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Emerging as a serious tool of analysis in the United States around 1950, the city region concept was increasingly applied in a European context after 1980. Since 2000, it has evolved further with recognition of the polycentric mega-city region, first recognised in Eastern Asia but now seen as an emerging urban form both in Europe and the United States. The paper speculates on the main changes that may impact on the growth and development of such complex urban regions in the first half of the 21st century, concluding that achieving the goal of polycentric urban development may prove more complex than at first it may seem.

Keywords: forecasting, city regions, spatial development

Une rétrospective et une prospective: la cité-région du milieu du 21ième siècle.

La notion de la cité-région, qui a vu le jour comme outil d'analyse important aux Etats-Unis aux alentours de 1950, est appliquée de plus en plus au contexte européen après 1980. Depuis l'an 2000, elle se développe suite à la reconnaissance de la mégacité-région polycentrique. Cette dernière a été reconnue pour la première fois en Asie de l'Est. Actuellement, on la considère comme une forme urbaine naissante à la fois en Europe et aux Etats-Unis. L'article spécule sur les principaux changements qui

pourraient avoir un impact sur la croissance et le développement de telles régions urbaines complexes pendant la première moitié du 21ième siècle. En guise de conclusion, on affirme que la réalisation du développement urbain polycentrique pourrait s'avèrer plus difficile que l'on n'avait pu prévoir au départ.

Prévision, Cités-régions, Aménagement du territoire

Blick zurück, Blick nach vorne: die Stadtregion in der Mitte des 21. Jahrhunderts

Das Konzept der Stadtregion entstand in den fünfziger Jahren als ernsthaftes Analyseinstrument in den USA und fand nach 1980 zunehmend auch im europäischen Kontext Anwendung. Seit dem Jahr 2000 hat es sich mit der Anerkennung der polyzentrischen Megastadtregion weiterentwickelt, einer Form, die zuerst in Ostasien anerkannt wurde, aber inzwischen auch in Europa und den USA als entstehende urbane Form angesehen wird. In diesem Beitrag wird über die wichtigsten Veränderungen gemutmaßt, die sich in der ersten Hälfte des 21. Jahrhunderts auf das Wachstum und die Entwicklung dieser komplexen urbanen Regionen auswirken könnten, mit dem Fazit, dass sich die Verwirklichung des Ziels der polyzentrischen Stadtentwicklung als komplexer erweisen könnte als zunächst angenommen.

Keywords:
Prognosen
Stadtregionen
Raumentwicklung

Mirando al pasado, mirando al futuro:
la región metropolitana en la mitad del siglo XXI

El concepto de la región metropolitana, que surgió como herramienta seria de análisis en los Estados Unidos alrededor de los cincuenta, se aplicó cada vez más al contexto europeo después de 1980. Desde 2000, ha avanzado aún más con el reconocimiento de la región policéntrica mega-ciudad, reconocida por primera vez al este de Asia pero ahora vista como una forma emergente urbana tanto en Europa como en los Estados Unidos. En este artículo se prevén los principales cambios que podrían repercutir en el crecimiento y el desarrollo de tales regiones urbanas complejas en la primera mitad del siglo XXI, concluyendo que lograr el objetivo de desarrollo urbano policéntrico podría ser más complejo que lo que podría parecer en un primer momento.

Keywords:
Pronóstico
Regiones metropolitanas
Desarrollo espacial

JEL Classifications: D84, E6, O3, R5

This paper serves two purposes. First, taking up themes in the editorial introduction, it analyses the concept of the city region in the academic and professional literature since its first emergence in the mid-20th century and its evolution into the "mega-city region" concept in the first years of the 21st. The city region concept has hugely changed the ways in which urban analysts seek to understand the changing spatial dynamics of urban areas; the mega-city region concept is about to have equally momentous intellectual implications. This first section is highly technical and analytic. Second, using this dual analytic framework, it speculates on the likely further development of the city region over approximately the first half of the new century. This second section, quite deliberately, is speculative, drawing in empirical work where possible, going beyond it where necessary. No attempt is made to introduce any formal forecasting methods, since the necessary research is not available. Rather, the argument will be developed that long-term spatial trends have proved fairly robust and are likely to continue thus in the future. This gives reasonable certainty, which is all that can be expected, that we can project these trends to produce a probable picture of the mid-21st century city region.

Throughout the paper, the primary emphasis is on trends in Europe, because of the relative richness of recent research on the European city region. However, parallels will be made with other highly-developed and highly-urbanised regions of the world: North America and Pacific Asia. Incidental attention will also be paid to the developing economies.

From City Region to Mega-City Region

The concept of a city region first appears in the classic work of Patrick Geddes, *Cities in Evolution* (Geddes 1915). In it Geddes argued that in certain regions of the world – particularly Europe and North America – individual cities and towns were already coagulating into so-called *conurbations*. It is however clear from Geddes' detailed descriptions that he saw this as a purely physical phenomenon. This concept was later adopted officially by the United Kingdom (in the Census definitions of conurbations), and in France (the similar concept of the *agglomeration urbaine*). In contrast, the modern concept of the city region is specifically not defined in physical or morphological terms; neither are such regions based on administrative units, though

administrative units must usually be used to define them. Rather, they are defined on the basis of what Manuel Castells (Castells 1989) has called the "Space of Flows": flows of people, information, or goods, on a *regular* basis, for instance daily commuting, or weekly shopping or reading a local paper. They are thus *Functional Urban Regions* (FURs).

The best-known example of such a system of regions is the American *Metropolitan Statistical Area (MSA)*: a functionally-defined urban region that extends beyond the physically-built-up area to encompass all the areas that have regular daily relationships with a core city. This originated in official nomenclature in 1949, in the *Standard Metropolitan Area* (later, in 1959, the Standard Metropolitan Statistical Area (SMSA); then, in 1983, the *Metropolitan Statistical Area* (MSA); then, in 1990, the Metropolitan Area (MA), and so widely accepted there as a statistical base; finally, in 2000, the *Core Based Statistical Area (CBSA)*, including Metropolitan and (a new concept) Micropolitan Statistical Areas. However, these are variants on a common concept which has remained the same for over half a century. In its latest (2000) manifestation, a *Core Based Metropolitan (or Micropolitan) Statistical Area* consists of:

- A *core area* containing a substantial population nucleus;
- Plus *adjacent communities* having *a high degree of social and economic integration* with that core;
- And comprising *one or more entire counties.*

Further:

- Each CBSA must contain at least one urban area of 10,000 or more population;
- Each Metropolitan Statistical Area must contain at least one urbanized area of 50,000 or more inhabitants;
- Each Micropolitan Statistical Area must have at least one urban cluster of at least 10,000 but less than 50,000 population;
- The county (or counties) in which at least 50 percent of the population resides within urban areas of 10,000 or more population, or that contain at least 5,000

people residing within a single urban area of 10,000 or more population, is the *Central County* (Counties);

- Additional *outlying counties* are included in the CBSA if they meet specified requirements of commuting to or from the central counties.

New England has no counties, so here, a similar set of areas is developed, using cities and towns: *New England City and Town Areas (NECTAs)*

This produces a total (at the last redefinition) of 362 Metropolitan Statistical Areas and 560 Micropolitan Statistical Areas. *Fig. 1* shows the MSAs at this last (2000) revision.

Extending the Metropolitan Area Concept to Europe

As long ago as 1968, work at the London School of Economics for the Royal Commission on Local Government in England (the Redcliffe-Maud Commission) adopted the American Metropolitan Area concept and applied it to South East England (G.B. Royal Commission 1968). But, applied to the actual task of reorganising local government, it proved somewhat of a Procrustean Bed: fitting reasonably well in the shire counties of midland England, it was less satisfactory in less densely populated areas like East Anglia, where the FUR does not produce a sufficiently large unit in terms of population to be efficient in providing local government services (Hall 1969). However, the concept was then applied nationally in studies that led in 1973 to publication in the book *The Containment of Urban England* (Hall et al 1973). There, too, it gave good results across much of the country but less satisfactory results in sparely-populated rural areas like Devon and Cornwall or the Lake District.

In 1980, Hall and Hay extended the concept to Europe. They defined and analysed data for a set of 539 uniform *Functional Urban Regions (FURs)* in western Europe, and a decade later a larger follow-up study by Cheshire and Hay, funded by the European Commission, updated and deepened the work for a set of 229 larger FURS in the then 12-member EC area, and conducted a further detailed analysis of a subset of 53 FURS (Hall and Hay 1980, Cheshire and Hay 1989).

This and subsequent work (Cheshire 1995, 1999; Cheshire and Carbonaro, 1996; Magrini, 1999), though updating the data base from the 1990 census round, had to rely on the original FUR definitions based on data from the 1970 census round or nearest equivalent. In consequence, over time the definitions became in many cases out-of-date and misleading. This was demonstrated in the work of the GEMACA group (IAURIF 1996) which showed for example that while the boundaries of the Paris urban region had remained relatively stable to 1991, those of London had expanded substantially. In the USA, the equivalent MSAs are regularly redefined on the basis of the latest Census and other data.

The Mega-City Region: A New Spatial Concept

This concept was taken up and further adapted in the POLYNET study (Hall and Pain 2006). POLYNET however seeks to analyse a new urban phenomenon, in course of formation in the most highly-urbanised parts of the world: the *Mega-City Region*. The term comes from Eastern Asia, where it was originally applied to areas like the Pearl River Delta and Yangtze River Delta regions of China, the Tokaido (Tokyo-Osaka) corridor in Japan, and Greater Jakarta (Lin and Ma 1994; McGee and Robinson 1995; Sit and Yang 1997; Hall 1999). It is a new form: a series of anything between twenty and fifty cities and towns, physically separate but functionally networked, clustered around one or more larger central cities, and drawing economic strength from a new functional division of labour. These places exist both as separate entities, in which most residents work locally and most workers are local residents, and as parts of a wider functional urban region connected by dense flows of people and information along motorways, high-speed rail lines and telecommunications cables. It is no exaggeration to say that this was the emerging urban form at the start of the twentieth-first century.

But MCRs are not exclusively an Asian phenomenon. Recent American work has identified ten 'megalopolitan areas' housing 197 million people, almost 68 per cent of the entire US population (Lang and Dhavale, 2005; Short 2007; Lang and Knox, this issue). Mega-city regions exist also in Europe. The outstanding European examples, analysed in the comparative POLYNET study (Hall and Pain 2006), are the Greater South East region around London, Central Belgium, Randstad Holland, RhineRuhr and

Rhine-Main in Germany, and Northern Switzerland. But many other parts of Europe have developed corridors of intense urbanization along major transport spines, as in the Rhône Valley below Lyon, or the Emilia-Romagna region of Italy. In a few cases (as in South East England) planning policy has played a conscious role in this; elsewhere, again, it seems to have been a spontaneous evolution.

The expression "Mega-City" may recall the earlier term coined by Jean Gottmann in his 1961 book, *Megalopolis*. But there is a subtle distinction. As defined by Gottmann, first in an article of 1956 (Gottmann 1956) and then fully in his celebrated 1961 study of the Boston-to-Washington corridor, Megalopolis was "an almost continuous stretch of urban and suburban areas from southern New Hampshire to northern Virginia and from the Atlantic shore to the Appalachian foothills" (Gottmann 1961, 3). That suggested a *physical* definition, like that of Geddes earlier: a continuously urbanized area. In response to criticism, Gottmann made it clear that he meant something different: Megalopolis was "the cradle of a new order in the organization of inhabited space" (Gottmann 1961, 9), defined in terms of Standard Metropolitan Statistical Areas; in other words a *functional* definition.

The Mega-City Region arises from a process of extremely long-distance deconcentration from one or more major cities stretching up to 150 kilometres from the centre, with local concentrations of employment surrounded by overlapping commuter fields, and served mainly by the private car. The precise spatial details vary from country to country according to culture and planning regime: in the United States, lower-density and less regulated with "Edge Cities" or "New Downtowns" on greenfield sites, exclusively accessed by the private car; in Europe, medium-density, regulated through green belts and other constraints, and centred on medium-sized country market towns or planned new towns (Garreau 1991; Scott 2001).

The POLYNET study analysed and compared the functioning of eight such regions in Europe:

a. *South East England*, where London is now the centre of a system of some 30-40 centres within a 150-km. radius;

b. *Belgian Central Cities* comprising Brussels and a surrounding ring of large- and medium-sized cities, with a high degree of interdependence and a total population of ca 7 million.
c. *The Randstad* in the Netherlands, encompassing the cities of Amsterdam, The Hague, Rotterdam and Utrecht, but now extending outwards to include the cities of Almere, Amersfoort and Breda;
d. *RhineRuhr* is one of the world's largest polycentric Mega-City Regions, embracing 30-40 towns and cities with a total population of some 10 million people, in this case with no obvious "core city".
e. *The Rhine-Main region* of Germany, encompassing core cities of Frankfurt am Main, Wiesbaden, Mainz and Offenbach, but extending widely outwards as far as Limburg in the north, Aschaffenburg in the east, Darmstadt in the south and Bad Kreuznach in the west;
f. *The European Metropolitan Region (EMR) Northern Switzerland,* an incipient "Mega-City Region" extending in discontinuous linear pattern from Zürich and its region westwards towards Basel;
g. *Greater Dublin*, within a 50-60 km. radius, but particularly northward along the Dublin-Belfast corridor;
h. The *Paris Region* represents a special case: through the 1965 Schéma Directeur, outward decentralisation pressures have been accommodated in new city concentrations within the agglomeration, with little impact on surrounding rural areas. But recent research shows that the region's economic core is not the historic Ville de Paris, but a "Golden Triangle" bounded by the city's western arrondissements; La Défense; and the suburbs of Boulogne-Billancourt and Issy-les-Moulineaux (Beckouche 1999, Halbert 2002a, b).

In the POLYNET study, Mega-City Regions are defined as aggregations of smaller constituent city regions: Functional Urban Regions, or *FURs.* These comprise a *core* defined in terms of employment size and density, and a *ring* defined in terms of regular daily journeys (commuting) to the core; the concept is very similar to the Metropolitan Statistical Area (MSA) widely employed in the United States Census and other sources, and used by Lang and Knox as building blocks. The *Mega-City Region* is then defined in terms of contiguous FURs, and is thus similar to the so-called Consolidated Metropolitan Statistical Area, CMSA, used in the United States.

Contiguity is the sole criterion. There may be functional relations (cross-commuting) between the constituent FURs, or there may not; this would emerge only in the course of the analysis. To be more specific:

> *Functional Urban Regions (FURs):* comprise a *core* defined in terms of employment size and density, and a *ring* defined in terms of regular daily journeys (commuting) to the core. *Cores* are defined in terms of NUTS 5 units (the smallest units for which published data are generally available), on the basis of: 7 or more workers per hectare*, and a minimum of 20,000 workers in either single NUTS 5 unit or in contiguous NUTS 5 units. *Rings* also use NUTS 5 units, where possible, and are defined on the basis of 10% or more of the residentially-based workforce commuting daily to the core[1]. Where they commute to more than one core, they are allocated to the core to which most commuters go.
>
> *The Mega-City Region (MCR):* These are defined in terms of contiguous FURs, and thus similar to the so-called Consolidated Metropolitan Statistical Areas (CMSAs) used in the United States.

The underlying hypothesis of the POLYNET study was that falling costs of transportation and (more particularly) communication, combined with new informational agglomeration economies, lead to the emergence of a highly complex "space of flows" (Castells 1989, 344) within the "Mega-City Region": there is a pervasive geographical deconcentration within these regions, from the heavily urbanized areas which form their cores, including most of the capital cities of North-West Europe (London, Paris, Brussels), with the most severe losses occurring where urban decentralisation is reinforced by industrial decline and the loss of port activities. The gainers are smaller metropolitan areas within the outer parts of the same regions, which have been among the fastest-growing urban areas in Europe; in the very largest and densest urban regions (South East England, Randstad Holland), there is a process of long-distance relative

[1] The threshold levels depend on the size of national building blocks – i.e. the size of NUTS 5 units. They required modification on the basis of local knowledge and experience.

deconcentration from the largest central cities to wide rings of medium-sized cities in the surrounding rural areas.

This process of "concentrated deconcentration" generates a progressive redistribution of functions: in the core city or cities, continuing concentration of higher-order service functions (financial and business services, design services, media, higher education, health…); in secondary cities, growth of more routine functions (R&D, high-tech manufacturing; niche roles, such as university cities) (Llewelyn-Davies 1996). The entire complex however achieves major agglomeration economies through clustering of activities, not in any one centre, but in a complex of centres with some degree of functional differentiation between them.

These trends reflect underlying economic realities. Globalization and the shift to the informational economy give special value to large cities as centres for efficient face-to-face information exchange. They are the locations of the major hub airports and the high-speed train stations; they also are hubs for commuter traffic. But they also experience some economic disadvantages: high rents, congestion, pollution, the costs of attracting middle- and junior-level staff. So certain activities ("back offices", R & D) tend to migrate outwards: to corridors leading to the airports, to suburban train stations, to country towns in the surrounding ring. Paradoxically, the more these central core cities succeed in the global economy, the more they will tend to irrigate the growth of other cities in their localities. Hence, logically, the development of polycentric Mega-City Regions around these principal cities.

However, the critical central feature of all such complexes is that their constituent parts are linked by flows: of people, of goods and – increasingly important – of information. The central feature of the POLYNET research was its attempt to measure and evaluate information flows in the knowledge economy - specifically, in the Advanced Producer Services (APS) - both through telecommunications and face-to-face, and both internal (node to node) and external. How are these flows of information reshaping relationships within these Mega-City Regions? In particular, are functional relationships between top-level and other centres changing? To what extent are these other centres dependent on concentrations of service industries in the top-level core cities? How far do lower-level centres in each region connect directly with similar places in other regions, bypassing the

top cities? How do these flows differ as between polycentric Mega-City Regions (like the Randstad or RhineRuhr) and more "monocentric" regions like Paris?

This is intrinsically difficult, because some of the most significant information – for instance, on telephone or email traffic – is commercially sensitive. In any case, it will tell us only about the sizes of the flows, not their content or, most critically, their quality. For this reason, quantitative data need to be supplemented and deepened by qualitative information derived from interviews with the agents who create the flows: a time-consuming and difficult research task, dependent on fine judgement (Pain and Hall 2007).

Forecasting the Future City Region

The question logically arises: how far are these deep-seated geographical processes likely to change during the coming half-century? Are there underlying structural changes – technological, economic, social, cultural – that could cause a basic disjuncture, a breach, with recent past trends? Or, in contrast, are there features that could actually exacerbate the processes, speeding them up?

Experience of previous exercises in forecasting (Wells 1902, Hall 1963, Hall 1977) suggests that forecasting tends to consist of two elements, one of which is relatively easy because it depends on long-term trends that are only occasionally shaken up by wars and other disasters, the other part of which is fundamentally difficult because it focuses on the very few key developments that will prove to change many if not most of the assumptions. These may be scientific, like the Human Genome project and its outcomes, which are still unfolding; technical, like the Personal Computer of 1976-81 and the World Wide Web of 1989-92; they may also be political, like the Russian revolutions of 1917 and 1990, or the establishment of the European Union in 1957, which change the entire shape of world affairs. They are inherently difficult to predict. John D. Barrow, Professor of Mathematical Sciences at the University of Cambridge, reminds us that, looking back fifty years, "None of the greatest discoveries in the astronomical sciences were foreseen…Perhaps scientists are as blinkered as the politicians and economists who failed to foresee the fall of the Iron Curtain and the

climatic implications of industrialisation … Nothing truly revolutionary is ever predicted because that is what makes it revolutionary" (Barrow, *New Scientist*, 18 November 2006, 36).

However, occasionally forecasters have achieved singular successes by imaginatively seizing upon key trends at their very outset. At the beginning of the 20th century, in a non-fiction work entitled *Anticipations of the Reaction of Mechanical and Scientific Progress upon Human Life and Thought* (Wells 1902), H.G. Wells foresaw both the coming of the motorways and their impact on space and location in Britain. All of the southern half of the country, he said, would become a single urban region, tied together by the motorways and by other "nervous connections". He did not get every particular right: he forecast pneumatic parcels tubes, instead we have different "nervous connections" in the form of fax and electronic mail. But he went on to argue that without the competition of motor traffic, "the existing type of railways" would be unlikely to "attempt any very fundamental change in the direction of greater speed or facility". A century later, all over Europe and in parts of Pacific Asia, railway systems have achieved an extraordinary renaissance in the form of high-speed trains: the Japanese *Shinkansen*, the French TGV, the British Inter-City 125s, the Italian *Direttisima*. During the 21st century, they promise to do what motorways failed to do: to shrink geographical space, and thus tie not only half of Britain, but much of Europe, into a single polycentric Megalopolis.

From this discussion, we can recast the argument of the second half of the paper. There are basic parameters, for the most part reflecting long and deep structural trends which are reasonably predictable. There is the possibility of a drastic event, whether natural or triggered by human action – global conflict, a pandemic - but the likelihood of this is impossible to predict. Relatedly, there is the possibility of a parametric shift because of a trend that results in a step function: over the next half century, the implications of global warming represent a probable example.

Basic Parameters

Environment

For the strong scientific consensus is that global warming will bring a shift in climate, making the climate of southern England or the Netherlands rather like that of Bordeaux today, or that of Northern Norway like that of Western Europe. That would be within the span of historic variation; historical geographers tell us that was the position about the time of the Crusades. This will change lifestyles, and may well speed up the processes of mass migration, increasing pressures to move out of a desiccating Africa into a temperate western Europe. But it will be accompanied by a rise in sea level that will, by 2050, begin to threaten many large coastal areas – London, the Dutch Randstad, New York, Tokyo, and many others – with inundation. There are possible ways of managing such a sea rise, actively being explored in the Netherlands: they are drastic, involving the deliberate flooding of substantial areas which would effectively have to be depopulated (Kolbert 2006). It seems likely that Dutch methods will be generally adopted in the low-lying North Sea areas where three of the mega-city regions of North West Europe are found. This has implications for the future outward expansion of these regions, for instance the Thames Gateway corridor east of London. It is likely to divert the bulk of the expansion into higher-lying areas, but it is unlikely to curb their growth overall.

Demography

One difficult question is the possibility of an extraordinary – and therefore difficult-to-predict – life-changing event such as a new plague or a new strain of drug-resistant diseases, marking a return to the days before antibiotics and penicillin. Avian influenza, mutating to humans, is presently the most obvious. There could be discoveries of new toxins with serious effects on health, long after they had taken effect on a mass scale (Blanc 2006).

More likely, almost to the point of certainty, is that – as an outcome of the Human Genome project and its continuation – there will be quantum jumps in our ability to treat certain kinds of disease, above all cancers, over and above the steady improvements that have been based on our current medical knowledge. Already, over the last twenty years of the 20th century, we began to see significant attacks on the big killers such as coronary disease, where the statins are having a major effect, and various kinds of cancer – for instance, brachytherapy for prostrate cancer, the main cause of death for old men,

followed by easily available drug treatments. The consequence could be an appreciable lengthening of the life span (Jha 2006). Francis Collins, Director of the U.S. National Human Genome Project, has predicted that "It is possible that half-a-century from now, the most urgent question facing our society will not be "How long can humans live?" but "How long do we want to live?" (Collins 2006, 36).

A first impact of these medical improvements, if indeed they transpire, would be on current population projections, which indicate substantial declines in the populations of a number of European countries (Hall and Pfeiffer 2000). In Europe, fertility in many countries and regions is already well below replacement levels and populations are firmly projected to begin to fall: between 2005 and 2050, in Italy from 57.5 to 48 million, in Germany from 83 to 76 million, across the EU from 455 to 432 million. In most European countries the rate of immigration necessary to counteract these trends, several million a year into the major European countries, is not conceivable economically or socially – though both the United Kingdom and Spain have seen rapid immigration from within the EU, taking the Spanish population from 40 to 47 million in only eight years from 2000 to 2008. With these notable exceptions, Europe faces the prospect of shrinking nations and shrinking cities, with severe consequences for rising costs of social services and falling tax revenues to pay for them. The same transition will occur drastically in China after 2015, when the working-age population will start to fall and the numbers of old people will start to rise: from 38% in 2005 to 58% in 2024, when fully three-quarters of all households will be childless; total population will begin to decline rapidly from 2019.

Medical advances may slow the projected rate of decline, but they are unlikely to reverse it in many European countries. In the process, they will generate a second consequence: the ageing of populations. In Italy, where by 2025 the median age will already be 50, between 2005 and 2050 the working-age population is projected to fall by 20% and the numbers of old people (65+) to rise by 44%, doubling the dependency ratio (numbers of old people to those of working age) from 32% to 67% in less than half a century. The position for Spain is even more drastic, for the entire EU only slightly less so. [[The rate of immigration necessary to counteract these trends, several million a year into the major European countries, is not conceivable economically or socially]]. This will further worsen the burden of dependency, through an increase in the "old old", the really

dependent and expensive-to-treat old. One obvious answer, adopted fully by the United States and more tentatively by the United Kingdom, is to raise and eventually abolish the mandatory retirement age, effectively releasing the increasingly-active "young old" to share the burden of catering for the "old old". At the same time, there is likely to be considerable geographical resorting of the population by age. Most notable, and already observable, is the migration of older retired people to areas of more favourable climate and lower living costs, as on the Mediterranean coast of Europe or the desert states of the United States, where they tend to form age-segregated colonies. This has been a major factor in the growth of extended mega-city regions like Phoenix or Las Vegas or the Texas Urban Triangle (Dallas-Fort Worth – Houston – Austin-San Antonio), which have enjoyed phenomenal rates of growth through the 1980s and 1990s – albeit somewhat restrained by the recession of 2007-8 (Knox 2008; Neuman and Bright 2008).

Sociology, Culture

Immigration, associated with the huge migration pressures that will be created along Europe's southern and eastern flanks, will almost certainly continue to bring flows of people, whether legal or semi-legally tolerated or illegal, into the neighbouring areas of low increase – above all the urban areas of southern, western and central Europe. The population of Spain increased by 5 million between 2000 and 2007, all due to immigration, mainly of young men from Africa and eastern Europe. The vast majority of these immigrants have gone into the major cities - London, Paris, Amsterdam, Madrid, New York, Miami, Los Angeles, Toronto, Vancouver – where they have already changed the overall ethnic and cultural composition of the population. Although diversity will increase almost everywhere, it will take an extreme form in these cities, with minorities forming a majority of populations: a position already being reached in some of them by the early 21st century.

The question then is whether cities can integrate these increasingly diverse populations. Exiling ethnic-cultural groups to live segregated from the mainstream in 1960s high-rise suburbs, where increasingly no one with a choice is willing to live, can prove a recipe for social disaster, as the French experience has so closely shown. The critical index here is the degree of such segregation, which we should be measuring across cities. New research in the UK gives encouraging news: between 1991 and 2002, in 48 out of 56

major urban areas in England, segregation declined, in six others it increased marginally, and in one of the two remaining ones the numbers were negligible anyway (G.B. Office of the Deputy Prime Minister 2006, 153). However, recent experience in the UK does not give confidence that this will axiomatically lead to a reduction in extremism.

Urban educational systems will play a crucial role here, integrating successive generations of immigrant children. As emphasized by Amartya Sen (Sen 2006), it will prove commonplace to adopt a double or a treble identity: we will feel ourselves both Dutch, or British, or French (and for that matter citizens of Rotterdam or Londoners or Parisians) and simultaneously European. But this could be compromised if urban schools become ethnically and culturally segregated, as appears to be happening in some European cities. These factors are relevant, because the degree of integration of urban societies will in part determine the rate of out-migration from them into surrounding rural areas, with significant outcomes for urban form and structure. Simultaneously with immigration from outside, as is already observable in European as well as American cities, there is a large compensating out-migration of older-settled, locally-born groups including the children of earlier generations of immigrants. The destinations will include distant climatically-favoured regions, but also the outermost parts of the mega-city regions of which these cities form the centres. Thus, there are likely to be increasing socio-cultural distinctions and divisions within these regions, as well as between them and the rest of their national territories.

Technology

The most important technological developments, as in the recent past, will occur in the field of Information and Communication Technology (ICT). Here the problem is to estimate the likelihood of really fundamental, or pervasive, technological change akin to the development of the integrated circuit or the internet. Two in particular would appear to promise fundamental prizes but to be highly uncertain: the development of direct man-machine interface ("Google in the Head"), representing a fundamental prosthetic aid to the human brain, and the creation of realistic three-dimensional synthetic environments (artificial experiences). Both would depend on fundamental scientific advances in physics and biology, not presently on the radar. But there are small-scale signs - for instance in the ability of computers to help remedy sensory loss – which

suggest possible ways forward. Ray Kurzweil, a member of an 18-stong team of scientists, entrepreneurs and thinkers convened by the US National Academy of Engineering (NAE) to report to the 2008 American Association for the Advancement of Science (AAAS) annual meeting in Boston, confidently forecast that "Intelligent nanorobots will be deeply integrated in the environment, our bodies and our brains, providing vastly extended longevity, full-immersion virtual reality incorporating all of the senses ... and enhanced human intelligence" (Jha 2008). Other experts appear more doubtful.

The significance of these advances, as with those that have recently occurred, lies in their impact on the pattern of human communication, above all the potential for substituting for face-to-face interaction. This is further discussed below.

Economy

The long process of economic and social change in progress for much of the last fifty years, certainly for the last thirty years, can reasonably be expected to continue. Its main components are the globalization of the economy, the transition from a manufacturing to an informational mode of production, the feminization of the labour force, the destructuring of firms and the development of flexible specialization, and the critical importance of both education and training for entry into the labour force. They are so commonplace that no extended discussion is needed. What is important, as elsewhere in this exercise, is to trace their consequences forward, particularly for the spatial organisation of economic activity.

Globalization and deindustrialization are an accomplished fact, converting national economies in the advanced urbanized world from ones with a sizeable manufacturing sector to one in which manufacturing occupies niche markets and the majority of the workforce earns a living by trading in information of one kind or another. There are now parallel pressures both to offshore service production and to substitute capital for labour in the informational services, reducing the demand for routine clerical labour. It will equally affect education, rendering much of the present teaching force redundant, though it should allow some of them to retrain to do the new jobs, which are producing

the new programs and offering personal interaction with students, both on-line and face-to-face.

There are indications of fundamental changes in urban employment patterns, with a "disappearing middle" of junior and middle-level clerical jobs, many occupied by women who in some cases have become the sole breadwinners in their households, and increasing numbers of highly-paid jobs in business services, including not only the commercially-related ones like law and accountancy and public relations, but also in the design professions like architecture, engineering and planning, fashion and industrial design; in high-level command and control functions; in the creative and cultural industries, ranging from live performing arts though galleries and museums to the print and electronic media; in education and research, health services for an ageing and health-conscious population, and tourism of both the business and leisure forms. They will be disproportionately located in the cities, even in the hearts of the cities. There will also be increasing numbers of unskilled minimum-wage jobs in the personal service sector, thus perpetrating and intensifying the unequal income distribution already evident, especially in major cities; research on London suggests that there, the top 10% of the income distribution are increasing their incomes much more rapidly than the rest, and so are drawing steadily away from the mean (Buck et al 2002).

A continuing question is the future of that section of the population – estimated as between 15 and 20% of the potential workforce – who so lack basic education that they become effectively unemployable. Here, attitudes play a major role: recent research in the UK shows that white boys from traditional blue-collar backgrounds are more prone to drop out of education than more highly-motivated ethnic minorities (GB Cabinet Office 2008). This is compounded by educational ghettoization: as schools compete more and more as rival consumer products, even encouraged to do so by policy (as in the UK), some of them are bound to fail and to start servicing only an extremely deprived and under-performing catchment area. Statistical evidence from England shows clearly that this educational apartheid is occurring particularly in the big cities where good schools compete to attract the best students (Sutton Trust 2005, HEFCE 2007, Dorling et al 2007). And this means that family background is compounded by neighbourhood effects, as working-class children, especially boys, become locked into a culture of low aspiration and low achievement (GB Cabinet Office 2008). One challenge for planning

will be to find ways of breaking up and dispersing such islands of concentrated deprivation. This is relevant because such areas generate very negative perceptions, helping to precipitate urban outflows from inner city areas to more affluent, increasingly distant, suburbs.

Consumption

Though such income inequalities are likely to persist, long-term trends suggest that across the developed world average incomes could increase three to four times by 2050. Assuming that consumption patterns and preferences remain constant, the average household of 2050 would then live like the very rich of 2000, with a large house or apartment, at least one car for every adult, and at least one second home, perhaps in some exotic and distant place.

The complication is that consumption patterns will have been altered by technology, in ways we cannot easily see foresee. An unimaginable wealth of education and entertainment will come directly into the home at the touch of a button. Providing such value-added services will become a major industry in its own right. But all this electronic information is highly unlikely to reduce the need for travel, for precisely the same reasons as suggested earlier for production. If someone watches an electronic opera or rock concert, that creates a desire to see and hear the live performance; buyers of Microsoft's computerized art gallery will develop an irresistible desire to see the originals in the Louvre or the Uffizi. As in production, so in consumption, the IT only in part substitutes for face-to-face; in part, it actually generates new demands for face-to-face. The spatial implication is that the growth of remote electronic consumption will do nothing to reduce the demand for direct consumption of cultural products, which are disproportionately concentrated in the largest (and oldest) cities. In Europe, urban tourism accounts for 35 % of international travel, with an annual average growth of 4 % over the last 10 years; according to the ETM (European Travel Monitor), urban tourism has a market share of 18% which is growing Europe-wide (European Commission 2000). Christopher Law shows that of more than 30 leading urban tourist destinations worldwide, virtually all are in old-established major cities, half of them in Europe (Law 2001, 10). Since this increases the demands on central urban spaces, the

likelihood is increased pressure on other activities (including permanent residences) to relocate to lower-cost peripheral locations.

Implications for City Regions: IT and Face-to-Face Communication

Thus a critical question, whether in the production or the consumption sphere, is the likely impact of e-communication on the need for direct face-to-face experience. Frances Cairncross's *The Death of Distance* (Cairncross 1997) does not mean the death of the city: the most critical exchange of information still occurs through face-to-face contact, as in conferences (Hall 2003). The people who market e-communication like to create a myth that we can now work anywhere. But this proves to be untrue in practice. Stephen Graham and Simon Marvin in their book *Communications and the City* show that for France, over a period of 150 years from 1830 to 1980, as telecommunication traffic grew, so did personal traffic grow in the same proportion (Graham and Marvin 1996, 262). That would be surely true, if similar data were available intercontinentally, internationally, or within another country: personal transport increases with electronic communication. Potentially, electronic services will reduce both the need and the desire to travel, and this almost certainly will mean that many people no longer need to work a five-day week or whatever the 2050 equivalent will be. We can already see this in the work patterns of free professionals like university teachers or consultants, who have become nomadic workers. And, as large corporations increasingly become virtual, subcontracting out many of their functions to specialist providers and providing hot-desk space for a residual peripatetic workforce, this process must grow exponentially. Already, in 2009 the typical professional worker might start the day with a couple of hours at home, go into a local hot-desk office for a meeting - or might equally well meet in a rented hotel suite, go on by train or air for a similar meeting and dinner in Europe, and then retire into a hotel room that is fitted up as a home office, from which he or she can communicate freely by any kind of information technology including videophone and instant access to any kind of information. But this will become more and more commonplace as more people join the informational class.

A paradox thus arises. Though the IT revolution will potentially reduce the need and desire for face-to-face contact, in practice it is likely to produce the reverse: the growth in information exchange will bring with it a necessity for more and more face-to-face. Therefore a key question is where this activity will happen. The answer lies in the locational demands of the advanced business services which dominate the 21st-century economy. These are part of Manuel Castells' "space of flows" (Castells 1989, 1996). In work comparing London, Paris, New York and Tokyo (Llewelyn-Davies 1996), we distinguished four key sectors of the metropolitan economy: Finance and Business, Power and Influence (Government and Corporate Headquarters), Tourism, and Creative and Cultural Industries; many key activities (hotels, restaurants; museums, art galleries; the media) occupy the interstices between these four sectors. And the study showed that although some activities move out, other activities grow to take their place *(Fig. 2a-d)*. Key global cities are now growing so remarkably because of the concentration in them of the key economic drivers: not merely in the advanced producer services, but also advanced consumer services (conferences; cultural tourism) which in practice are often difficult to distinguish.

We may make such face-to-face encounters in traditional city centres, or in edge city centres. All the evidence, even from high priests of cyberspace like Bill Gates or Bill Mitchell of MIT (Gates 1995, Mitchell 1995), suggests that city centres will retain their unique role in providing the most efficient locations for much of this activity, simply because of the accumulated weight of interrelated functions that have historically accrued there, and because radially-oriented transport systems focus on them, Again, limited empirical evidence suggests that the hierarchy of cities in Europe has not changed only in one or two significant respects (notably, the rise of Madrid) in the last forty years; as suggested later, Eastern European capital cities may well see similar rises in the overall hierarchy over the next half century, but otherwise the system is likely to change only slowly.

So the need is to understand how information moves in order to achieve face-to-face communication. Over longer distances it will continue to move by air, through the great international airports (Shin and Timberlake 2000). There is significant correspondence between this list and another from recent research by the GaWC (Globalization and World Cities) group, which shows the urban hierarchy of the

informational or knowledge economy (Taylor 2004). This is only to be expected. The main new technological influence is likely to be the development of the high-speed train system, which in Europe will be largely in place shortly before 2010, connecting cities in North West and West Central Europe, in Spain and in Italy - and will be completed during the following decade with linkages through the Pyrenees and the Alps (Hall 1995a, Hall 2009). This will carry conventional steel wheel on steel rail trains, capable of speeds up to 350 k/hr. (220 m.p.h.) on new dedicated tracks and about 200 k/hr. (125 m.p.h.) on older conventional tracks; this will represent an overland speed limit for the foreseeable future. Extensive experience in Europe and Japan teaches that these trains will take about 80-90 per cent of traffic up to about 500 kilometres and about 50 per cent up to about 800 kilometres; the most recent evidence from France suggests that these figures may be underestimates (Pepy and Leboeuf 2005, Pepy and Perren 2006). Further, given that they have been shown to produce a fraction of the CO_2 of equivalent flights, there will be the strongest possible environmental incentive to transfer to them for all but long-haul flights.

Thus in Europe, as early as 2020, high-speed trains will connect all the principal cities of Europe from Bari right up to Glasgow and Umeå, and virtually all traffic between key city pairs, up to at least the 500-km. limit – Madrid and Barcelona, Naples and Milan, Milan and Paris, Munich and Cologne, Cologne and Brussels, Brussels and London, Brussels and Paris, Copenhagen and Stockholm - will go by rail. The longer-distance traffic – southern to northern Europe, far west Europe to far east Europe, as well of course as intercontinental traffic - will largely remain in the air, and a critical planning question will then become the linkages at the airports between the two systems. Efficient and easy links between the two modes already exist at Europe's most advanced airports: Amsterdam, Frankfurt, Paris-Charles de Gaulle. These places are likely to become effectively new urban centres, as Dejan Sudjic (Sudjic 1992) has suggested, not only attracting conference centres, exhibition centres and hotels, but also becoming major shopping centres, as at London's new Heathrow Terminal Five. So they will compete with traditional downtown areas as business hubs.

There are two other recent developments that relate closely to the evolution of high-speed train systems. One, especially in Europe, is the regional metro: a network of fast trains connecting medium-sized towns, up to 100 km. distant, through city centres to

towns on the other side. Stockholm has developed such a system around Lake Mälar; Copenhagen-Malmö have built an international system via the new Öresund link, opened in 2000; London's Thameslink project will connect cities up to 150 kilometres distant; Switzerland is networking the entire country in this fashion. In Japan the extensive commuter rail systems around Tokyo and Osaka have a similar character, though they did not usually extend across city centres; in the United States the San Francisco BART system was designed to perform a similar function and may yet achieve it, if future extensions complete the original grand design. The other – first in the German city of Karlsruhe, in 1992, and now spreading to many other cities - is the development of tram-train systems, allowing urban tram (streetcar) networks to operate on railway systems which extend their radius widely into the surrounding region (Hall 2007, 2008). Together these act as agents – in effect, alternative technologies - for the development of a polycentric city region structure, whereby cities, towns and villages are connected to central inter-city high-speed train interchanges. Ironically, however, this structure closely resembles the concept of the Social City, in Ebenezer Howard's visionary book of 1898 (Howard 1898, 2003).

A critical question for this paper, clearly, is the precise effect of these new networks on urban form. Trains connect centres to centres; they always have been remarkable agents of urban centralization, unlike airports and orbital motorways which disperse functions centrifugally. The question is whether inner-urban or suburban stations can similarly act as development foci. The Japanese experience at Shin Yokohama and the Swedish experience at Stockholm Syd suggest they can; the UK is about to test the theory in the Thames Gateway stations at Stratford in east London and Ebbsfleet just beyond the London boundary. The result is likely to be the emergence of variants of Joel Garreau's Edge City (Garreau 1991), some such places being located at airport-to-rail transfer points, others serving as the points of relationship between high-speed trains and the outer ends of metropolitan transit systems. Precursors, in existence or about to be built, include Paris-Charles de Gaulle, Paris Marne-La-Vallée (Disneyland Paris), Amsterdam Zuid and Amsterdam Schiphol, Stratford International and Ebbsfleet International on the UK's High-Speed One. Serving as nodes for major new developments, they will compel urbanists to think about the words they use casually: centrality and urbanity.

Progressive European cities such as Freiburg (Germany), Zürich (Switzerland), Amsterdam (Netherlands), Copenhagen (Denmark) and Barcelona (Spain) have developed strong policies to maximise access to opportunities by walking and biking and public transport and minimising the need to use the car, giving priority to these virtuous forms of movement and deliberately subsidizing public transport while making private motoring much more expensive. These cities have mixed-use, walking-scale neighbourhoods linked by conventional public transport, including the regional metro systems mentioned earlier, or by new systems such as automated car travel (Cervero 1998). Extending this to the city-regional scale, the suggestion is that – at least in European Mega-City Regions - an urban settlement structure will emerge, suggested by the late Michael Breheny and the late Ralph Rookwood in the UK, or Peter Calthorpe in the USA: a beads-on-a-string structure, developed along strong public transport corridors (Breheny and Rookwood 1993, Calthorpe 1993), which recall Howard's vision of a century earlier.

However, the threat of global warming is hugely intensifying the pressures to develop a ZEV (Zero Emission Vehicle) at affordable purchase and running costs, and also an automated Personal Rapid Transit system vehicle which would act as an alternative to, even a successor to, the private car; in 2008, all the major producers are beginning to market such vehicles, and this can be only the beginning of a major change (Hall and Pfeiffer 2000). The resulting irony is that most of the objections to the motor car would then be removed, encouraging yet further decentralisation out of our cities, as Wells forecast in 1901. One particularly difficult problem for forecasting is to guess which of these contrary scenarios is more likely. At least until 2020, more likely beyond 2030, conventional cars are likely to survive and are likely to be the subject of ever more stringent physical and fiscal controls.

Implications for Urban Systems: The European Case

What might be the impacts of these developments on national or supra-national urban systems? And how might policy seek to shape the process? Europe presents a particularly interesting case. At the macro or Europe-wide scale, the dominant feature is the contrast between the Pentagon – the area bounded by London, Paris, Milan, Munich

and Hamburg - with its dense cluster of cities closely networked through air, high-speed-train and telecommunications links, and forming the cores of extensive mega-city-regions (London, Paris, Frankfurt, Luxembourg, Brussels, Amsterdam), and the "gateway" or "regional capital" cities in the more peripheral European regions, each dominating a large but less-densely-populated territory (Dublin, Edinburgh, Copenhagen, Stockholm, Helsinki, Berlin, Vienna, Rome, Madrid, Lisbon, Ljubljana, Budapest, Prague, Warsaw and Tallinn). These latter Cities invariably act as regional airport hubs, with a range of long-distance destinations (Copenhagen, Madrid) and as the hubs of sub-continental high-speed-train systems (Madrid, Rome, Copenhagen); they have a wide variety of global service functions, especially where they dominate linguistic regions (Madrid and Barcelona for Latin America). The larger ones have also spawned extensive surrounding city regions.

As Davoudi (2003) has argued, in Europe the concept of polycentricity is not merely an analytical tool; in the 1999 European Spatial Development Perspective, it has also become a *normative* concept, a principle to be achieved through policy intervention. And this is to be achieved at a European scale: policy should seek to divert growth from the cities of the Pentagon to more remote growth centres, the intermediate-size gateway cities that proved relatively dynamic in the 1980s and 1990s – not least because several of them (Dublin, Lisbon, Madrid, Athens) received fairly massive aid from European Union structural funds. But the paradoxical outcome is that while official policy has promoted urban polycentricity at the European scale, it has resulted in increasing monocentricity at the national scale, as national political and/or commercial capitals increasingly dominate the picture. This has been obvious in the cases of Dublin, Madrid and Lisbon in the 1980s and 1990s; it is equally evident for Prague, Budapest, Warsaw or Tallinn in the first decade of the 21st Century. As a result, during the coming half-century many of these cities also are likely to develop large surrounding mega-city regions.

Given this basic fact, as these extended city regions develop, experience from the older-developed ones suggests the wisdom of a policy of "deconcentrated concentration", guiding decentralized growth, wherever possible, on to selected development corridors along strong public transport links, including high-speed "regional metros" or even along true high-speed lines such as London-Ashford, Amsterdam-Antwerp or Berlin-

Magdeburg. These would not be corridors of continuous urbanization, but rather clustered urban developments, at intervals, around train stations and key motorway interchanges offering exceptionally good accessibility. Some could be at considerable distances, up to 150 kilometres, from the central metropolitan city.

But it needs to be emphasised, finally, that "morphological polycentricity", which refers to the regional distribution of towns and cities of different sizes, is not at all the same as "functional polycentricity", which refers to flows of information (business travel and communication, especially face-to-face) and the organization of firms. Interview evidence in the POLYNET study paradoxically suggests morphological polycentricity – as in Randstad Holland – may be associated with rather weak intra-regional functional linkages, while the very degree of global concentration in London (regarded as a monocentric area in the North West Metropolitan Area (NWMA) Spatial Vision), was found to produce the most concrete evidence of regional functional polycentricity. Yet this too is associated with uneven development, in the form of an east–west economic imbalance in South East England: the area west of London is found to contain many more independent nodes, with a greater degree of functional independence, than the area to the east. It is functional polycentricity that proves more significant, and it is not axiomatic that it yields either more competitive or more sustainable outcomes than its opposite, monocentricity (or primacy) (Hall and Pain 2006, Chapter 18).

At whatever spatial scale, spatial planning strategies cannot impose rigid blueprints. They can only suggest broad desirable directions; since the ESDP (in whatever form it survives by 2050) may well continue to be advisory, and the principle of subsidiarity will still apply, implementation will come mainly at national, regional and local levels. And there can be no firm guarantee as to outcomes: increasingly cities will compete directly in a global marketplace, and it can and should be no part of planning strategy to discourage this process. But the European Union will play an increasingly valuable role in coordinating efforts at these other levels, and in managing a variety of funds which can help shape them.

Conclusion

The Mega-City Region is the emerging urban form at the start of the 21st century and is likely, on all realistic scenarios, to become steadily more dominant in the course of the next half century. But that leaves open a number of important questions for spatial policy.

The first is that Mega-City Regions vary very greatly in location, scale, urban form and economic base. As the POLYNET study showed for North West Europe, some (South East England, Paris Region) are based on a single dominant core city; others (Randstad, RhineRuhr) are truly more polycentric in a physical sense, while others occupy an intermediate position between these two poles. Even more significantly, some (RhineRuhr, Central; Belgium) contain significant elements of the old manufacturing economy while others (South East England, Paris, Rhine-Main) have largely completed the transition to the new knowledge economy based on informational services. In parts of Europe (Northern England, Scotland, Rhine-Ruhr) it appears that central "core" cities are in course of making a successful transition while other smaller places are not. Here, between the growing economy of the core cities and the rural areas outside, from which many of the core city workers commute each day, old single-industry towns form a solid ring characterised by higher unemployment, lower Gross Value Added, higher deprivation indices and lower property values (GB DCLG 2006; Hall 2007). There is still an open question as to the future of these places. Perhaps, as some observers suggest – and as is observable in eastern Germany - they are destined to undergo long-term shrinkage (Leunig et al 2007; Mace et al 2004).

The second point is that, because of differences in scale and location, there is no necessary firm agreement as to the minimum scale necessary to constitute such a region. Thus, in North West England, spatial strategy calls for the recognition of three "City Regions" – in effect, Mega-City Regions: Greater Manchester, Merseyside (Greater Liverpool) and Central Lancashire (Blackpool, Preston, Blackburn with Darwen, Accrington and Burnley-Nelson-Colne) (Northwest Regional Development Agency 2006). But, while the first two are demonstrating positive economic transformation and falling levels of deprivation based on the recovery of their core cities, the third – which has no core city – does not. There is a suggestion here of a complex process of spatial

differentiation, manifesting itself as an "archipelago economy" (Veltz 2000, Dorling 2004): a few central islands dominated by the sharp peaks of the core city economies, and lower peripheral islands in perpetual danger of economic inundation.

The third point is that in such a pattern, wide bordering rural areas may effectively be brought into the orbit of the Mega-City Region, as more affluent urbanites continue to work in the cities (particularly the core cities) but reside and dispose of their incomes in rural locations. This however is an uneven process: research in the UK shows that the spatial orbit of more affluent professional and managerial workers, whether for residential search into the countryside or for entertainment opportunities back in the cities, is far wider than that of their lower-income counterparts (Harding and Robson 2006). We may therefore increasingly need to think in terms of a variable geometry when we deal with the spatial perceptions that help build these increasingly complex urban artefacts. And – again assuming no radical disjuncture in economic growth and income distribution - this complexity can only grow over the coming decades.

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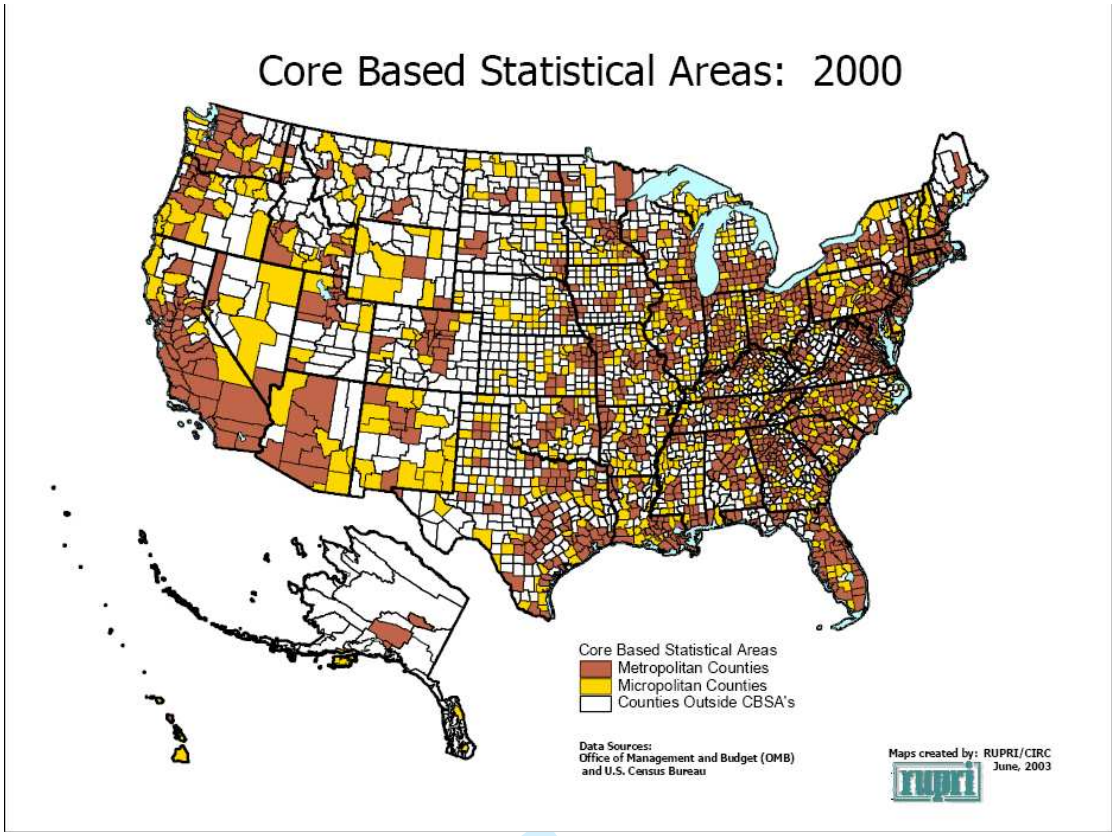

Fig. 1 U.S. Core-Based Statistical Areas 2000

Figure 1

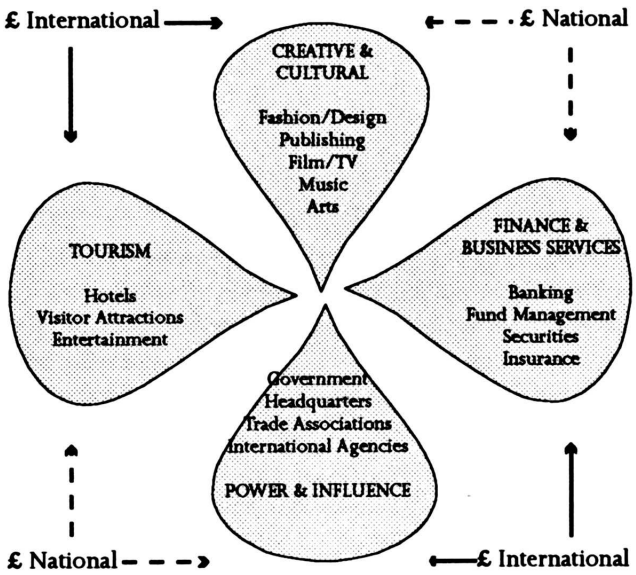

Fig. 2a Four Key Sectors in World Cities
Source: Llewelyn-Davies, UCL Bartlett School of Planning and Comedia 1996

Figure 4

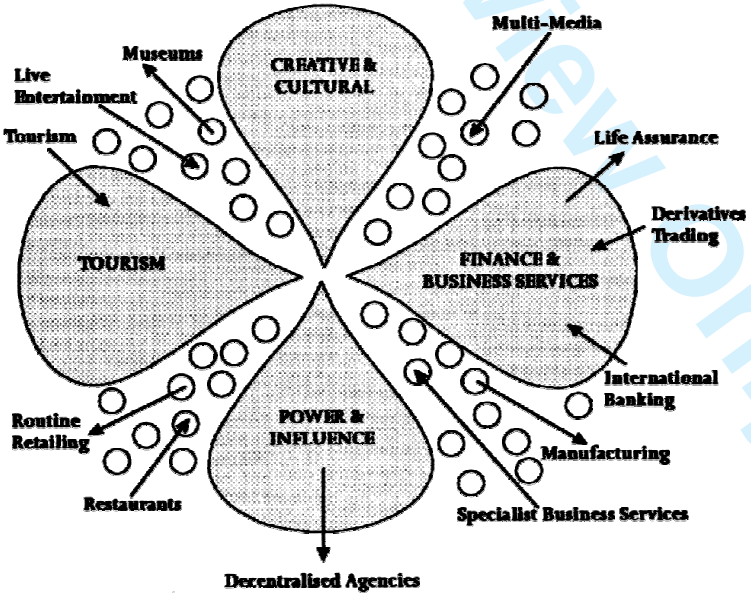

Fig. 2b Four Key Sectors in World Cities: Interstitial Activities and Trends
Source: Llewelyn-Davies, UCL Bartlett School of Planning and Comedia 1996