuable source of fertilizers) illustrate the difficulty of the problem and explain the delays.

Some 100 years later the sewage problem re-enters the city agenda, but now in a quite different form. While in the first hand a serious city- and human health problem (cholera) was solved by piping sewage into the river, fiord or sea, stricter demands were now introduced on receiving water quality, recreational values and healthy environments in general. This meant that sewage treatment became the issue since only treated sewage should be discharged into surface waters. But such treatment means production of sludge that contains nutrients and organic matter, and cities want to get rid of this product that can be obnoxious and smelly. Consequently farmers were again offered an organic fertilizer, but due to industrialisation the fertiliser (sludge) quality was quite different from the one 100 years earlier. Sludge may contain heavy metals and a series of compounds related to industrial production and household activities, e.g. cleaning and washing. As a consequence it has often been intensively discussed if sludge is a valuable fertiliser or a risky pollutant. Cities found themselves in a tricky position and started looking for alternatives to land application of sludge. Presently a number of big cities use sludge as a fuel for electricity and heat production at the same time as possibilities for recovery of nutrients (phosphorus) are considered. The cities thereby obtain thermal destruction of pathogens and organic toxics as well as a solution where they are themselves in command of the entire routing of water and sludge from sewage treatment.

As another example it can be mentioned that incinerators were built in Hamburg already in the 1880s in order to reduce waste volumes and the risk of disease transmissions by rodents. Some 100 years later, incineration has developed to become an acknowledged technology whereby cities recover energy from waste that is not otherwise recycled as material resources (e.g. glass, metal and paper). Integrated waste management with high rates of energy and materials recovery, nutrient recycling and low negative environmental impact must be acknowledged as an innovative achievement led by cities under pressure to keep towns clean and tidy and at the same time provide health to both citizens and environments, and with an operation that is controlled by the city itself.

Successful innovation in cities as elsewhere requires packages of policies. Only the innovative environments of cities can provide the necessary combinations of technical and administrative competence, manpower and financial resources to make and implement the radical innovations needed in the urban order. The problems of maintaining urban order are not necessarily solved by *technical* innovations alone,

moreover. Often both problem and solution are more *institutional* than technical, while conflicts and disagreements about the distribution of costs, benefits and power in connection with public works often block the solutions and make administrative and political reform essential. This packaging of several aspects of solutions is especially needed when the problems are related to environmental and social sustainability and solving them is only possible in creative city environments which support interactive learning and innovation and constantly recreate new types of urban order.

Innovation as a driver of cities.

So far the focus in this paper has been on cities as drivers of innovation - on how city environments may back and stimulate innovation. But innovations are also drivers of cities. Innovation transforms and develops cities and helps them to grow. We can explain the growth and development of cities as a result of processes of innovation, and we can use this knowledge about the connections between cities and innovation for developing policies of urban quality management and development.

Innovation and growth

The positive argument is straightforward. As has already been mentioned the tradition in regional economics is to explain city growth from the supply side i.e. by characteristics of the production function (for example economies of scale and agglomeration effects). Since it was discovered that a traditional neoclassical production function with labour and capital as input factors only explained a small part of output growth, leaving most of the explanation to an exogenous rest factor interpreted as technological advance in a very broad sense, efforts have been concentrated on how to understand and explain the rest factor (Solow 1956). Endogenous growth theory is one response to this. Evolutionary growth theory is another. These two competing paradigms are quite different from each other, maybe especially in the way they look upon equilibrium even if Verspagen (2005) observes signs of convergence.

Innovation theory is mostly part of the evolutionary paradigm (Fagerberg 2005). It aims at an empirically and historically founded explanation of innovation as an open-ended process. Clearly understanding innovation is a prerequisite for understanding economic growth and the contribution of innovation theory to city growth would lie in an analysis of the specific conditions for innovation that is provided by cities. Cities affect innovation, which affect economic growth. The problem with this rather clear-cut argument is of course that the present knowledge about both the link between cities and innovation and between innovation and growth is quite limited. This should not, however, be as academically devastating as it may seem since in fact growth theory as a whole is rather shaky and every major change in the rate and location of world economic growth tends to come as a surprise to most of the mainstream research community.

Cities and the creative class

In the border area between positive and normative aspects of innovation as drivers of cities lie arguments about the importance for the growth and development of firms and cities of a specifically creative part of the labour force (Florida 2002). The creative class is defined as those people whose primary job function is to innovate. They identify problems, figure out new solutions or combine existing knowledge in

new ways. This class is defined rather broadly and include people engaged in science and technology, innovation, management, education, culture and artistic activities. This means that the creative class (which is really not a class in the classic sense since it does not have common interests or act collectively) may constitute a significant part of the working people in developed countries. Florida estimates its share of the American labour force to be over 30%. In Denmark, it is over 40% and its share of the city population is considerably bigger (Andersen & Lorenzen 2005).

The creative class, according to Florida, is attracted to and congregates in places with certain qualities, for example places characterised by openness, diversity, high incomes, and good provision of public and cultural services. Localities, which have the ability to attract the creative people, usually cities of a certain size and diversity, also have a better chance of increasing their dynamic efficiency. The creative class brings technical change and economic growth to its cities, especially in high tech sectors. For these reasons, city planners and managers may become focused on creating clean, liveable, interesting and diversified environments, which are attractive to this group of people.

However, this may turn out not to be as beneficial to national or regional innovativeness and income growth as expected. If one city is successful in attracting creative people it may be at the cost of other cities. Moreover, it is not certain that the qualities of a city that make it attractive to creative people are the same as those that strengthen its creativity and innovativeness. To the extent that the innovativeness of a city resides in systemic characteristics (its diversity and its pattern of communication and interaction) its operation is somewhat sticky and city dynamics will not be as mobile in space as the creative class. People who are creative in one environment may not necessarily be creative in another one. How much a person can contribute to, for example, innovation and sustainable development in a city depends not only on his or her genes, background, education and experience but also on how he or she interacts with other people, groups and organisations. *A creative environment will to some extent create the jobs and activities, which form the creative class, not the other way around.* The creativeness and innovativeness of cities are not primarily caused by creative people moving to them but by their institutions, diversity and communication intensity. The city environment shapes the creative class more than the creative class shapes the city environment.

City policy makers and planners may benefit from knowing something about what makes cities innovative and attractive to people with learning and innovation capabilities and they should consider the potential dynamic benefits of paying attention to the diversity of both production and consumption and of nursing the interactive learning opportunities when forming the city milieu. This might help them to solve the environmental and social problems connected to the maintenance of the urban order, which cities and depend on for their survival and development.

CITIES AND SYSTEMS OF INNOVATION.

So far discussion in this paper has not distinguished between minor and major innovations. Much of the literature about creative cities tends to treat innovation as rather unusual and dramatic (eg Hall 1998). Hall's analysis is similar to the ideas of punctuated equilibrium in biological evolution (Eldredge, N. and Gould, S. J. 1977) and to new techno-economic paradigms in economic evolution (Freeman 1997).

But this is not the whole picture. There is also another kind of creativity, an every-day creativity, a smaller creativity existing in the shadow of the greater one. In the dynamics of city development incremental innovation takes place all the time, complementing radical innovation. Such innovation is less dramatic but equally important in the long run. Cities do not sleep between their golden periods of creativity. The city environment constantly provides both new problems and new opportunities to solve them. Growing cities frequently offer environments of diversity and interaction that support everyday creativity and innovation.

In the long run, city development shapes both the forces of incremental and radical innovation, which feed economic growth. It is suggested here that the concept of “systems of innovation” is useful in at least two ways. It can increase our understanding of city dynamics (innovation as a driver of cities) and help promote the sustainable development of cities and thereby society as a whole (cities as drivers of innovation). The concept of system of innovation was introduced in the 1980s to emphasize the interdependence and interaction between technical and institutional change in the process of development (Edquist 2005). Innovations can only be understood in a systemic and dynamic framework and the innovation performance of an economy (nation, region, city) depends not only on how its individual firms and organizations perform, but also on how they cope with change and interact with each other and with the financial and public sector.

There are narrow and broad versions of the innovation systems approach to economic dynamics (Johnson and Lundvall 2003, Lundvall et al. 2002). In the narrow approach, the focus is on the research and development system and on high-tech activities. In the broad version, innovations are also seen as anchored in the everyday activities of firms, such as procurement, production and marketing operations and as taking place in all kinds of firms, organizations and sectors. The view of innovation it is appropriate to take depends on the concrete research questions being asked and on the particular region or country being studied. In my view, the long-term interdependencies between city development and innovation include both incremental and radical innovation and are best studied in a broad perspective. A firm’s innovative capability is affected by *what* it produces (its sector), by *where* it produces (its localisation), by *how* it produces and *with whom* it interacts (its institutional environment). Other actors, public and private, are similarly influenced. Policies, such as those for education and labour markets as well as innovation itself, may directly or indirectly affect innovation capabilities, whether directly aimed at this result or not.

The city as a system of innovation

Innovation systems may act at several territorial/spatial levels; we should accept that there are many possibilities and that there is no ideal territorial base where innovation will always flourish. In spite of this we may look for the presence of four specific place-attributes that tend to support innovation performance.

First of all, we should look for a geographical area with institutional characteristics that lead to frequent, intense and high-quality interactions. Second, we should look for an area with a certain degree of production and trade specialisation, namely an area where people and firms have become good at doing certain things and acquired a production and competence profile. Accumulated competences contribute to specific interaction characteristics and impinge on the processes of innovation. Third, we should look for an area with developed knowledge infrastructures and public policy routines and where there is an established polity, including policies affecting learning

and innovation both directly and indirectly. Finally, we should look for an area that over time has acquired specific demand characteristics, which to some extent match its specialisation pattern and enable different kinds of user/producer interactions.

A spatially delimited unit with all these characteristics is not easy to find. Small and reasonably culturally homogenous nation-states or city states seem to be obvious candidates. Some types of regions (both within national borders and crossing national borders) also have some or most of the characteristics identified above; hence, the lively research about 'regional systems of innovation' (Cooke 1992; Asheim & Gertler 2005). A local community or a group of such communities may also constitute an interaction area and the 'local system of innovation' is now increasingly proving to be a useful concept in development theory and policy (Cummings 2005).

The most obvious spatial limitation for an innovation system is the "city state". Athens and Rome of the Antiquity, Florence and Venice during the Renaissance, Singapore - and to some extent Hong Kong in present times, are all examples of innovative areas that possess most of the characteristics mentioned above. During their 'golden periods' of creativity, these city-states were successful, interaction-rich areas with common cultural traits, established competences and institutional frameworks that allowed capabilities of different kinds to be combined and recombined. Not least important was the acceptance and, in fact, stimulation of transactions and interactions with the external world (Hicks 1969). There were intense connections with other regions and countries. Furthermore, during their periods of economic growth, increasing and diversifying demand stimulated learning and innovation. Finally, and crucially important, they had strong political powers that allowed implementation of decisions about infrastructure, institutions, education, health, and conflict resolution for the city-state as a whole and with its common interest in mind. They had an internal cohesion, but at the same time, they were intensely interactive both internally and externally.

If the city-state is close to an ideal territorial system of innovation, then what can be said about a city? Clearly, a city is not an ideal area since it often lacks the strong political power centre that can form policies aimed at developing in its own interests. There is potential policy rivalry between the city government and the national and/or the regional government. Cities also often lack a strong common culture, the sense of belonging together that leads citizens to believe it is necessary or reasonable to act together. However, even if they do not constitute perfect or ideal territorial systems of innovation, many cities seem to combine several of the specific characteristics of a potentially well-performing one. It is a good guess, therefore, that in many cases and for certain periods of time, cities may constitute spatial bases for quite efficient innovation systems.

There are important overlaps between the literatures about creative cities and territorially based systems of innovation. The discussion of cities as creative environments emphasises that creative acts are the result of problem-solving, driven by communication and interaction between people with different knowledge and competences in situations of structural instability and tension. Hall (1998) has explained how and under what conditions cities have been able to provide such environments and underlined the uniqueness and exclusiveness of these situations. Bursts of creative innovation occur as seldom, sudden, short-lived outbreaks creating new paths upon which development moves.

The literature about the broad innovation system approach shares the ideas of the interactive and problem solving nature of city environments with the literature about the creative city. However, it also incorporates minor innovations founded in everyday activities. Routine interaction is seen as an indispensable activity that leads to incremental innovation. This double perspective of big as well as small change, of radical as well as incremental innovation, enriches our understanding of the city as an environment for innovation and, more generally, the role of cities in economic development.

Against this background, the notion of ‘city systems of innovation’ (or the city as an innovation system) may be formed as a complement to existing concepts of territorially-based systems of innovation (Johnson and Lehmann 2006). The concept may help city planners to better understand the processes of innovation that crucially underpin the capacity of a city to solve problems connected to the urban order and whose solution is essential to the survival and development of cities and their countries. It may also help policymakers to take initiatives to form relevant public-private partnerships, including some with universities and researchers, as instruments for moving towards more sustainable cities. Cities may serve as arenas for partnership building. Viewing cities through the lens of systems of innovation will not make it very easy to plan and build creative environments in cities but it may increase policy realism and help avoid mistakes in ‘urban quality development and management’. It may also help national policy makers to better understand the roles that different kinds of ‘territories’ play in the broader national process of innovation.

Having a strong innovation system does not imply that a city will necessarily direct its innovation capacity towards making its economic growth more sustainable. Bringing the issue of sustainable development to the forefront in the innovation process requires general recognition and acknowledgement of its importance. It also requires powerful groups and organizations regarding it as being in their own interest. These conditions have not been fulfilled very often which helps to explain why fast city economic growth is frequently limited in time.

Finally, the analysis of creative city environments in different historic periods seldom suggests that the creative role of cities is coming to end because of the ‘death of distance’, the creation of ‘cities without borders’, the birth of ‘cyberspace communities’ and other phenomena, which are often supposed to follow from the development of information and communication technologies. Cities as creative environments can still usefully be analysed within a system of innovation approach. Innovative firms, organisations and people will continue to come together and cluster in specific places, primarily cities, even when the key labour force is becoming increasingly mobile, transport costs are decreasing and information is increasingly fluent and thus less sticky. This continuity, which follows from the character of innovation, makes it of particular importance for both analysts and policymakers to focus on the sustainability of cities and their role in innovation systems.

CONCLUDING REMARKS

It has been suggested in this paper that the notion of systems of innovation, and more specifically, city systems of innovation, can be a useful tool for understanding how to solve key problems of urban order. Sustainable urban development requires efficient transport of people and goods, reliable water supply, effective land-use and management, green spaces and soil protection, well-functioning sewage systems, high quality waste management, effective energy management, and many other things. It

also requires an efficient polity with well-functioning policy-makers, judiciary, arbitration, administration and so on. It needs to have adequate social capital including, for example, forums for the participation, acceptance of responsibility and empowerment of citizens, networks for communication and capacity building and room for subcultures and cultural diversity.

All this calls for persistent technical, organizational, political and institutional innovation. The innovation system approach casts light on the sources of such innovation and on how they are connected to each other. Specifically the innovation system concept puts institutional innovation and its relations to technical innovation into focus. This is crucial since problems of urban order very often have strong institutional attributes. Their solution may require new property rights to land, new regulations, new types of public and political attention and new ways of thinking about sustainable development more than new technical blueprints.

The innovation performance of cities in practice is often focused on economic growth pure and simple and the solution of the problems of sustainability often has low priority. However, solving the problems of urban order may be assisted by taking a city system of innovation approach especially directed towards the problems of sustainable development. It is largely an institutional and political question if the capacity is utilized or not. Using the approach successfully is very much a question of political will and the development of appropriate institutional capacity.

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Bio-note.

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