

E/ “HARD” POLICY INSTRUMENTS AND URBAN DEVELOPMENT

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1. Do communications matter?

How important is hard infrastructure, in the form of transport links and advanced telecommunications, in linking key metropolitan areas into global circuits of investment and trade? To begin to answer this question, it is necessary to understand precisely what is happening in the global economy, in particular within the advanced economies, and then to consider their implications for the location of economic activity.

The argument is occasionally advanced that current trends suggest no future for cities at all. Ten years ago Frances Cairncross predicted the “Death of Distance”: a world in which the traditional distance-deterrence effects, embodied in every locational model, diminish to zero and the entire world becomes a frictionless plain on which it is perfectly easy to locate any activity anywhere in Cairncross (1995, 1997). In such a scenario, everyone will be free to locate in the place that best suits their personal preferences and whims, intercommunicating freely and at uniform cost with every other person in the world. Because the long-term trend in advanced societies has been for people to migrate from city to suburb and from suburb to countryside, so this scenario runs, a huge dispersal of human beings and human activities across continents can be expected. Five thousand and more years of city-building will come to an end: the traditional advantages of the city as a place for doing business, and for living, will finally have been eroded.

The reasoning behind this argument is economic, technological and organisational. Economically, the balance of production in advanced economies has shifted sharply away from manufacturing and goods-handling and towards services, especially those that handle information. Manuel Castells has described this as the transition to the informational mode of production: a shift as momentous, in his view, as the shift from an agrarian to an industrial economy in the eighteenth and nineteenth centuries (Castells, 1989; Castells, 1996; Hall, 1995b, 1995c). This is not new: it was already recognised over half a century ago (Clark 1940); by 1991, in typical advanced countries, already by 1991 between three-fifths and three-quarters of all employment was in services, while between one-third and one-half was in information handling: for information, the proportions were 48 per cent for the United States, 46 per cent for the UK, 45 per cent for France, 39 per cent for Germany and 33 per cent for Japan. Typically these proportions have doubled since the 1920s in Castells (2000, pp. 304-324). The trends are very strong and consistent, so there can be little doubt that the proportions will continue to rise, so that by 2025 80-90 per cent of employment in these economies will be in services, and up to 60-70 per cent will be in information production and exchange.

The question then becomes: what exactly is the nature of the work performed in these informational services, and that does that imply for their location? Manuel Castells’ celebrated work speaks of the “space of flows”, the space where the information flows in Castells (1989, 1996). In research on Four World Cities, comparing London, Paris, New York and Tokyo, four key sectors of

the metropolitan economy were distinguished: financial and business services, both financial and non-financial (including the fast-growing design services like architecture, engineering and fashion); command and control functions such as company headquarters, national and international government agencies, and the whole web of activities that grows around them; cultural and creative industries including the live arts and the electronic and print media; and tourism, both leisure and business in G.B. Government Office for London (1996). These are highly synergistic; and many key activities (hotels, restaurants; museums, art galleries; the media) occupy the interstices between these four sectors. All four sectors essentially deal with the generation, exchange and utilisation of information in different forms. They relate closely to the cognitive-cultural economy identified in Allen Scott's paper for this conference. They cater simultaneously for local, national and international markets; the international business, though generally a minority share, is significant in providing an export base. Further, they merge rather confusingly with advanced consumer services (conferences; cultural tourism) which in practice are often difficult to distinguish. Some but not all of them are now exhibiting productivity gains associated with the injection of information technology, which is producing jobless growth. They offer a wide range of job opportunities, but – as stressed by Scott – there is a sharp tendency to polarisation: on the one hand there are what Robert Reich (1991) has called the symbolic analysts, performing jobs that require high formal education, professional training and interpersonal skills; on the other, there is a wide range of semi-casual and low-paid work in personal services, which offer no career prospects and are often unattractive as an alternative to welfare payments (Wilson, 1987, 1996).

Technologically, the cost of both personal travel and of telecommunications has dramatically fallen over the last half century, as the first jet airliners have been supplanted by the jumbo jets and as the internet has become the medium of preference for telecommunication. Telecommunications costs have fallen most dramatically: the cost of a three-minute call from London to New York, expressed in constant 1996 prices, fell from GBP 486.98 in 1927 to GBP 62.80 in 1945, GBP 12.46 in 1970 and GBP 0.52 in 1996 (Cane, 1996), and the Internet is effectively free once a flat fee is paid.

Organisationally, global corporations have exploited these technologies to extend into every country, crossing and increasingly ignoring national boundaries. But globalisation too is not new. Ancient Athens and Renaissance Florence were global cities for their worlds, as was London from the sixteenth century onward in Hall (1998). Thirty foreign banks were already established in London before 1914, 19 between the two world wars, another 87 down to 1969. Then the pace accelerated: 183 in the 1970s, 115 in the first half of the 1980s; in all, between 1914 and the end of 1985 the number of foreign banks in the City grew more than fourteen-fold, from 30 to 434. Both London and New York now had more foreign than domestic banks in Thrift (1987, p. 210); King (1990, pp. 89-90, p. 113); Moran (1991, p. 4); Coakley (1992, pp. 57-61); Kynaston (1994, 1995, *passim*). So the scope of globalisation has progressively widened.

But there are problems with the “death of the city” formulation. First, though it is undoubtedly true that the long-term trend is for both transportation costs and communication costs to fall, and even fall dramatically, they never quite diminish to zero, nor do they become spatially indifferent; it will always cost more to call New York than another part of London. The internet may appear to be the exception, but high-speed broadband access will always be unevenly available, with the highest-level access available in the major centres where there is the most demand. Long-distance personal movement has also fallen in cost, but less dramatically; and there are additional time-costs in being located remotely from major air or rail hubs.

There has been much discussion of the importance of tele-work. This seems to divide into two entirely different phenomena: first, call centres, which are highly agglomerated large-scale factory-style units, highly prone to off shoring to lower-cost locations and to replacement by web-based direct

access; second, part-time home-work on the part of professionals, a large and increasing proportion of the total workforce in informational industries and occupations, who may increasingly divide their working time among a three very different types of activity: quiet solitary work (reading, report writing); face-to-face meetings either in offices or conference-style settings; and electronic communication, which increasingly takes place almost anywhere. The first of these can be well performed in a well-equipped home office used for quiet work, and so can be - and often is - dispersed, even to quite remote (but accessible) rural locations. The second remains agglomerated, though not always in traditional central locations: a new archetype is the IBM building at Bedfont Lakes next to London's Heathrow airport, which consists of electronically-equipped hot desk facilities for short stays plus a variety of café-type meeting facilities. The third is performed in a variety of mobile working places such as conference facilities, trains, airplanes, airport lounges and hotel bedrooms -- and so is also agglomerated, but along lines of travel, including travel hubs -- which also, of course, are central locations for all kinds of tourism, including business tourism.

There is a basic reason for this continuing agglomeration: although telecommunications can substitute for personal movement, they can also complement and stimulate it. It was observable that the invention of the telephone, in 1876, was immediately followed by the development of concentrations of high-rise business offices in the centres of New York City and Chicago, together with the growth of commuter railroad traffic; paradoxically, the telephone had a concentrating rather than a dispersing effect on business Hall (1998, p. 770). This was explained by John Goddard, whose early work on London showed that the telephone was used for preliminary "programmed" contacts but personal meetings were used for more important discussions of an "unprogrammed" nature, where the outcome was uncertain in Goddard (1973). Evidence from France suggests that over a period of more than a century, roughly since the spread of the electric telegraph and the invention of the telephone, personal business traffic has grown at almost exactly the same pace as telecommunications traffic in Graham and Marvin (1996; Fig. 2). This strongly suggests that telecommunications of all kinds do not finally replace the need for face-to-face contact. Not merely the growth of personal business traffic by air and rail, but also the development of the conference/convention industry, suggest that this must be the case.

This continuing significance of face-to-face communication is surely true, if data were available, intercontinentally, internationally, and within a country: personal transport increases with electronic communication. All the evidence, even from high priests of cyberspace like Bill Gates or Bill Mitchell of MIT in 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 radial-oriented transport systems focus on them. The 1996 Four World Cities study showed that although some activities decentralise from the major cities, others grow to take their place (Fig. 1b). This is the basic reason why the economies of cities like London, Madrid, New York and Los Angeles are now growing so remarkably: it is that the economic drivers so heavily concentrate in these cities. The empirical evidence suggests that the hierarchy of cities here in Europe has not changed very much in the last forty years and will not change very much in the future.

Face-to-Face Information Transfer: Air and High-Speed Rail

So the need is to understand how information moves for face-to-face communication. Over longer distances it will continue to move by air, through the great international airports (Shin and Timberlake 2000). It is interesting to notice the correspondence between this list and another from recent research by the GaWC (Globalisation and World Cities) Programme at Loughborough University in England, which shows the urban hierarchy of the informational or knowledge economy (Taylor, 2004). The two are significantly very similar.

The main new influence is likely to be the development of the high-speed train system, on present plans largely in place shortly before 2010 (Hall 1995a). From the extensive experience in Europe, and in Japan, it is known 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 the competitive range of the high-speed train may be even greater because of its comfort and convenience for business travellers (Pepy and Leboeuf 2005, Pepy and Perren 2006). This means that by 2010, when the system will connect all the principal cities of Europe from Bari right up to Glasgow and Umeå, virtually all traffic between key city pairs -- Naples and Rome 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. These can already be seen at Europe's most advanced airports: Amsterdam, Frankfurt, Paris-Charles de Gaulle. The likelihood is that these places will become effectively new urban centres, as Dejan Sudjic suggested over a decade ago (Sudjic, 1992). They will not only attract a vast amount of business in the form of conference centres, exhibition centres and hotels; they are likely to become shopping centres in their own right, as you can see from the plans for London's new Heathrow Terminal Five. So they will compete with traditional downtown areas as business hubs.

Measuring Information Flows

Unfortunately, there is virtually no direct measurement of the impact of communications infrastructure on patterns of location of the advanced service industries. It is possible to relate the distribution of global air traffic to measures of the global urban hierarchy. There is virtually no research on the pattern of telephone and internet traffic and its relation to urban development, because of the lack of data. Partial studies have been made of individual cities, starting with the pioneering work of John Goddard on London over thirty years ago Goddard, (1973). Halbert (2004) has mapped telecommunications flows for the Ile-De-France using a unique data set from France-Télécom (Fig. 3); and Carlo Ratti has begun important work at MIT based on mobile telephone (cell-phone) data in Berry and Ratti, (2007 forthcoming). The POLYNET project attempted to map telephone and email traffic in North West Europe but the response rates were poor in Hall and Pain (2006). Insofar as patterns emerge, they suggest a strong concentration on the "First City" within each Mega-City Region, both of information flows within the region and of flows outside that region to other regions (Figs. 4-6).

Given this lack of data, researchers have sought to employ proxies for communications information flows. The most important recent work on a global comparative scale has been done by the GaWC group in Taylor (2004, 2005). They use the internal branch office structure of large multi-locational Advanced Producer Service (APS) firms as a proxy. Table 1, which shows the resulting hierarchy, bears a close resemblance to work on the hierarchy of global airports in Shin and Timberlake (2000; Table 2). Taylor and his colleagues have applied these techniques at a regional scale in the POLYNET project. Fig. 5 gives an illustration for South East England: it shows a degree of polycentricity, since some linkages bypass London, the "First City". The analysis was able to show structures at different spatial scales: critically, at the highest (global) level, the structure was much more primate than at regional or local level. Thus, within the Rhine-Ruhr region, Cologne recorded 99 per cent of Düsseldorf's local connectivity, but only 58 per cent of its global connectivity.

2. Where to invest?

How important are inter-city connections in raising economic productivity? Is there hard evidence, of the kind that would persuade economic advisers in government departments of finance,

that investment in new or improved links would have a demonstrable economic effect, over and above measurable gains in time or reductions in cost of travel? There is in fact very limited work on this question. An intensive review has recently been conducted in the UK as part of the review of transport policy headed by Sir Rod Eddington, supported by a commissioned research study in Eddington (2006a, b) & Crafts and Leunig (2005).

The Eddington Study: Main Conclusions

The report acknowledges that in national economies, transport networks have historically played a critical role in driving phases of rapid economic growth. Step changes in connectivity, often associated with new transport (and more recently communications) technologies, have been of particular significance. But in countries with well-established transport networks, giving good connectivity between centres, there is considerably less scope for such dramatic effects. Here, the report suggests, attention should be focused on the capacity and performance of existing domestic links, and the addition of new links to support the growth and performance of the labour market in growing and congested urban areas, through an incremental approach. Research suggests that it is important not only to consider the benefits from investment, but also the efficiency with which existing transport networks are used.

Internationally, the most recent phase of globalisation appears to be driven by a rapid expansion in global connectivity, provided both by new communications technologies, and falling international transport costs. The report argues that it is perhaps too early to judge whether this could represent another step change that will drive significant growth in the global economy.

Historical and macro-economic evidence can only take us so far. It is also important to understand what users value from the transport system; the mechanisms by which transport impacts on the economy; where transport may be the answer to economic challenges; and what the future implications are for the UK given its role in the world economy. The evidence is very clear that users value journey time, journey time reliability, cost, network coverage, comfort, safety and security. Improvement or worsening of these characteristics impact on the economy through a variety of mechanisms: increasing business efficiency, investment and innovation, improving the functioning of agglomerations and labour markets, increasing competition, increasing trade and attracting globally mobile resources.

Some of these microeconomic drivers are becoming more significant; notably the importance of reliability grows with wide-spread adoption of just-in-time management techniques; the importance of urban areas as centres of highly-productive service industry growth means an increasing role for transport in supporting agglomeration economies; and transport's role in facilitating trade and attracting and retaining globally mobile resources becomes ever-more important in a globalising world. A significant proportion of these economic benefits, from freight and business time savings, are already well captured. But current methodologies do not reflect other potentially significant impacts. Assessments of overall benefits on a project-by-project basis could in some cases increase by up to 50%, if new evidence concerning the importance of reliability and agglomerations were to be included in the appraisal of transport schemes. These are particularly likely to impact on interventions in highly agglomerated major cities. Furthermore, important international effects, namely transport's role in boosting trade and globally-mobile activity are strategically significant, but as yet unmeasured even with significant recent advances in appraisal techniques. The report recommends that transport strategy and appraisal should incorporate the full range of these effects as a matter of urgency.

Eddington concludes from the evidence that transport improvements aimed at tackling existing problems and shortages are most likely to offer real benefits. Particularly important here is that an

economy can become the victim of its own success because of rising congestion which dampens growth - particularly damaging in agglomerations or where they impact on the costs of doing trade, within the UK or beyond. So the key signals will be signs of economic success (economic growth, very high wages and land prices), plus signs of congestion and unreliability. “In areas without such clear signs, it is unlikely that transport is holding back productivity and growth. Without signs of congestion and high prices, any transport investment is likely to be high-risk in terms of delivering productivity and competitiveness benefits. The economic fortunes of areas which already have sufficient transport capacity to meet demand will not depend in any great part on transport improvements: such economies can continue to succeed without significant increases in transport provision. Even in less vibrant areas transport improvements will not turn around a local economy when adequate transport provision already exists. Instead, other policy measures will be important” in Eddington (2006a, p. 16).

The exceptions, suggested by economic theory, are:

- if transport improvements enable an urban area to grow the size of its labour market significantly, this may lead to agglomeration benefits; or
- if new connections open up access to genuinely new markets, this will deliver trade benefits, particularly when providing new global connectivity; or
- if transport improvements contribute to the global attractiveness of the UK as a place to live, work and invest.

However, the report stresses, projects aimed at achieving such goals should be approached with a high degree of caution. There is no substitute for careful cost-benefit analysis based on robust economic evidence and there are many examples around the world of projects founded on speculative demand forecasts, which did not deliver their purported economic benefits. Further research would be needed to understand the potential scale of these latent demands and the benefits may well be speculative. There is certainly enough for government to be getting on with in the meantime, to tackle the more certain looming challenges of congestion and overcrowding, where intervention offers far more certain economic benefits. Prioritisation of transport pending must mean focusing on those schemes where the economic benefits are more certain.

The Eddington study specifically asks what role transport can play in facilitating productivity benefits through agglomeration economies. It finds that the literature has been largely unsuccessful in answering this question. Its own assessment of the literature and analysis based on simulated models suggests that although transport alone cannot generate clusters, it can play an important role in facilitating their expansion by reducing travel time and costs, bringing firms, workers and consumers closer than otherwise would be the case. This is particularly the case for service industries which benefit from large, dense labour markets and proximity not just to similar firms but also to a variety of complementary firms – for instance City of London financial and trading businesses which make use of insurance and legal services. It concludes that firms would not tolerate such high-costs locations unless there were compensating productivity effects. Nowhere, however, does the study distinguish the effects of inter-city transport from those of intra-metropolitan transport (for commuters and clients); it appears implicitly to be thinking mainly about the latter: “Transport can therefore be fundamental to the future success of major urban areas and their labour catchments, by facilitating business to business interactions and reducing congestion on commuter links” in Eddington (2006b, p. 29).

The Eddington study thus fails to find any connection between transport investment and measures of economic performance, except perhaps to boost the performance of already-strong regions: "It is unclear whether a general policy of significantly improving the connections between a peripheral urban area and a core urban area through transport generates productivity benefits for both areas. A link between the two areas can result in a displacement of economic activity, with the core benefiting at the expense of the periphery, and with little or no impact on national productivity". The conclusion is that "a transport link is unlikely to improve an unproductive urban area unless there is underlying demand for this connection, and that productivity returns are likely to be greatest where there is demand for transport, as manifest, for example, through congestion" in Eddington (2006b, pp. 15-16).

Some international evidence

It is notable that this conclusion depends heavily on UK research at a broad scale, and appears to contract a great deal of evidence from more specific local evaluations of transport impacts – as, for instance, of the Japanese Shinkansen or the French TGV. The original Tokaido Shinkansen in Japan, which opened in 1964, has accelerated the growth of the major cities along the line, and speeded up the development of a megalopolis. Tokyo and Osaka, especially Tokyo, have generally been strengthened while the position of Nagoya, the main intermediate city, has been weakened in Kamada (1980, p. 48). On the TGV-Sud Est between Paris and Lyon, opened in 1981-3, similarly, the result is that the structural effects have been centred on urban poles and their immediate environs (Bonnafous 1987, 129). There is an historic imbalance between the economies of the two regions at the end of the TGV-SE line: Rhone-Alpes has half the population of the Paris region but only one-third of the production, one-fifth of the higher level services, and one-twenty-fifth of the headquarters of top companies in Bonnafous (1987, p. 131). Surveys show that high-level services in Rhône-Alpes have benefited by getting better access to Paris, while Paris competitors are happy to stay with their own market. Parisians have increased their journeys by 52 per cent to Rhône-Alpes to buy or sell a service, while inhabitants of Rhone-Alpes have increased theirs by 144 per cent in Bonnafous (1987, p. 136). Thus service industries, particularly consultancies, do not need to move to Paris, but can sell their services from Lyon in Bonnafous (1987, pp. 135-6). On the "new trunk line" of the European TGV, linking London, Brussels, Paris, Amsterdam and Cologne, a reinforcement or enhancement of the positions of London, Paris, Brussels, Cologne and Frankfurt and a weakening of intermediate places is likely to be seen; the sole exception will be Lille, because of its position as hub of the entire system. Places like Leeds, Manchester, Cardiff, Lyon and Stuttgart may also benefit so long as they are connected into the system, as the French are doing for Lyon. Recent Dutch research suggests that the system will increase the lead of Paris over all competing cities, but with London still in second place; Brussels will gain sharply; the British provincial cities all drop sharply in their relative scores in Bruinsma and Rietveld (1993).

The general effect is bound to be that cities in the European heartland - the "Golden Rectangle" bounded by London, Amsterdam, Köln and Paris, connected by fast train networks which have a natural advantage over air - will mutually benefit; and this effect may extend over a wider fringe area, approximately as far as Bristol, Birmingham, Dortmund, Frankfurt and Lyon. Beyond this, travel to and from the heartland will be predominantly by air; but fast trains may play an important role as regional systems focusing on such centres as København, München, Milano and Madrid. Both in the heartland and in these more peripheral regional nodes, there is likely to be increasing stress on good interconnection between longer-distance air and shorter-distance fast train feeds, because increasing air congestion may persuade deregulated airlines to invest in new train systems. Paris Charles-de-Gaulle and Lyon-Satolas have set the lead here; they will be followed by Amsterdam-Schiphol, København-Kastrup, Bruxelles-Zaventem, and perhaps Frankfurt and Berlin. This, again, may fortify the position of such air-rail hubs as European business centres.

Within the major urban areas, high-speed trains will reinforce the position of the city centres and will tend to restrain any tendencies to business decentralisation; but this may depend in part on the decision to develop an airport station, either as an addition to a central station or as an alternative to it. A critical question is whether new high-speed train stations can be used as the basis for urban development or regeneration efforts. On this, the evidence is ambivalent. There seems no doubt that new stations can stimulate local regeneration effects, both at the edge of the central business district and also in selected edge-city locations. Examples of the first are the huge Euralille development in Lille, the Part-Dieu development in Lyon, the Quartier-Lu in Nantes, and on a smaller scale at Wilhelmshöhe in Kassel, where in effect the old city centre has been displaced by planned regeneration around the new station. British Rail's first high-speed line, the InterCity 125 from London to Bristol, opened in 1976. The area around Reading Station 70 km west of London is now the third office centre in southern England after Central London and Croydon. However, office development was occurring even before 1976, associated with Reading's favourable position west of Heathrow, in the high-technology manufacturing belt that has come to be known as the M4 Corridor (even though the motorway was completed only in 1971, just five years before the train service opened). In Lyon, Part-Dieu is now the most favoured office location in the city, where total office space rose by 43 per cent between 1983 and 1990 (Sands 1993a, 25). In Nantes, a major regional centre in Brittany, located 380 km. from Paris, the city and private developers have collaborated to develop a mixed-use development incorporating a major conference centre and office park with about 592 000 sq.ft. (55,000 m²) on the 6.7 acre (2.7 ha.) site of an old biscuit factory (the Quartier Lu, officially the Quartier Champ-de-Mars-Madeleine), next to the new TGV-Atlantique station, which opened in 1990. However, like Reading and Bristol, Nantes was already a high-tech centre in its own right, and was proving attractive as a regional office location (Sands 1993b). On the other hand, the new Bruxelles-Midi station is located in an extremely depressed edge-of-centre area which has only recently showed signs of regeneration. In Lille a public-private partnership has built the Euralille Centre around the new TGV station, which opened in summer 1994 to coincide with the start of through Eurostar services via the Channel Tunnel; there seems to be no definitive evaluation as yet.

Outside the city centres, high-speed trains do nothing for the areas through which they speed; they have precisely the same impact as an airplane flying overhead. What is still in doubt is how far intermediate stations can be successfully developed in advance of demand, in effect creating their own development which in turn generates demand, either in greenfield locations or in edge-city locations. There is only fragmentary evidence on this point; there are relatively few high-speed railways, the oldest is less than 30 years old, and most are much newer than that. And in each case the effects are very difficult to disentangle from the effects of other phenomena. It is difficult to unpick the impact of the Shinkansen from the fact that the Tokaido Corridor west of Tokyo, through which it runs, is the crucible of Japan's high-tech revolution.

Speculation must therefore be built upon anecdotal evidence. At Bristol Parkway station on the first British high-speed line, 170 km from London, there has been extensive recent campus-type office development; but again, Bristol has been a successful high-technology industrial centre and a favoured location for decentralised offices because of its location on the M4 Corridor, and the site is close to the major interchange between two national motorways, the M4 and M5. On the other hand, the new station at Le Creusot, standing in a greenfield site, conspicuously failed to attract development in Sands (1993a, 25).

The most interesting cases are edge-city developments on the fringes of major metropolitan areas. At Massy in the south-west suburbs of Paris the local authority plans a huge European business centre around the TGV station which opened in Autumn 1993, serving the new Interconnection around Paris which opened in 1994; but, once again, this will exploit the fact that the site is gateway to the Cité Scientifique Ile-de-France Sud, the French equivalent of the M4 Corridor in Anon (1989a); Germon

(1989) & Pommelet (1991). Similarly, there is very extensive office and other commercial development at the other end of the Paris Interconnection, at Roissy-CDG Airport; but this is attracted to the airport location at least as much as to the TGV in Anon (1989b); Anon (1991a, 1991b) & Pommelet (1991).

But the most important cases, because the best-documented, are in Japan. Gifu-Hashima near Nagoya is a station on the Kodama service, opened in open fields some distance from the nearby city of Ogaki, capital of Gifu prefecture; it has developed modestly but not spectacularly on the intervening thirty years. In sharp contrast Shin Yokohama, some 25 miles south-west of Tokyo, was also a station in a green field, when it opened in 1964. Ten years later it had achieved a ridership of 15,000 a day, but then the figures fell to an average of 10,000 a day for the next decade. But then an underground station opened, cutting the journey to central Yokohama, four miles away, to 12 minutes. And then JR introduced Hikari super-expresses; nearly half of all the super-expresses, 48 out of 105 each day in 1990, stop here. In a mere five years ridership nearly trebled, to 27,000 a day in 1989, the fastest growth of any station on the entire system. The physical result is quite anomalous: half the site, on one side of the railway, is still a rather derelict green field defiled by scrapyards and similar uses, because local citizens have resisted development. The other is an Edge City of concentrated new office development, which is evidently the creation of the railway: about one kilometre long and one third of a kilometre deep in Sands (1993b).

Shin Yokohama makes quite clear the development potential of high-speed trains. The only question is how many such development nodes it is realistic to create along a single line. In the UK, the Channel Tunnel High Speed link to London, due to open in November 2007, has two intermediate stations, at Stratford in East London and at Ebbsfleet just outside Greater London in the country of Kent, both "edge city" locations as defined here. Major commercial developments are proposed and are about to start at both stations; the first played a major role in selection of London for the 2012 Olympics next to the train station, which are predicted to have major urban regeneration impacts. But it is interesting that at this site, earlier independent assessments of development potential have shown great variations in PIEDA (1993) & Hausner (1993). This illustrates the difficulty of predicting long-term parametric shifts in the pattern of development potential and resulting land values, arising from fundamental transport investments and/or major redevelopment schemes involving public-private partnership.

4. Is urban quality important for building "Creative Cities"?

Do the physical attributes of cities and the 'quality of place' –cultural and residential environments, and lifestyle advantages – matter in attracting the kind of high-level workers who are deemed critical in driving and servicing economic development? The research in this area tends to the anecdotal. There are a number of well-known studies that seek to measure urban quality of life, going back to the original Places Rated Almanac published in the United States since 1981. This achieved some notoriety when in 1985 it ranked Pittsburgh the most liveable city in the United States. It argued that this ranking was based on objective criteria such as low crime and housing costs, and its high arts, education and health care quality, and it has continued to rank the city highly, most recently at 12th place in 2000. However the city's economy has not been dynamic; rankings that include business performance tend to place it lower.

The Economist Intelligence Unit (EIU) periodically ranks 127 cities worldwide for quality of life, in terms of personal risk, infrastructure and the availability of goods and services.. In 2005 Vancouver scored top, followed by Melbourne, Vienna, Geneva, Perth, Adelaide, Sydney, Zürich, Toronto and Calgary. Notably, all the cities in the top "liveability" bracket were in Canada, Australia and Western (more specifically, Central) Europe. All, therefore, were in highly-developed countries with high

levels of GDP per head. However, it is notable that other similar countries (the United States, United Kingdom, France, Germany and Italy) had no representation. Notably, also, all were medium-sized cities, ranging in size from 0.5 million (Geneva) to 4.9 million (Toronto), the majority between 1.0 and 2.2 million (Table 3). There seems to have been no attempt to correlate these results with measures of economic performance, but all are affluent cities with high average personal incomes.

The Florida study

The most celebrated attempt to relate quality of life factors to economic performance comes from Richard Florida in Florida (2002). Florida argues that the entire nature of work in advanced economies has demonstrated a major shift: in the United States in 1999, the Creative Class numbered 38.3 million Americans, roughly 30 per cent of the workforce, against 10 per cent during the period 1900-1950 and 20 per cent in the 1970s and 1980s; a Super-Creative Core included 15 million workers or 12 per cent of the workforce against only 2.5 per cent in 1900. The traditional Working Class numbered 33 million workers, 25 per cent of the labour force, but has seen a decline since 1920 when it included 40 per cent, slow until 1970 and then declining sharply. The Service Class, numbering 55.2 million or 43 per cent, is ten times the number a century ago in Florida (2002, p 74). He further argues that the Creative Class has become a major factor of location in its own right: it chooses congenial locations in which to live, and in effect generates new economic growth in new places in Florida (2002, pp. 5-7). It is moving away from traditional corporate communities and Working Class centres like Pittsburgh and even from Sunbelt regions in the south, to a set of Creative Centres like the San Francisco Bay Area in California, Austin (Texas) and Seattle, not for “the physical attractions that most cities focus on building -- sports stadiums, Freeways, urban malls and tourism-and-entertainment districts that resemble theme parks -- [which] are irrelevant, insufficient or actually unattractive to many Creative Class people. What they look for are abundant high-quality amenities and experiences, an openness to diversity of all kinds, and above all the opportunities to validate their identities as creative people” in Florida (2002, p. 218).

Florida goes on to try to quantify exactly what gives such places a specially attractive milieu. He develops a dependent variable, the Creativity Index, which is a mixture of four equally weighted factors: (1) the Creative Class share of the workforce; (2) innovation, measured as patents per capita; (3) a High-Tech industry index; and (4) diversity, measured by the Gay Index, used as a proxy for an area's openness to different kinds of people and ideas. This puts the San Francisco Bay Area as the undisputed leader in creativity; other leading metropolitan areas include both established East Coast cities like Boston, New York and Washington DC, as well as younger high-tech places like Austin (Texas), Seattle, San Diego and Raleigh-Durham in Florida (2002, pp. 245-6). He produces some cross-correlations of rankings between the four constituent elements and the composite index, as well as other indicators such as the percentage of foreign-born immigrants and a “Bohemian Index” measuring the “number of writers, designers, musicians, actors and directors, painters and sculptors, photographers and dancers”, which he concludes is “an amazingly strong predictor of everything from a region's high-technology base to its overall population and employment growth” in Florida (2002, p. 260). He does not however produce regression results, nor is it at all clear what is supposed to cause what: the results could simply demonstrate that fast-growing regions are dominated by economic sectors that need large numbers of such creative individuals. It is of course quite likely that these areas are demonstrating complex dynamic agglomeration effects: growing activities attract talented workers who then in turn generate new activities and new growth by a process of circular and cumulative causation, in much the same fashion as Alfred Marshall described over a century ago in a celebrated passage:

When an industry has chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to

one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously. Good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organisation of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas. And presently subsidiary trades grow up in the neighbourhood, supplying it with implements and materials, organizing its traffic, and in many ways conducing to the economy of its material. (Marshall 1890).

Florida's work is based on American data and it is unclear whether it would produce similarly clear patterns if extended worldwide. Recent work for instance has compared the successful development of creative industries in London, Vancouver and Singapore, finding an explanation in the presence of a "traditional" or old urban structure in Hutton (2006). Yet Singapore does not fit easily into Florida's definition of the elements of a successful creative city.

An historically-based approach

An entirely different, historically-based, approach came from the present author in a study of six "creative cities" in Hall (1998): Athens in the fifth century B.C.; Renaissance Florence; Shakespearean London; Vienna in the eighteenth and nineteenth centuries; Paris between 1870 and 1910; and Berlin in the 1920s. The first three of these cities became culturally creative long before they proved very adept either at technological advance, or in managing themselves effectively. All enjoyed golden ages even while the majority of their citizens laboured in abject poverty, and even while most people lived in conditions of abject squalor - at least, by today's standards.

The literature offers relatively little clue as to where creativity happens, and why there. Only two contributions appear central: first, that of Hippolyte Taine, a nineteenth-century professor at the École des Beaux-Arts in Paris, who in his 1865 publication *Philosophie de l'Art* developed the concept of the artistic milieu: what he called "the general state of manners and mind" in Taine (1926, I, 55), producing a certain "moral temperature" that allowed a particular kind of talent to develop in one place at one time. This was something people acquired from long residence in a particular place, a kind of accumulated culture and style of life. The other comes from the Swedish geographer Gunnar Törnqvist, who developed the notion of a creative milieu in Törnqvist (1983). It had, he said, four key features: information transmitted among people; knowledge, consisting in the storage of this information in real or artificial memories; competence in certain relevant activities, defined in terms of the demands of an external environment, which can be instrument-specific or region-specific; and finally creativity, the creation of something new out of all these three activities, which could be regarded as a kind of synergy. He said that special kinds of competence can be attracted to certain magnetic places - the Vienna case, again. They need communication between individuals and between different areas of competence; so there must be a certain density of communication, which seems to require a rich, old-fashioned, dense, even overcrowded traditional kind of city.

Törnqvist further argued that such a creative milieu is quintessentially chaotic: it suffers from structural instability, like a river that enters a period of instability in its middle course. Another Swedish scholar, Åke Andersson, developed a very similar concept and uses the same river metaphor in Andersson (1985a, b). He lists six essential characteristics of such a milieu: a sound financial basis, but without tight regulation; basic original knowledge and competence; an imbalance between experienced need and actual opportunities; a diverse milieu; good internal and external possibilities for personal transport and communication; and structural instability - a genuine uncertainty about the future within the general scientific and technical environment. He quotes two classic instances but both from technological not cultural innovation. One, borrowed from Koestler's *The Act of Creation*,

is Gutenberg's invention of the printing press. This demanded an association between three disparate technologies, all already existing: wood block engraving, raised letters as on coins, and the wine press. Koestler describes the final breakthrough when Gutenberg attended a wine festival in Koestler (1975, 121-4). Neither he nor Andersson makes the additional point: that the breakthrough came because the region around Gutenberg's city of Mainz was (and is) one of Germany's major wine-growing areas. The other case was the Wright Brothers' realisation that structural instability was the clue to powered flight. It is perhaps not fanciful, again, to think that this was because of their experience as bicycle manufacturers. The key is the ability to transfer ideas from one circuit into another - for which, there must be many such circuits.

How far can these ideas help explain the six cases? There are some general lessons; but none that comfortably fits all the facts. These six cities varied enormously in size, but they were generally among the bigger and more important places of their time. They were generally rather unpleasant places, at least by the material standards of the early 21st century: even their haute bourgeoisie lived extraordinarily squalid lives compared to the average family in Europe or North America today.

What was important was that every one of these cities was in the course of rapid economic and social transformation, a city that in consequence had grown with dizzy speed. Athens can hardly be called a capitalist city, but it was the first example in the world of a great global trading emporium with a complex system of exchange arrangements. The others were all capitalist cities, but interestingly with strong pre-capitalist features: Florence and London were still essentially guild craft cities, Vienna and Paris likewise had strong atelier traditions; only Berlin was a fully-fledged capitalist manufacturing city. They were all great trading cities; in the cases of Athens, Florence and London, the true global cities of their time. And out of trade came new ways of economic organisation, and out of those came new forms of production. Their geographical position, as ports or as national or regional capitals, helped here; but this was no guarantee, because there were other similarly-placed places that achieved far less. In economic terms they were sometimes world leaders (Athens, Florence, London, Berlin), sometimes laggards (Vienna, Paris); there is no clear pattern. But all led their respective polities, these polities were large by the standards of their day, and that made them magnets for the immigration of talent, as well as generators of the wealth that could help employ that talent.

The wealth clearly played an important role. Athens was not a rich place, but by our standards its citizens had exceedingly modest personal needs, and there was wealth to spare; the other European cities were by far the wealthiest places in their respective domains, and - as seen - that wealth was concentrated in relatively few hands, usually that of the rising bourgeoisie and the more canny of the old aristocracy, who might [though not inevitably] intermarry. So it was true that, as D.H. Lawrence once said, culture was founded on the deep dung of cash. That meant individual patronage, but it also meant community patronage whether at the level of the city or [after the arrival of the nation in early modern times] the nation state. The role of the community was always vital, whether in creating the Florentine Baptistery or the court theatres of London or the Louvre or the Vienna Rathaus or the great Berlin theatres.

These were all high-culture cities, cities in which culture was fostered by a minority and catered for the tastes of that minority. Athens was the last case in history, or perhaps the last before mass television culture, where an actual majority of the population could share the same plays or poems; and even then, of course, the majority was a minority, because it did not include the slaves. But in any subsequent place and time, art had a bourgeois clientele. That had to imply a very unequal distribution of wealth, because that would be needed to foster individual consumption, and also to generate a surplus necessary for state support. So most creative cities were bourgeois cities - but the reverse is

not always true: by no means all, or most, bourgeois cities were creative; it was a necessary but not a sufficient condition.

So the presence of talent may be more important than the availability of wealth. And a notable feature is that recent in-migrants - sometimes from the countryside, but often from far-distant places, provided both the audience and the artists: the Metics of ancient Athens, the artists who came to Florence from the countryside or from further afield, the provincial musicians of Vienna and provincial artists of Paris, the Jews in fin-de-siècle Vienna. The creative cities were nearly all cosmopolitan; they drew talent from the far corners of the empires they controlled, often far-flung. Probably, no city has ever been creative without this kind of continued renewal of the creative bloodstream.

But these talented people then needed something, a stimulus, to react to. These were all cities in transition: a transition forward, into new and unexplored modes of organisation. Because these were all societies in economic transition, they were also societies in the throes of a transformation in social relationships, in values and in views about the world. As a huge generalisation, but one that works rather well, they all were in a state of uneasy and unstable tension: between a set of conservative forces and values - aristocratic, hierarchical, religious, conformist - and a set of radical values which were the exact opposite: bourgeois, open, rational, sceptical. "These were societies troubled about themselves, societies that were in course of losing the old certainties but were deeply concerned about what was happening to them" (Hall). Because of the influence of Marxist thinking, there is a tendency to associate the first set of values with medieval feudalism and the second with modern capitalism, but its more complicated: during the nineteenth century the bourgeoisie might become a brake on the development of new artistic forms and new values, as was evident in 19th-century Paris. It might take a near-revolution and a total breakdown of the established aristocratic-bourgeois coalition, as in Berlin after 1918, to generate the creative spark. So Törnqvist and Andersson appear to be right: creative cities, creative urban milieux, are places of great social and intellectual turbulence, not comfortable places at all.

What appears to be crucial is that this disjuncture is experienced and expressed by a group of creative people who feel themselves in some way outsiders: they both belong and they do not belong, because they are young or because they are provincial or even foreign, or because they do not belong to the established order of power and prestige; quite often most or all of these things. That label applies to the Athenian Metics, to the guild craftsmen of Renaissance Florence, to the young actor-playwrights of Elizabethan London, to the court musicians and later the Jewish intellectuals of Vienna, to the Impressionists and later the Cubists, to the producers and writers who flocked from the provinces into Berlin in the 1920s. Great art is not produced by insiders, even though the artists may be patronised by insiders (as many of these groups were) and may in consequence enjoy a fleetingly close relationship to them. A creative city will therefore be a place where outsiders can enter and feel that state of ambiguity: they must neither be excluded from opportunity, neither must they be so warmly embraced that the creative drive is lost.

They must then communicate their avant-garde notions to at least part of the class that patronises them: they must communicate their uncertainties, their sense that there is another way of perceiving the reality of the world. That demands a widespread social and spiritual schism in the mainstream society, wide enough to provide at least a minority of patrons for the new product. This is evident with the Athenians who heeded the doctrines of the Sophists and the playwrights who followed them, the Florentine burghers who commissioned the new naturalist religious art and finally had the temerity to put themselves in the pictures, the Elizabethan playgoers whether in the galleries at the Globe or in the royal playhouses, the Viennese concertgoers who embraced romanticism or their great-grandchildren who eagerly read *Die Fackel*, the Parisian bourgeoisie who bought Manet and later

Picasso, and their Berlin equivalents who flocked to Brecht's Theater am Schiffbauerdamm to hear their values parodied and attacked. So, once again, creative cities are almost certainly uncomfortable, unstable cities, cities in some kind of basic collective self-examination, cities in the course of kicking over the traces.

That means that there must be traces to kick over. Conservative, stable societies will not prove creative; but neither will societies in which all order, all points of reference, have disappeared. To a remarkable degree, creative cities have been those in which an old-established order, a too-long-established order, was being challenged or had just been overthrown; that was true, almost to a point of parody, of Vienna 1900, but it was only slightly less blatantly evident in the London of 1600, the Paris of 1860 or the Berlin of 1920. There is indeed something subversive about most serious art; it is likely to express the forces of discontent and unrest that challenge the old order of doing things and thinking things, and at the same time to help foster and give voice to those forces. That is self-evidently true of art with an explicit political purpose, such as Piscator's Berlin theatre; but it can be equally true of art with no such purpose or with a merely incidental political aim, such as most Elizabethan drama, Picasso's Cubist paintings or the work of the Viennese Sezession.

Is then the milieu purely a reflection of broad socio-economic forces in a particular place at a particular time, or does it spring from cultural traits that develop almost independently of the economic substructure? That proves a very difficult question. Athens' lead over the other Greek states can be explained in terms of Attica's central position and the consequent trading advantages within the eastern Mediterranean; but it seems difficult to express the scale of the difference. Likewise, fifteenth century Italy had developed as the most advanced part of Europe, and Florence as perhaps the most advanced city in Italy; but again, the Florentine achievement appears quite disproportionate in comparison with cities like Siena or Verona, let alone Bologna or Parma or Ravenna. It seems that an initial economic advantage is massively transformed into a much larger cultural one. So it is almost as if there is such a socio-economic explanation, but it is hardly enough to bear the weight of explaining why Athens or Florence should have developed so uniquely.

5. Have cities seriously addressed these issues in developing their strategic policies for economic development and regeneration?

There have been a host of initiatives in cities worldwide to try to create a new economic base as an antidote to the contraction of traditional manufacturing industry. These have consisted both in the attempt to create "technopoles" of high-technology industry based on advanced research and development (science parks, science cities) and in the creation of new galleries, museums, theatres and other cultural artefacts, sometimes associated with temporary one-off events like forums or designation as city of culture.

Technological initiatives ("Technopoles")

The first was exhaustively analysed by Castells and Hall (1994). Their conclusions are worth summarising in some detail.

Technology Parks aim to concentrate in a designated area a number of high-technology industrial firms that will provide jobs and skills, and eventually will generate enough income and demand to sustain economic growth, in a region that is seeking to survive in the new conditions of international competitiveness and information-based production. Their emphasis is on manufacturing, although some specialise in the R&D component of manufacturing. Governments aim to attract investment by private firms through fiscal incentives, offering facilities and productive infrastructure, accommodating specific demands from incoming firms, seeking to improve telecommunication and

transportation, helping the creation of educational and training institutions, and creating a favourable image, usually by improving the environment and staging public relations campaigns. Industrial competitiveness, rather than scientific quality, remains the fundamental goal.

Castells and Hall analysed three different cases that represent different contexts and different industrial structures. Sophia-Antipolis, on the French Riviera, combines the European branch establishments of multinational corporations, small and medium firms, and large public research centres and universities, under the auspices of public regional authorities. The "Cambridge phenomenon", built around the Cambridge Science Park in England, is a semi-spontaneous spin-off from a major research University, which gave birth to a technology-oriented complex consisting essentially of small and medium firms. The Hsinchu Science-Based Industrial Park in Taiwan illustrates a more deliberate national Government project to attract advanced foreign firms into a new area, built around national research centres and universities, in order to diffuse technology and industrial know-how into networks of local firms, as a way of upgrading the Taiwanese industrial structure.

Castells and Hall show that it is indeed possible to create new high-tech industrial spaces, even in relatively remote locations, such as North-Central Taiwan, or in previously under-industrialised regions, such as the Cote d'Azur or Cambridgeshire, given the presence of certain critical factors and the support of local, regional, or national authorities. Among the critical factors are the presence of research and training institutions, favourable tax and credit incentives, availability of industrial land, a local labour market with quality engineers and technicians, a good transportation system, and adequate telecommunications. Environmental quality, bureaucratic flexibility, and a good locational image also enhance the attractiveness of a Park.

Quite different, however, are the conditions for the "success" of a Technology Park. Most difficult of all is the creation of linkages and synergistic interaction between the Park's various components. In general, industrial high-technology Parks are made up of three components: public research centres and universities; large firms; and small and medium firms. Experience seems to show that the relationships between large firms on the one hand, and public and University research centres on the other, prove most difficult. They tend, as in Sophia Antipolis, to generate two different cultures, often secluded and sometimes hostile to each other.

Thus, the critical question for the generation of synergy proves to be the relationship between small and medium firms and each one of the two other components. When large firms link up with a network of small firms, as in the case of Sophia Antipolis' information technology complex, a new productive dynamism can appear. Such is also the case in the relationship between Cambridge University and a number of spin-off private firms in that city, and between ERSO's Electronics Laboratory and Taiwanese firms in Hsinchu. On the other hand, the isolation of the biology-pharmaceutical-chemical complex in Sophia Antipolis or the relative self-sufficiency of foreign electronic companies in Hsinchu provides evidence that the mere fact of location in a Technology Park does not generate synergy by itself. The differences are due to the diversity of firms' strategies, as well as to the stage of development of the Park at the moment of the location of the firm.

Another crucial factor is the role of government in the development of a Park. Without such support, it seems very unlikely that Technology Parks could ever develop in previously under-industrialised regions. In Hsinchu the Government was primarily responsible for the Park, as is generally the case in the Asian Pacific Region, the supposed epitome of laissez-faire economies. In Sophia-Antipolis, the initial impulse came from a public Grande École, with the support of the local authorities, and later received help from the national government and from nationalised companies, such as Air France, which were lured into the venture by the Government. Even in Cambridge, a

semi-spontaneous development spun-off from the University, industrial development was blocked for some time by obstructive local planning policies, and could only take off after the revision of the Cambridgeshire Development Plan in 1971 to follow the recommendations of a 1969 University report which advised the establishment of a "Science Park" in the area.

Thus, the role of Government and/or a University seems to be crucial for the establishment and growth of a Park. Yet the ability of the Park to generate new economic dynamism depends also on the awareness of Governments that they must let Parks grow primarily through private investment and entrepreneurial initiative. The greater the role of private firms in the development of the Park, as in Cambridge, the greater the chances of generating growth and innovation. At any rate, in these three cases, and in many more experiences around the world, Technology Parks that meet these basic conditions do create jobs and attract inward private investment, thus playing an important role in industrializing or reindustrializing regions.

But judged by the criterion of creation of an innovative milieu, few Technology Parks proved a success. Indeed, even the three cases above are only partial successes on this count. Economic and technological synergy requires the development of industrial linkages and information networks that took place only on a limited scale among small firms in Cambridge, in the information technology complex in Sophia-Antipolis, and between the Government Laboratory and small and medium firms in Taiwan. But in all three cases, the existence of a Technology Park in its various forms triggered a process of industrial growth and technological upgrading of the local economy, literally putting these areas on the map of the new industrial geography.

Science cities go a stage further: they are new settlements, generally planned and built by governments, and aimed at generating scientific excellence and synergistic research activities, by concentrating a critical mass of research organisations and scientists within a high-quality urban space. In some cases, they are intended to link up with industrial firms or to generate commercial spin-offs; in other instances, not so. But what characterises them, in contrast with other types of technopole, is their focus on science and research, independent of their impact on their immediate productive environment. They are generally conceived as supports to national scientific development, considered a positive aim in its own right, in the hope that better scientific research will progressively percolate through the entire economy and the whole social fabric. But they are also often presented as tools of regional development, intended to assist the decentralisation of scientific research, with all the prestige that involves, to the national periphery or, failing that, the metropolitan periphery.

Underlying the experience of science cities is the notion of the campus model as the spatial expression of research, innovation, and high learning. Given that in most modern societies scientific institutions are highly dependent on governments, their spatial location is often easier to manipulate than the investment decisions of private corporations. Thus, governments vowing to decentralise major functions from major cities and/or from traditionally dominant regions, are always tempted to exile research institutions to new areas, forcing them into the pioneering role of disseminating knowledge in the virgin lands - that is to say the uninformed territories - of the information economy.

The results are rich, diverse, and indeed contradictory. More often than not, they substantially depart from the intentions of their would-be creators; yet they always introduce new dynamics, both in their regional environment and in their internal working. One extreme case is the creation of a Science City under the conditions of total State control over research, industry, and spatial location: conditions that should favour the complete articulation of all the necessary ingredients of a synergy-generating science city. This case is Akademgorodok, near Novosibirsk, personally designed by Khrushchev in the late 1950s as part of his grand vision to develop Siberia into the future power house of Communism. A different case is a major project resulting from a direct Presidential decision to foster

science and regional decentralisation by building a science town in the President's native province: the Taedok Science Town built from the mid-1970s onward near Taejon, South Korea. Different again is the implementation of technocratic logic in building and developing Tsukuba Science City, near Tokyo, perhaps the best known Science City experiment in the world. Finally, there is the Kansai Science City, between Kyoto, Osaka, and Nara: a new urban form that brings together public and private organisations from the outset, and that moves away from the old locality-based concept of scientific city to introduce a new model of a linked, multi-nuclear development, apparently characteristic of the space of flows within the informational economy.

These four experiences provide some clues that help shape answers to the fundamental questions underlying the inquiry. First, it appears that spatial concentration of research activities has little effect on scientific innovation in the absence of a deliberate programme to favour synergy and of specific mechanisms to implement such programme. If there is no system to stimulate networking and cross-fertilisation, the science units located in the new area are as valuable only as the value of their individual members. If there is scientific excellence in the institutes established in the science city, research findings will undoubtedly emerge, but these will not necessarily be more far-reaching or more industrially applicable than if they had originated in a more traditional academic setting.

Indeed, in some instances, the fact of moving the research units from their original networks may hamper the quality of the research, by increasing their isolation vis-à-vis national and international scientific milieus. True, the improved working conditions and scientific equipment, which generally go hand in hand with the investments in establishing the science city, may help research activity. But such improvements might yield even more productive results if provided to existing units of academic excellence. The organisation of new research institutions may have a positive effect in breaking bureaucratic rules and in undermining the conservative ideology of established academic centres. Yet, unless new systems of research management and organisation are established, observation shows that, after a short period of time, old scientific vices are simply reproduced in the new science cities. In such conditions, research institutions, researchers, and research directors all carry with them the viruses of their own demise. By relocating without reorganizing, the old problems will not fade away.

Secondly, it would seem that the development of a Science City requires a fundamental impetus from the public sector: it must be anchored from the outset on the location of government and/or university research institutes. It is extremely difficult for private firms to take the initiative in such a risky venture without a strong commitment from government agencies, including the presence of government research institutes that provide a basis for reaching the critical mass of researchers and research activities in a given location. But the more a technopole is based on public research institutes, the more it is difficult to link up with industrial applications that make the research economically useful. While such linkages are still possible, they require the expansion of the original nucleus of public research institutes into the domain of private firms' research institutes, which alone will provide the channel for the commercialisation of research findings. The two-stage evolution in Tsukuba illustrates this analysis, with the private firms being called in by the government itself in the 1980s, after the initial failure of the public research institutes to generate sufficient research with direct industrial and agricultural applications. Thus, if the goal of a science city is to provide the research basis for economic productivity and competitiveness, it seems that the integration of public agencies and private firms at the very onset of the design is a precondition for future linkages between basic research, R&D, and industrial applications - as appears to be the case in Kansai.

Thirdly, it does not seem that in themselves science cities are powerful tools of regional development, at least in the absence of specific policies linking the information they generate to the local and regional economy. Both Akademgorodok and Taedok have remained exotic enclaves in their regional environment, actually condemned by local authorities as a waste of scarce resources,

unconnected in any way to the regional economy, generating few jobs, the most skilled of which go to scientists and technicians from other areas. Yet, if the conditions of regional development change, if the areas where science cities are located become dynamic in their own right, they can then make use of the scientific potential contained in their science cities. Thus, when the expansion of metropolitan Tokyo finally reached Tsukuba, this science city suddenly became an additional element of the multinuclear technopole that is emerging in Greater Tokyo. If the current tendencies of articulated regional development in South Korea end by integrating Taejon and the central area of the country, Taedok will certainly be an asset for the region.

Undoubtedly, Castells and Hall concluded, the presence of thousands of scientists and engineers in an area is a fundamental asset for the economic dynamism of that area in an information-based economy. But the science city will be directly productive for that regional economy only as long as it is materially related to its productive activities, through the integration of its knowledge and expertise into a network of regionally-based enterprises. It would seem, though, as if the efforts involved in designing and constructing science cities are too great in comparison with the value added they generate, be it in scientific excellence, in industrial applications, or in regional growth.

Japan's Technopolis programme is distinctive in its scale. It was a national plan, master-minded by MITI - Japan's Ministry of International Trade and Industry - to create an entire series of new science cities in the country's peripheral areas, in order simultaneously to promote new technologies and develop lagging regions. The plan sought to achieve this through multiple strategies: concentrating public and private research institutes, promoting hybrid technologies, upgrading local university labs, establishing technology centres, funding joint R&D projects, and providing R&D funding.

Combining elements of Silicon Valley and Tsukuba, and even much older garden city notions that the Japanese had imported from England early in the 20th century, the vision featured research universities, science centres (technocenters), industrial research parks, joint R&D consortia, venture capital foundations, office complexes, international conventional centres and residential new towns. Unlike earlier Japanese regional development exercises, it rejected public works projects in favour of a "soft" infrastructure of trained people, new technologies, information services, venture capital and telecommunications services. MITI however had another objective: to discourage offshoring, also known as hollowing-out, of the Japanese economy.

In selecting the 26 technopolis sites, the main emphasis was clearly on the peripheral regions; but the sites varied very greatly in their relationship to the dominant Tokyo-Osaka (Tokaido) axis: while a few, such as Kofu and Hamamatsu, are very close to and almost part of it, the majority are more than 300 kilometres from Tokyo, and ten are off the main island of Honshu - six on the southern island of Kyushu, two on the small island of Shikoku off western Honshu, and two on the northern island of Hokkaido. In terms of their size and population they were somewhat more homogeneous: areas ranged from 30,000 to 140,000 hectares; populations of the main (mother) city ranged from 175,000 up to 728,000, with most close to the middle of the range; most significantly, the targeted industries conformed closely to MITI's general priority list. And in every case, there was a significant research complex at the heart of the site, developed either out of an existing institute, or through creation of an entirely new centre.

Castells and Hall drew two main conclusions. First, in the majority of cases the programme had not been very successful in generating new activity. There was a distinction between the eight Technopolis areas within 300 kilometres of Tokyo - Utsunomiya, Kofu, Hamamatsu, Toyama, Koriyama, Asama, Yamagata, and Sendai-hokubu - and the rest. For the remaining seventeen sites, a Japanese assessment concluded that prospects are poor. The second conclusion is that even the limited successes mainly lie in promoting branch-plant type operations, which have little innovative potential.

and are highly vulnerable to the risk of off shoring. The programme has failed to achieve the original objective of a satellite city integrating R&D, educational facilities, and production facilities for high technology industry; decentralised firms have been mainly confined either to the making of parts for shipment to Tokyo, Osaka or overseas or to routine assembly, and very little technology transfer has occurred between incoming factories and local industries; university-industry links have failed to develop; there is a lack of "soft" infrastructure of R&D consortia, venture capital funds, and university research needed to drive the technopolises; R&D has remained in Tokyo and Osaka; inter-industry linkages are lacking; spin-offs are generally lacking; key workers have not been attracted; the fiscal burden on local governments is considerable; and off shoring continues apace.

This points to the underlying tension, or contradiction, between the two main objectives of the programme: national development and regional development. However, the Technopolis policy cannot be seen in isolation. It represents a very deliberate attempt - almost certainly, the most determined yet made by any major industrial nation - to pursue a concerted innovation-based regional policy. But it makes sense only in terms of an even higher national priority to shift the Japanese industrial base, away from exploitation of imported technologies, and toward a world role in the development of leading-edge high technology industry. What is still uncertain is how far these two policies can be made compatible. Other things being equal, an emphasis on innovation may well fortify the tendencies toward centralisation that are so evident in the Japanese (or indeed any) urban and regional system. The regional policy emphasis may try to harness the forces working in the opposite direction - particularly, the massive negative economic externalities that operate in the Tokyo area - but the result may merely be the development of a branch-plant R&D system, in which regional laboratories take their orders from Tokyo headquarters.

MITI would doubtless counter that by saying: time alone will tell. Certainly, the early 1990s were too early to reach a definitive judgement on a programme that was first announced in 1980, passed into law in 1983, began to operate in 1984-5 and is planned to achieve full operation just about now. What remains unclear is how a bottom-up regional policy can be grafted on a top-down centralised system of industrial management in the world.

Cultural initiatives

There has been no subsequent systematic study of the Technopolis programme, and no similar systematic comprehensive study of cultural initiatives. But a centrally relevant review is to be found in one chapter of the new book by Charles Landry (2006). He estimates that no less than 60 cities worldwide are currently claiming to be creative cities, twelve of them in Britain alone. But viewed more closely, most are concerned narrowly with strengthening the arts and cultural fabric and the creative industries. This, for him, is different from - though obviously related to - the critical issue, which is how to achieve a truly creative city. He gives specific individual examples of creativity policies in selected cities worldwide, deliberately leaving it to the reader to judge whether these are truly creative cities:

- *Dubai*. Here Landry expresses his own doubts: "Courageous, strategic, a place of visions, determined, motivated and focused are words one might use, but creative? That is doubtful" (Landry 2006, 341). Dubai deliberately aimed to diversify away from oil and usurp the lost role of Beirut as financial centre and transactional hub of the Middle East. It has invested prodigiously in a new airport, a metro system and huge land reclamation projects on which a new recreational complex and residential developments will arise. But it is a city of expatriates, without any sense of history, and is an ecological catastrophe. Above all, it simply is not creative in Landry (2006, p. 347). Yet it is being imitated elsewhere - above all in neighbouring Kuwait.

- *Singapore*. At the end of the 1980s Singapore deliberately embarked on a programme of cultural development. It has built the new Esplanade cultural centre, designed for major performances. Later it developed the Renaissance City project, ambitiously designed to make creativity permeate the lives of all Singaporeans. Landry concludes, however: “The Renaissance City strategy implied a completely different way of operating, but this has not occurred. The historical mindset that worked so well for the past has not adjusted. The notion of a creative city implies a level of openness that potentially threatens Singapore’s traditions of more top-down action” in Landry (2006, p. 354). Significantly, its “One-North” research park embodies the traditional Singaporean approach of investment in hard infrastructure. And, after embracing tolerance towards gays, in 2004 it cancelled a licence for a gay event. Landry concludes that “Singapore’s strengths embody its weaknesses...It is better at creating the containers than the contents, the hardware rather than the software” in Landry (2006, P. 360). In particular, “Singapore therefore oscillates between constraint and creativity...It has a desire to plan creativity as against creating the conditions in which creativity can occur” in Landry (2006, p. 360).
- *Barcelona*. Barcelona was not a promising place to develop a creative city strategy: thirty years ago, at the rebirth of Spanish democracy, it was a rundown industrial city. But it had a tradition of great design, out of which it sought to “create its identity as a designed work of art, from its architecture, street furniture and interior design to ships, bars and restaurants. Barcelona has become a cultural icon in itself – one of the few places where the city is a living work of art as distinct from a dead one” in Landry (2006, pp. 362-3). Then it went on to reconstruct the city starting from public space rather than housing, roads or offices, creating spaces of communication and gathering so as to foster conviviality and stage performances, with a revival of traditional public events. Finally, the city put culture at the centre of its policies, particularly stressing a combination of public design and big events such as the Olympics of the Universal Forum of Culture in 2004 (which, in Landry’s view, was not an unreserved success). All this was based on a Metropolitan Strategic Plan, developed in 1988, which included a so-called innovation and creativity “block”. In consequence the city has steadily moved up the hierarchy in terms of business ratings, so far so that it is beginning to compete with leading European cities like London, Paris, Brussels and Frankfurt; it has become a major tourist destination. But, Landry concludes, “Whether these add anything to the city’s creativity potential, however, is an open question” in Landry (2006, p. 368).
- *Bilbao*. Bilbao, for Landry, provides three lessons in creativity: long-term thinking, staying strategically principled though tactically flexible; standards of design; and the need to shift values towards openness in Landry (2006, 368). Its long-term *Perspectiva de 2005* dates from 1989, a decade before the Guggenheim, and was specifically designed to address the challenge of developing a new economy to replace its lost port and steel-making industry. In 1991 it set up a driving mechanism, *Metropoli-30*. This provides the vision, while implementation is in the hands of *Bilbao Ria 2000*, the key agency for physical renewal. This was driven by a whole series of investments in infrastructure and culture, all designed by internal architectural stars who could help create a “new centrality” for the city: “The levers to create this centrality include high quality design standards, iconic architecture, cultural facilities, advanced eco-friendly design and sustainability, attracting the headquarters of European-level organisations and developing global events” in Landry (2006, p. 372). There is a stress on shared vision, shared ambition and shared vision based on common values: “the way we do things around here” in Landry (2006, p. 372). The result has been huge investment, and has become the equal of places like Rotterdam and Birmingham as a business location. One key to achieving this, Landry concludes, was the

city's considerable budgetary autonomy – something that British cities, for instance, can only envy.

- *Curitiba*. Curitiba's global reputation -- it shares with Freiburg in Germany the reputation for the world's most ecologically concerned city -- has helped make it very successful economically, with a threefold increase of population in 35 years. Essentially it was the product of a group of activist architectural and design students – one of whom, Jaime Lerner, three times became the city's mayor. A key step came in 1965, when a master plan led to the creation of an Institute for Urban Planning and Research. "Like in Barcelona and Bilbao, this was a forward-looking thinking brain for the city" in Landry (2006, p. 377). Its approach was encapsulated in Lerner's phrase *urban acupuncture*: "identifying pinpointed interventions that by being accomplished quickly can be catalytic by releasing energy and creating a positive ripple effect" in Landry (2006, p. 377). They can be small actions by individuals, like the dentist who ended his day's practice by playing the trumpet at his window, or by the city, like the planting of the first of a million trees, which the citizens were asked to water themselves – and they did. Very fast approaches overcame inertia by completing projects almost before anyone could object. All kinds of smart incentives were developed, from the free food for poor people who collect material for recycling, to tax incentives for developers who include green areas. Further, importantly, three elements – planning, execution and administration – are handled by three different agencies – but the three interfaces constantly through weekly meetings.
- *Amsterdam*: a creative city over centuries, Amsterdam has been anxious to establish what it is creative for: "a creative city for the highly educated and prosperous upper class or a creative city for all the city's inhabitants" (q. Landry 2006, 383). But Landry has doubts whether the Zuidas (South Axis), the city's planned new business core, will have the necessary quality as opposed to the small-scale traditional structures preserved in the city's seventeenth-century core. And its policy of positively encouraging squatters to take over buildings and develop them as artist studio and performance complexes, is threatened by high rentals and local opposition – so much so that in early 2007, the squatters are threatened with wholesale eviction (*The Observer*, London, 14 January 2007).
- *Vancouver*, ranking as the world's most attractive city in the EIU 2005 ranking, Vancouver has since the early 1970s developed and implemented a clear framework for urban planning and design, based on making the urban core mixed use with shopping and residential as well as offices. This has been achieved through discretionary zoning, cooperative megaproject schemes, development levies, managed neighbourhood change and building intensification both around the central core, in the False Creek redevelopment zone, and also in eight regional neighbourhood centres, accessible via the region's splendid transit system. Here developers have received incentives for densification which in turn has allowed a very high level of investment in a top-quality urban public realm, very unusual for North American cities, demonstrating that it is possible for a city to go totally against the general grain.

Landry concludes that the aim of creative city-making is "to think of your city as if it were a living work of art where citizens can involve and engage themselves in the creation of a transformed space. This will involve different creativities: the creativity of the engineer, the social worker, the planner, the business person, the events organiser, the architect, the housing specialist, IT specialists, psychologists, historians, anthropologists, natural scientists, environmentalists, artists of all kinds and, most importantly, ordinary people living their lives as citizens. This is comprehensive creativeness" in Landry (2006, 385-6). In particular, he stresses, "Organization, management and leadership, with a control ethos and hierarchical focus, did not provide the flexibility, adaptability and resonance to cope

in the emerging competitive environment. Cities' atmosphere, look and feel were seen as coming from the industrialised factory age where quality of design was viewed as an add-on rather than the core of what makes a city attractive and competitive" (Landry 2006, 388).

Creativity however comes painfully to many established professions. "For the traffic engineer continuity and predictability are at a premium, as they are for the property developer. The lawyer thrives within a plethora of rules to be nit-picked to achieve clarity, Planners can project a future only with clear guidelines; they would prefer less instability. In fact most people and professions prefer order" (Landry 2006, 391). But the activities that dominate city economies today, often described as quinary, "emphasize the creation, rearrangement and interpretation of old and new ideas and information as well as innovation of methods in the knowing, gathering and interpretation of data. They are thus concerned with the reconceptualisation of thinking, concepts, products and services at different levels. This is the strategic realm of the creative city thinking" (Landry 2006, 392). The aim must be to create conditions open enough so that decision-makers can rethink potential in every aspect of urban life, from waste disposal to education.

A diverse population is critical for urban creativity, as it has been throughout history: cities need an influx of outsiders to bring in new ideas, products and services. Such diversity generates much of the life of the city, exemplified in street markets. Policies need to focus much more on these qualities of the urban experience rather than concentrating on purely physical solutions. Above all, they need to open out the process of imagination and decision-making, to encourage a "yes" rather than a "no" attitude. This means ensuring that as many different groups and interests as possible – the municipality, the universities, business interests, individuals with new ideas – can all be kept in constant interaction. Once this starts to happen, "the agglomeration of resources, talent and power accelerates and reaches a critical mass" (Landry 2006, 412); this explains why the world's great cities continue to maintain their position as creative places, but makes it more difficult for new entrants to compete.

Landry is of the firm opinion that what he calls soft creativity is the wave of the future. This involves thinking of solutions that go with the grain of the local culture, rather than believing in a technological fix to everything. Innovative places, those with a strong track record of technical achievement, may in fact hinder real creativity. Above all, "The creative city notion is about a journey of becoming, not a fixed state of affairs. When taken seriously it is a challenge to existing organisational structures, power configurations and habitual ways of doing things" in Landry (2006, 415). Clearly, in Landry's view, "hard" policy instruments have only a very tenuous relationship to this process.

6. Are national governments seriously linking their (a-spatial) macro-economic policies to their spatial development policies? How could they do more?

There are a number of key requirements, here:

Develop a national spatial strategy. It is an elementary point, but it needs stressing: national governments can link macro-economic policies to spatial development policies only if they have spatial development strategies in the first place. So the first essential is to develop a national spatial strategy that guides key investments in infrastructure (especially transport and communications) and in higher education, research and development and culture, while giving maximum autonomy for cities and city regions to utilise the opportunities thus offered to forge imaginative solutions that are tailored to the specific requirements of each place. Many nations – and also state governments in nations with Federal constitutions – have developed such strategies in recent years. The new German report *Perspektiven der Raumentwicklung in Deutschland* (Germany Bundesamt 2006) is an excellent

example, albeit only a first stage in the development of a strategy that will be developed over the course of 2007. In the UK, paradoxically, the devolved governments of Scotland and Wales have both published such strategies, while no equivalent exists for England. The Town and Country Planning Association established a high-level Commission to examine the case for such a Development Framework for England, which pronounced itself strongly in favour; introducing the report, its chair wrote:

"England isn't working to its full potential. Without a strategy to guide key infrastructure projects and national programmes, to set priorities – from rail to road investment, the location of ports to airports, the allocation of university research funding on an equitable basis – the country will simply drift directionless, reinforcing a belief, real or imagined, that the winner takes all" (Town And Country Planning Association 2006, 2).

Specifically, the Commission recommended the development of a *Development Framework for England (DFE)* that would:

- create a shared national infrastructure framework – of ports, flows and networks including education and skills networks on which all regions depend;
- manage the inter-regional impacts of 'local' decisions and region proof Government investment decisions;
- enable confident decision-making based on evidence at national, regional and local levels;
- demonstrate joined up Government spending and investment;
- ensure best value from the current level of Government expenditure, reduce duplication, and show how investments made in different sectors can reinforce each other;
- avoid the enormous time delays and costs in delivering major projects that arise because of the lack of an agreed national framework and priorities; and
- demonstrate how local and sectoral programmes of action add up to the required scales and directions of change sought by national policies for economic growth, social justice and the environment in Town And Country Planning Association (2006, p. 8).

A key Commission proposal was that planning decisions on nationally significant research facilities should be region-proofed as part of a public process to ensure that their regional development implications are highlighted and the benefits to regional development objectives are optimised. This was proposed to a UK Parliamentary Committee by Professor John Tomaney of the University of Newcastle upon Tyne, who pointed out that "prospects for development in lagging regions are partly dependent on decisions made by a plethora of national government bodies, which spend large amounts of public money but whose activities are rarely coordinated at the regional level. On the contrary, these organisations have an explicitly national mission, which can conflict with regional priorities. There is a case for much stronger region proofing of policies." In Tomaney, J. (2003) Memorandum to Select Committee on Office of the Deputy Prime Minister: Housing, Planning, Local Government and the Regions Ninth Report, House of Commons, London, q. Town And Country Planning Association 2006, 32).

Such an approach could be developed through a Planning Policy Statement for Major Education and Research Facilities, and the approach could be widened to apply to any major development of

truly national significance (Town And Country Planning Association 2006, 32). The Commission stresses that the effect should not be to direct investment to inappropriate places but rather to ensure central and local Government (and regional bodies) were able to offer clear and co-ordinated support for agreed regional development outcomes as opposed to region competing with region. A DFE would make regional priorities for such investments clearer and more explicit.

The Commission also proposed that major transportation investments – ports, airports and a new high-speed train line – should be consciously developed to assist the development of the lagging peripheral regions of England: an approach in direct contrast to that of the Eddington report, which suggests that such investments will prove sub-optimal and poor value for money in Town And Country Planning Association (2006, pp. 38-41).

Develop specific transport strategies to improve face-to-face communication. The key is to plan to integrate different transport modes: air (for longer-distance, especially intercontinental, travel), high-speed rail (for travel up to approximately 100 km. within Europe), regional express networks (S-Bahn systems) and local metro, so as to provide a “seamless web” of high-quality public transport. Such networks will best be developed at regional (provincial) level, though national finance will often be needed to invest in them, dependent on the degree of financial devolution in the country concerned.

Encourage development of strategies for polycentric Mega-City regions in lagging regions, especially to harness the growth of “core” regional cities in order to “irrigate” the economies of old one-industry towns around them. Examples include the Manchester city region in England and *Lille Metropole* in France. Transport strategies (see (2) above) will play a role here, in creating better accessibility for these towns to the wider national and international economies. But beyond that, specific triggers will need to be devised which will help such places make the transition from the “old” manufacturing economy to the “new” economy. The solutions here will need to be specific to each place, and will involve a great deal of creative imagination on the part of “crazy” urban thinkers; the example of “Madchester” in the 1970s is highly instructive: “dance culture and the gay scene remade this faltering industrial behemoth as a trend-setting centre, precipitating the city’s regeneration ... five creative entrepreneurs were crucial to the city’s club, music and gay scenes. It is no coincidence that, to this day, they are key players in shaping Manchester’s physical regeneration, economic development and transport strategy” in Walker (2007, pp. 20-21).

Encourage and help fund bold strategic schemes at municipal and city region level, in particular urban regeneration projects that exploit major opportunities arising from external events (e.g. the completion of a new transport link; a major one-off cultural or sporting event; the availability of a large tract of available land). There is abundant evidence in the literature that such actions can be transformative: La Défense in Paris and its relationship to the original RER Line A; the regeneration of London Docklands in the 1980s and 1990s; the continuing development of this strategy in the Thames Gateway scheme including developments at the new Channel Tunnel Rail Link stations of Stratford and Ebbsfleet; the new Amsterdam Zuidas development axis; the impact of the 1992 Barcelona Olympics on the regeneration of that city’s waterfront, and of the 2004 Forum on the continuing regeneration of the east side. Needless to say, the impacts are almost impossible to quantify in advance and some developments may fail to produce the expected results – though even then, it is vital to consider impacts over a time span of 10-20 years, i.e. over more than one construction cycle. But the recent evidence is fairly overwhelming that cities can restructure themselves, transforming relic or residual areas into dynamic places, if the right transformative actions are undertaken.

Develop approaches that incentivise cities to do better, particularly by competition for national (and international) funds for imaginative projects in the arts and cultural fields. These can include one-off events with a longer-term permanent spin-off, such as a Festival or Forum or International Expo or recognition as Capital of Culture, and more permanent projects. Examples of one-off events include Glasgow's year as European City of Culture in 1990, which essentially kick-started the city's renaissance as a centre for cultural tourism; the Seville International Expo of 1992 on the La Cartuja site opposite the city centre, which was the basis for an ambitious attempt to create a new high-technology research centre in Andalucia; and the Barcelona Forum of 2004, a kind of intellectual Olympic Games, which (it is claimed) brought millions of visitors to the city. Examples of more permanent projects are of course legion, including galleries like the Bilbao Guggenheim or the Lowry in Salford, Greater Manchester, new museums like the Imperial War Museum North in Trafford, Greater Manchester, or new or refurbished theatres outside major capital cities. These and many other efforts demand systematic evaluation to quantify what long-run difference they made to the economic fortunes of cities. Currently much of the evidence is anecdotal and may be unreliable in Landry (2006) asserts that estimates of visitor numbers at the Barcelona Forum were exaggerated); and there is certainly difficulty in arriving at a good comparative assessment; particularly of the additional effect that a particular investment may have triggered.

Concentrate on human capital. Successful places increasingly appear to be those with universities that attract able young people and then retain them after graduation, especially through an attractive urban ambience. But it will be crucial to retain these people when, after a few years, they begin to have children. Building apartment complexes in and around the city centres and the university campuses and quarters must be combined with family-friendly policies (housing, schools) in the middle and outer rings of the cities in Mace (*et al* 2004) & Nathan and Urwin (2006), so that cities retain their vital human capital resources within their boundaries rather than dissipating them in distant suburbs.

Develop policies to manage urban space so as to encourage creativity. Hutton's work on London, San Francisco, Vancouver and Singapore clearly establishes that new creative enterprises tend to start in low-rent premises in run-down "funky" areas close to city centres – but there is a danger that such areas become victims of their own success, as rent levels rise and the creative industries and firms are forced out of the area and even out of business, as demonstrated by Sharon Zukin over 20 years ago in Hutton (2004, 2006) & Zukin (1982). Managing such areas to restrain redevelopment is essentially a local matter for city planning, but is an extremely delicate and difficult business; national governments can guide them in this process and provide the right legislative framework for such local policies to become effective.

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