Afterword

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SPATIAL DIMENSIONS OF KNOWLEDGE PRODUCTION[1]

Knowledge-Intensive Industries: A New Hope for Urban Policy Making

Around the world, in both academic and political arenas, promoting the role of knowledge-intensive industries in urban and regional development has become a hot topic. The importance of knowledge-based urban development has been fully realized, not least because in the majority of industrialized countries of the "Old World," traditional industries have gradually lost their role as the predominant urban employers, with the new industry sectors in some cases unable to compensate for the local job losses that have followed. The new hope is that knowledge-intensive industries could form a new future-orientated economic base for cities. Often this hope is expressed without a clear definition of the nature of knowledge-based industries, their location requirements, and with little insight into the complex milieus of these industries.

Dortmund, an industrialized city in Germany, an engine of economic development based on coal and steel, is a pertinent example. The city shares a common experience with many other cities around the world in establishing a new university. For almost 100 years from the turn of the 19th century, the city lobbied hard to get a local university. Finally, the university was built in 1964, far from the city on a greenfield site to accommodate 25,000 students and 3,000 academic and non-academic jobs. Subsequently, the interest in the university vanished gradually and the long-aspired academic institution was treated like an industrial plant at the fringe of the city. For more than three decades, the university slept like *Dornröschen*, the famous sleeping beauty, a long and undisturbed fairy tale sleep. For a long time, the university was not really an institution of which the city would be proud. It was just seen as a new piece of urban infrastructure offering higher education for the sons and daughters of redundant miners and steelworkers, and the new local middle class. However, when the last coal mine was closed in 1987 and the local steelwork was sold to China in the year 2001, the university became the new hope for the local political class, the desperate unions, and economic business establishment—an anchor from where future economic development should depart. Not overnight,

though within a few years, the university and its technology park in its precincts have become the image profiling factor for urban marketing and infrastructure policy. This new role as a significant chess figure in the local political game was new for the university, one which it still does not really know how to deal with.

The Spatial Dimensions of Knowledge Space

Knowledge and the various dimensions of knowledge spaces could be explored at four different spatial levels: global (including continental), national, regional, and local levels. Each of these levels has its own spatial, political, and of course, economic rationales.

At the *global* level, we observe a real and perceived hegemonial domination of American knowledge-intensive industries that cluster around main tertiary education and research hubs in the USA. These clusters (e.g., Silicon Valley, DNA Valley) are located around the most famous universities on the east and west coasts of the USA (e.g., University of California, Massachusetts Institute of Technology), and at a few other locations ,such as Minneapolis, St. Paul, Michigan, the Research Triangle, and Austin, Texas. The locations outside the USA include, South East England, Vancouver, Toronto, Sydney, Melbourne, Auckland, and selected technology locations in India. In such locations, English, the dominating global academic language, provides them with a competitive advantage. However, all over urban Europe, significant concentration of knowledge-intensive industries exists also. These knowledge-based developments have primarily taken place in Germany, France, Italy, Spain, Finland, Switzerland, and the Netherlands. They all have more than national importance and historically have been able to attract knowledge workers from all around the world, eager to study, research, or work in established R&D milieus. Language and international image, as well as successful marketing and specialization, are among the factors that "make" and favor such places at the costs of others. However, new hubs of knowledge-intensive industries are rapidly developing in Asia and Latin America, particularly in China and Brazil. And once language constraints are removed by new (simultaneous) translation technologies, the comparative advantage of English-speaking locations gradually will vanish, and new opportunities will rise for other urban regions.

At the *national* level, knowledge-intensive industries are concentrated and have expanded in major metropolitan regions, such as London, Paris, Madrid, Berlin, Milan, Helsinki, and Amsterdam, and major city regions, such as Munich, Stuttgart, Hamburg, Manchester, Toulouse, and Lyon, where the knowledge economy, high-tech production (e.g., biotech, defense, aerospace) and creative industries are flourishing rapidly. Single traditional gown towns beyond metropolitan or city regions such as Heidelberg, Göttingen, Uppsala, Pisa, Lund, Coimbra, Györ, and Aix-en-Provence compliments their national knowledge systems, though the distance between the metropolitan/urban knowledge core and the knowledge hinterland is unavoidably large. And as the more soft location factors (e.g., tolerance, quality of life) gain importance as factors for attracting the internationally and nationally mobile knowledge workers, the more established and spatially expanding knowledge cores will dominate the knowledge-based urban development of the creative urban regions.

At the *regional* level, it is the metropolitan region, where knowledge-intensive industries find appropriate production conditions. In many regions across Europe, all hard and soft location factors have been actively used for the knowledge-based development of these places. Though within the metropolitan region, a region that usually stretches out more than 100 kilometers to the hinterland, the locational pattern of knowl-

edge-intensive industries may vary. Depending on the urban system within the metropolitan region, medium-size towns adjacent to the metropolitan core can accommodate concentrations of knowledge-intensive industries, such as Heidelberg and Darmstadt in the Greater Frankfurt region, and Oxford and Cambridge in the London metropolis. In other metropolitan regions, such as Paris, a polycentric system of decentralized and newly established suburban knowledge hubs on the urban fringe has evolved over the last three to four decades. Similar development patterns also can be observed in the Kansai region in Japan, in the Seoul metropolitan region and in Taiwan.

In general, the location decisions of large knowledge clusters, such as universities, technology and science parks, and knowledge community precincts, at the *local* level, are rather the outcome of a multitude of political, economic, and socio-cultural factors, which scarcely follow any principal rationale developed by the local administrations. They are more the outcome of decisions made for whatever reasons and sometimes even centuries ago. Usually, major reasons for decisions made are, the availability of land, property endowments, or political directives to reuse derelict land at strategic locations. When exploring the spatial pattern of knowledge in city regions, it becomes obvious that knowledge-intensive industries have not, to date, followed a particular spatial logic. And whether a knowledge complex in an urban district is embedded in a multi-functional environment or not, largely depends on the long history of a location and the success of strategic urban planning and local community concerns. Heidelberg, in Germany, is a good example. The university in the city is surrounded by urban quarters full of lively and entertaining quarters, where students and staff meet after work, sometimes even before they enter the university premises scattered around in the gown town. When the university had to expand to the city fringe, the newly built functional environment of the new out-of-town campus did not accommodate all the desired places for non-functional activities, and to do that in a newly built environment is extremely difficult in many ways. The consequence is that the new campus is pretty much like a factory. Once the classes or the work is over, the campus precincts are deserted.

University and City: Two Quite Different Policy Arenas

Today, Dortmund is experiencing a love affair between two partners, university and city administrators, who are pursuing quite different development agendas. Such love affairs have become common in European cities, which do not have hundreds of years experience as more or less mono-functional gown towns, such as Oxford, UK, Göttingen, Germany, Uppsala, Sweden, or Bologna, Italy. This is a new challenge for urban governance. The fact is that the rationale of guiding urban development and the rationale of managing a university are significantly different. This is particularly true in a policy environment, as in Germany, where universities are public institutions, depending largely on the budget of a state government and, as a rule, regulated by state legislation from examination rules to constitutional regulation and to labor laws. Moreover, any physical extension is designed and controlled by a powerful state-owned and controlled property development institution, which is reporting directly to the Minister of Finance of the State. Local politicians face problems in identifying partners at the universities with whom they should communicate. The university on the other side does not have easy access to the local politicians and the urban development administrators. Thereby, the university is only one actor of the local knowledge-intensive industries. Others are the manifold public organizations, semipublic and private research institutions, which are typically located at the city.

Location Factors for Knowledge-Intensive Industries in the City

Around 150 years ago, efforts to plan the industrial city began. A much appraised and quoted concept for such an industrial city was designed by Tony Garnier, a French architect, who lived in Lyon from 1869 to 1948. In reality, however, most industrial cities in the world have just been developed without any master plan or blue print. They have evolved, more or less unplanned, just following selected functional criteria and reflecting the rationales and vested interests of large industrial corporations. Nevertheless, and until today, cities around the world zone industrial land in their zoning and land use plans in order to prevent the development of an uncontrolled mix of housing and industrial areas, with mutually negative implications. Conditions and infrastructural requirements have changed since. Modern knowledge-intensive industries require quite different location criteria and other infrastructure than a steelwork or an automotive factory. Today, it is rather a balanced mix of functional criteria, which is important, when planning for knowledge-intensive industries. With a few exceptions only, planning knowledge-intensive industries on greenfield sites or in urban or semi-urban environments, with little or no knowledge potential have not been quite successful. It is much more than a rational land use plan, which is required to turn a city or an urban district into an attractive knowledge environment.

What are the essential location factors of knowledge-intensive industries? First, people who are living in a place matter most to the knowledge-intensive industries, whereby their educational background, knowledge, skills, and competence are essential in attracting these industries and investment. Knowledge-intensive industries require competent and committed knowledge workers, who commit time and competence to the work as well as to the local civil society. Thereby, second, it is the social- and family- related infrastructure, which does play an essential role for household decisions, primarily the existence of good kindergartens and excellent international schools, and quality hospitals. Third, it is an easily accessible and affordable cultural and leisure infrastructure that influences family decisions of knowledge workers to stay in a city or to move to another one. And in double academic households, decision-making conditions are even more complex. All this, in turn, is linked to the local housing market and the opportunities to buy or rent a house or an apartment not too far away from the working place; in short, housing affordability plays an essential role. Finally, household connectivity to transport networks plays a role, which allows easy access to national and international transport networks. Besides these, a complex bundle of location criteria linked to the knowledge environment plays a critical role, such as: academic traditions; the profile of local institution of tertiary education; the academic reputation and the international connectivity of local knowledge-intensive industries; the image and innovativeness of research institutions; and the local knowledge milieu and accessibility to local knowledge infrastructure, such as libraries or specialized laboratories. These factors cannot be planned and implemented within a short time. Either they already are an essential feature of a knowledge location or they require a holistic view and understanding, as well as comprehensive strategic policies and investments, initiated and promoted by, far-sighted, visionary, creative, communicative, political and professional leadership.

How to Condition, Plan and Manage Knowledge Spaces and Intelligent Territories at the Local Level?

Given the fact that locally embedded universities, as spearheads of local knowledge-intensive industries and the local government are quite different institutional entities, and have dif-

ferent agendas, ways and means of continuous communication between the two main actors have to be explored. Experience shows that this would require persons at both sides who organize communication processes beyond daily business routines in a full-time job. They are responsible for continuous monitoring and benchmarking, and review of the mutual implications of institutional policies on the respective partner. The aim of closer cooperation between the two entities is the comprehensive local and interregional promotion of local knowledge-intensive industries. Additionally, it may make sense to involve other key stakeholders in the city in this process, not just to *decorate* the city or university, or to give individuals another function, but to benefit from their respective competence, experience, insight, and networks. This would best be achieved by setting up standing committees with individuals from the university, local knowledge-intensive industries, and the city administrators. Such committees would be responsible for strategic actions to further improve the local knowledge environment, and for bi-annual reports on the state-of-the art of knowledge-intensive industries of the city. Additionally, a catalyst document could be prepared on past achievements, reviews, and assessments on urban development with reference to local knowledge-intensive industries. This could guide local policies in this field, including policies on affordable housing, public transport, and immigration to maintain the quality of life for national and international students, academic staff and scientists, and their support and service environments, and knowledge-based urban development.

Knowledge, Health and Food, the Cornerstones of Local Economies

There are three essential key cornerstones of local economies in the global future. They are three economic complexes, namely *knowledge*, *health* and *food*. They provide most of local employment in any urban region. They are and continue to be the local territorial capital profiling sectors of the city, and they strengthen local identification and embeddedness. Such complexes will have to be the main concern of local economic politics, and they will strongly influence local agendas to maintain the quality of life of citizens. While health and food mainly serve local communities, the knowledge complex is the externally visible flagship. That is, why much more political attention has been given to the crucial role these complexes play in urban development. In the past, the spatial dimensions of knowledge-intensive industries have often been neglected. The policy passion for attractive landmarks, remarkable architecture, and international public events in cities around the world has shown that the quality of urban space plays a critical role in continuously attracting talent, tourists, industries, and investments.

For above reasons, knowledge-based urban development is a key planning approach for attracting and retaining knowledge workers and knowledge-intensive industries, and also for the nurturing of knowledge cities. Furthermore, knowledge-based urban development provides an important collaborative development framework for all parties (public, private, academic, and community) in the development of future strategic (and knowledge-intensive) urban and regional policies.

ENDNOTE

[1] The rich territorial capital of Europe is its cultural diversity, with quite different political, economic and cultural traditions. Consequently any effort to describe the spatial dimensions of knowledge is biased by the respective cultural context of the observer. The author's observations are influenced and formed by 32 years of work at the University Dortmund, Germany, a university at the edge in an old industrial city.