

*Chapter*

# 4

## **The Age of the City: The Challenge for Creative Cities**

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This chapter addresses the key needs that will confront cities seeking to compete in the new knowledge economy. The most successful are likely to be world cities that are already integrated in different ways with the world economy. These cities and their challenges were discussed during the World Cities Summit 2008 session on Urban Planning and Conservation: Planning for a Distinctive and Vibrant City. In the global marketplace for jobs and investments, there has been extensive effort to make the city more creative, distinctive and liveable. The paradigm of the creative city is centrally important in understanding how knowledge, applied through human intelligence, has been central to the success of great cities throughout history and continues to provide the vital element today.

### **FOSTERING THE CREATIVE CITY**

First, cities must foster the creativity of their citizens and attract creative people to live and work in their city. They need to learn from those cities that have been uniquely creative in the past, or are uniquely creative today. To take only Western or European culture, why was Florence so remarkable a place in the 15th century, or London at the end of the 16th, or Paris at the end of the 19th and the beginning of our century? Why in a different way was Manchester so remarkable at the end of the eighteenth century, or

Detroit around 1900, or Silicon Valley today? How exactly do these golden ages come about? Why is it that such golden ages do not last more than a few decades at a time? And why do so few cities have more than one such golden age? How is it that they fail to recapture the creative spark that once animated them? Perhaps most important, how do some cities occasionally bring off the trick? What forces are going to shape the fates of cities in the coming century — and what, if anything, can we as planners do about them?

The question is important for planners, because practical people, the ones whom John Maynard Keynes believed to be the slaves of some defunct economist, seem to be obsessed by the question of what we now call cultural industries. Nearly 70 years ago, in a marvellous essay, Keynes predicted that the world might eventually reach the position where we no longer need to care about the basic economic problem of survival that has plagued the human race since beginning of time, but are able at last to do only the things we find agreeable and pleasurable. He unforgettably wrote that we would face our “permanent problem — how to use ... freedom from pressing economic cares, how to occupy the leisure, which science and compound interest have won ... to live wisely and agreeably and well” (Keynes, 1972, p. 328). In the 70 years since he wrote that, in North America and Europe and other developed economies, we have almost arrived at that condition he described: we can guarantee at least a decent minimum level of existence. But, even Keynes never foresaw that these agreeable activities would themselves become sources of income and economic growth, generating new industries of a kind never known before. Rich, affluent, cultivated nations, above all their cities, can sell their beauty, philosophy, their art and their theatre to the rest of the world. During the 1980s and 1990s, cities across Europe — Montpellier, Nîmes, Grenoble, Rennes, Hamburg, Cologne, Birmingham, Barcelona, Bologna and Glasgow — have become more and more preoccupied by the notion that cultural industries (a term that 20 years ago no one would have understood, but that we no longer seem to think are anomalous or offensive) may provide the basis for economic regeneration. Culture, it seems, will fill the gap left by all the lost factories and warehouses, and will create a new urban image that would make cities more attractive to mobile capital and mobile professional workers.

But — and this is an important argument in the book I have written on this subject — it is not the only kind of creativity (Hall, 1998). Cities

have always been the places where human creativity flourished; from them came not only the world's great art, not only the fundamental advances in human thought, but also the great technological breakthroughs that created new industries and even entire new modes of production. Ever since cities became large enough and complex enough to present problems of urban management, they also became urban laboratories, places that developed the solutions — technological, organisational, legal or social — to their own problems of growth.

So, the fundamental argument is that we can distinguish three main kinds of urban innovation: first, cultural/intellectual; second, technological-productive; and third, a relatively new phenomenon in history, the marriage of the cultural and the technological. During the 20th century, the first and second types of innovation have tended to fuse together into the third. And we should expect this to continue into the 21st century.

### **THE ARTISTICALLY-CREATIVE CITY**

The six studies that make up the first part of *Cities in Civilization* (Hall, 1998) deal with cultural and artistic creativity. They are Athens in the fifth century B.C.; Renaissance Florence, between 1400 and 1450; Elizabethan London, the time of Shakespeare; Vienna during the 19th century, culminating around 1900; Paris between 1870 and 1910; and Berlin in the 1920s.

These cities became culturally creative long before they proved very adept either at technological advances, or in managing themselves effectively. They enjoyed their golden ages even while the majority of their citizens laboured in abject poverty, and most people lived in conditions of abject squalor — at least, by the standards of the 21st century. One question is why diverse urban societies should have set themselves this apparently odd order of priority. Another closely related question is whether this has anything to do with the kinds of urban societies they were.

There is not much in the conventional theory to explain the phenomenon of golden ages. There are, however, a few insights. One is France, where a now obscure professor of art, Hippolyte Taine, developed the idea of a creative milieu. Another is Sweden, where a professor of geography at the University of Lund, Gunnar Törnqvist, developed an identical idea (Taine, 1865; Törnqvist, 1983). They help to develop an

explanation, which runs like this: these six cities varied enormously in size, but they were generally among the bigger and more important places of their time. More important, every one was on a course of rapid economic and social transformation, a city that in consequence had grown with dizzy speed. Athens 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 precapitalist features: Florence and London were still essentially guild craft cities, Vienna and Paris likewise had strong *atelier* traditions; only Berlin was a full-fledged capitalist manufacturing city. They were all great trading cities; in the cases of Athens, Florence and London, they were the true global cities of their time. 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 them. But this was no guarantee, because there were other similarly placed cities 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. All we can say is that they led their respective polities and they 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.

Wealth is important. 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 however 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 DH 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 talent may be more important than the wealth. 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: just consider 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.

Talented people needed something to react to. Because these were all cities in economic transition, they were also societies experiencing a transformation in social relationships, in values and in views about the world. Most were in a state of uneasy and unstable tension: between a set of conservative forces and values — aristocratic, hierarchical, religious, conformist — and an opposing set of radical values: bourgeois, open, rational, sceptical. These were societies troubled about themselves, societies that were on the course of losing the old certainties but were deeply concerned about what was happening to them. We are prone to associate the first set of values with medieval feudalism and the second with modern capitalism, but it is more complicated: during the 19th century when the bourgeoisie might have become a brake on the development of new artistic forms and new values, as can be seen in 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.

What appears crucial is that this disjuncture is experienced and expressed by a group of creative people who feel that in some ways they are 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, the guild craftsmen of Renaissance Florence, young actor-playwrights of Elizabethan London, the court musicians and later the Jewish intellectuals of Vienna, the Impressionists and later the Cubists as well as 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, nor must they be so warmly embraced that the creative drive is lost.

They must then communicate their uncertainties, their sense that there is another way of perceiving the reality, to at least part of the class that patronizes them. That demands a widespread schism in the mainstream society, wide enough to provide at least a minority of patrons for the new product. 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 of the past and the stable.

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. Creative cities have been those in which an old-established order as well as a too-long-established order, was being challenged or had just been overthrown; Vienna in 1900, obviously, but likewise the London of 1600, Paris of 1860 or 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 help foster and give voice to those forces. That is self-evidently true of art with an explicit political purpose, such as Berlin theatre of the 1920s; but it can be equally true of art with no such purpose or with a merely incidental political aim, such as most Elizabethan dramas, Picasso's Cubist paintings or the work of the Viennese *Sezession*.

So, is 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 is a very

difficult question to answer. You can explain Athens' lead over the other Greek states 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, 15th 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. I could give other examples: it seems that an initial economic advantage is massively transformed into a much larger cultural one. It is almost as if there is such a socio-economic explanation, but it is hardly enough to bear the weight of explaining why an Athens or a Florence, should have developed so uniquely.

### **THE TECHNOLOGICALLY-INNOVATIVE CITY**

The technologically-innovative cities were in every sense different. Again, six cities can be considered: Manchester and innovation in cotton textiles around 1780, Glasgow and steamships between 1820 and 1880, Berlin and electrical engineering around 1870, Detroit and automobiles around 1900, the San Francisco Bay Area and electronics around 1950 and Tokyo in the same field in the last half of the century. They were not generally established cities, 20th century Tokyo was an exception; they were cities somewhat on the periphery of the established world, neither right at the centre (as the culturally innovative cities were) nor right at their periphery. They were middling cities, plugged into what was happening in the world much like world cities of today, but keeping their distance: they were emerging, upstart places.

The Japanese example apart, these case studies seem to show the continuing strength of bottom-up, individualistic innovation. The innovators were outsiders living in outsider cities. Most were middle class; though some of the early ones had little education, the majority was at least well grounded in basic technical skills. A surprising number were self-taught. All followed careers that taught them what they needed to know, in a related industry or field; they were well-grounded, so their success was no accident. They all relied on strong local networks, supplying specialised skilled labour and services, and creating a climate of innovation among

small firms, even individuals, who shared knowledge while they competed with each other. More closely analysed, as a number of commentators have recently emphasised, in the late 20th century there seem to be at least two, perhaps three, models of capitalism, with different attendant models of innovation: the American model of bottom-up innovation in a *laissez-faire* environment, and German-Japanese model of state guided capitalism. The integrated model seems to have faltered in the West, and now massively in Japan too: the verdict is not in, but it seems likely that bottom-up, small-scale, networked innovation will always be necessary for real fundamental economic change, the process of “creative destruction” that Joseph Schumpeter wrote about half a century ago.

The innovative places could all be called edge cities: more accurately, they were not at the centre but neither were they off the edge of the world altogether. All had some strong previous tradition that proved critical. They were not trammelled by old traditions or ways of doing things. Most had egalitarian social structures: they lacked old wealth and were not class-hidebound; they were open societies in which careers were open to talents. They shared an ethos of self-reliance and self-achievement; they tended to have open educational systems, or at least apprenticeship systems, with a stress on the practical uses of scientific knowledge. They might well have recently acquired wealth, in the hands of adventurous people who were willing to take risks. Many of the infant firms in these places seem to have started by catering for a local market whose characteristics they understood. It might be a consumer market, but often it was a market of related producers; in this case, there might be a chain of interactions in which the demand spurred producers to come up with innovative solutions to overcome problems.

Primary innovation does not seem to have been crucial, indeed of decreasing importance: what was important was the downstream innovation, tuned to the market. New entrants like Ford could achieve this; so could established Tokyo corporations. Local demand helped here, but it does not provide a satisfactory total application. One can say that there was something else: continuing ability to innovate and ally technical knowledge to the changing demands of the marketplace. Geography relates to industrial organisation. Theoretically, as examples like GE and IBM show, the giant bureaucratised corporations can exist on a self-contained basis far distant from the city. Yet Japanese corporations continue to lock into Tokyo and

its surrounds, apparently fearing the consequences if they move R&D too far from the city.

## THE CREATIVE-INNOVATIVE CITY

There is thirdly, and importantly, a hybrid form: a phenomenon I called the marriage of art and technology, which is exceptionally important to the argument, because it points the way to the 21st century future. It is in fact a 20th century story. It happened especially in the United States, and that is not surprising. America was not outstanding in technological invention, but it was unique in its capacity to turn inventions into commercially useful innovations. At a very early stage, it developed traditions of mass production of standardised consumer goods for vast mass markets: the American system of manufacturing. It allied to this a populist concept of culture and entertainment, far removed from the European patrician attitude that public corporations should give the masses what was good for them; out of this, for good or ill, came Hollywood and Tin Pan Alley as well as commercial radio and television. The stories of Hollywood in the 1920s, and of Memphis Tennessee in the 1950s, were both stories of entrepreneurs, flourishing in a uniquely open society. These entrepreneurs were able to reach new audiences. The American media revolution was created by classic Schumpeterian new men, who fitted the classic definition of entrepreneurship given by one such entrepreneur, Henry Kaiser: *Find a need and fill it*. They discovered huge markets for new products. The industry was always market-led, but in turn it led the market. In particular, it identified new mass markets — the turn-of-the-century immigrant communities in the cities, the bored and rebellious teenagers of postwar suburban America — and produced a new product that catered directly for their deepest emotional needs.

Almost certainly, it could not have happened in any other country. What is puzzling, however, is why this should happen in two cities so far removed from the cultural mainstream and from the original New York powerhouse of the mass media revolution. Such huge innovative capacity does not come easily. It can happen only in a society in extreme flux, where new socio-economic or ethnic groups are defining themselves and asserting themselves. New York in 1900, America's quintessential immigrant city, was one such

society, but it lost its touch, and its most successful entrepreneurs removed themselves to the opposite side of the continent.

Both the new industries existed in an uneasy relationship, half-symbiotic, half-hostile, with the forces that created them. Movies, once past their nickelodeon origins, were expensive, capital-hungry products that needed yet more capital to exhibit them nationwide and worldwide; so the industry was soon in thrall to the bankers. But the individuals who had forged it were archetypal small and opportunistic entrepreneurs. They retained the attitudes of their youth and they rebelled against their bankers. The resulting organisation of the industry, based on constant tension between producers and financiers three thousand miles apart, was in a sense logical; out of it came the legendary hostility between the two urban cultures, New York seeing Los Angeles as superficial and gimmicky, Hollywood viewing Wall Street as stifling and philistine, and the East Coast elite wishing a plague on both houses.

Oddly, Tin Pan Alley was essentially created by the same cultural-ethnic group as Hollywood. It grew up catering for a mass market it understood viscerally, because it was them. But it destroyed itself, because finally it could not come to terms with the generation gap: it became an industry peopled by old men, catering for a teenage market. Worse than that were the comfortable old men who had forgotten their origins, losing touch with the grassroots of poverty and alienation that had once inspired them. These grassroots were deep in rural America, in the one part that had retained deep folk traditions out of Africa and England and Ireland, ironically because it was too poor to share in the media revolution that New York and Hollywood had sold to the rest of America. New entrepreneurs who knew those grassroots, either because they had grown up with them or because they emotionally responded to them, filled the gap: a classic Schumpeterian situation.

Today, there may yet be another untapped market that no one properly understands or even knows. It may be the millions of children playing with their computer games. It may be adults bored with their everyday lives, and seeking solace in fantasy worlds as yet impossible to grasp. Someone will empathise with such a group and produce another industry, the outlines of which are still dim and uncertain. The likelihood is that this will happen in a special kind of city, a city in economic and social flux, a city with large

numbers of new and young arrivals, mixing and merging into a new kind of society. It sounds like London or Los Angeles, New York or San Francisco as well as many of the world cities that are connected and integrated with the world economy. The places that achieved the revolution the last time round could be the ones that achieve it next time. This might not necessarily be the case since there are no absolute rules in this ultimate game; time and chance can happen to come together in other cities too.

## **THE NEXT INNOVATIVE WAVE — AND ITS GEOGRAPHY**

The practical question now has to be: how will creativity manifest itself in the 21st century city? If there is to be yet another Schumpeterian burst of innovation, which may be beginning right now, and giving rise to a new long wave of economic growth based on new industries, what are the key new industries that will provide the basis for it?

There are at least three clear clues. One is the point with which this paper began: the huge expansion of the creative and cultural industries, which are no longer the playthings of a few rich patrons, but have become mass-consumption industries. The future Keynes predicted has arrived in the developed world, and during the next century it will happen in much of the now-developing world. In the UK, Andy Pratt has shown that the cultural industries employ nearly one million people, some 4.5 per cent of the workforce; they are as big as the construction industries, and of course they have grown far faster (Pratt, 1997).

The second is the one I emphasised earlier: that we are now seeing the convergence of artistic and technological creativity, two forms traditionally held to belong to different people and to opposite sides of the brain: Frances Cairncross calls such people “techno-bohos”, and more recently Richard Florida has captured the same concept in his study of urban creativity (Cairncross, 1997; Florida, 2002). We have already noticed two outstanding previous examples, both American. It is no accident either that the United States has so far proved equally outstanding in the new multimedia industries that are developing through the marriage of computing and telecommunications. The basic technologies are the Internet, developed in the 1960s by the American armed forces for military purposes, and the World

Wide Web, actually created in Europe by an Englishman, Tim Berners-Lee. Yet, again it has been American ingenuity that has developed the many commercial platforms, which have exploited the new technologies in the 1990s, such as Netscape, Yahoo and Google.

What matters here is not the basic technology but the uses that are made of it. Of course, the steam engine was important, but more important was the network of railways and steamship lines that were built on it, spanning continents, and finally the world as well as in turn producing the first global division of labour. Likewise, the internal combustion engine was a key invention, but what mattered was the vast apparatus of mass-produced auto-mobility that was erected on top of it and the phenomena that it then generated, ranging from suburbia to fast food. We need to ask: what are the industries, this time round, that will develop on top of the new infrastructure of the net and the web?

We can see some of them: tele-medicine and tele-health care, tele-education and tele-learning, online information services, electronic publishing, financial services, trading and brokering, tele-shopping, entertainment of all kinds (film, video, theatre, music, multimedia pop, animation, virtual reality, games), electronic sports and competitions and virtual reality expressions, security and surveillance, earth resources information, environmental monitoring and control, digital imaging and photography, data mining and processing. Most share a characteristic, identified by Manuel Castells as central: what he calls “the application of . . . knowledge and information to knowledge generation and information processing/communication devices, in a cumulative feedback loop between innovation and the uses of innovation” (Castells, 1989, p. 32).

Education is perhaps the most obvious of these applications, but the one with the most profound social implications. During the coming decades it will be transformed beyond recognition through the injection of information technology in every stage of teaching and research. As MIT professor William Mitchell puts it: “If a latter-day Jefferson were to lay out an ideal educational community for the third millennium, she might site it in cyberspace” (Mitchell, 1995, p. 70). In the UK, Douglas Hague has predicted that first-rate remote lectures will replace second- or third-rate direct ones; multimedia presentations will allow students to pace their own learning. Teachers will thus find themselves performing new roles: as “guides”

or tutors; “communicators/interpreters” on TV; “scholars/interpreters”, turning research into teaching material, and “assemblers” packaging this material into products; all working in teams, on the model set in the 1960s by the UK’s Open University. Healthcare will be similarly transformed, forcing physicians, consultants and nurses to learn new roles.

One group of applications is in no doubt at all in the media, where the digital-fibre optic revolution will generate virtually unlimited capacity to send moving images into a computerised box in the home, whether TV or PC and interactive broadcasting in the future. We can already see the revolution described by MIT professor Nicholas Negroponte in his book *Being Digital*: “broadcasting” is being replaced by “broadcatching” whereby everyone picks what they want from cables full of digital information (Negroponte, 1999). There is however, a third and extremely relevant clue to the nature of the new industries that will form the foundation of the new economy. This is the application of scientific research and development to meet the challenge of global warming by the development of new renewable energy sources. Here, Germany and its cities provide the classic case study.

At the start of the 1990s, it was one of the first countries to present a national timetable for reducing carbon dioxide. It fully signed up to the Kyoto treaty, with a pledge to cut emissions of key greenhouse gases by 21 per cent by 2012; in fact it had already achieved 18 per cent by last year. (The UK, it should be said, has done it as well.) At the March 2007 EU summit, it persuaded the 27 members to cut CO<sub>2</sub> emissions by 20 per cent by 2020, by increasing energy efficiency by 20 per cent and raising the role of renewable energy by 20 per cent: the “3 times 20” formula. But Germany has pledged to do much better: a 40 per cent cut, from 880 million tonnes to 270 million tonnes.

For Germany, this is a win-win formula. Historically, the country’s economic development came somewhat late, after unification in 1871, and was based on applying top-quality scientific research to what were the high-technology industries of their day: electrical and electronic goods, optical products like microscopes and cameras, chemicals, cars — many of which goods, like the motor car, they actually invented. *Vorsprung durch Technik*, the line that Audi so successfully used in their advertising in the 1990s, could have been a national slogan. After 1945, Germany lost the leadership in technological innovation to the United States and Japan. But companies

like Siemens or Jena or Mercedes remained much stronger than their British equivalents, and the German economy has retained a much bigger element of advanced manufacturing than those of other advanced economies.

Now, Germany sees a real prospect of achieving global technological leadership in new industries again, creating yet another industrial revolution. This time, the great economic driver will be environmental technologies: solar power, wind and wave power, energy conservation techniques. Germany's Renewable Energies Act came into force seven years ago and has triggered a frenetic response: already, 12 per cent of all the electricity consumed in Germany comes from wind, solar and water power. The government is backing the drive with three billion euros of additional spending over the next three years.

The result, to quote Burkhard Schwenker of Roland Berger Energy Consultants, is that "Germany is rapidly assuming the role of world leader in this field". On behalf of the Germany Federal Government, these consultants interviewed almost 1,500 German environmental technology companies and evaluated a number of other studies in order to compile an eco-atlas of Germany that was officially published at the European Union's environmental summit in June 2007. They conclude that energy and ecology-related occupations are becoming Germany's number-one job engine. His colleague Torsten Henzelmann says that "By 2020, this sector will be employing more people than mechanical engineering or the automotive industry". He calls it "the boom sector of the 21st century".

Companies' order books are full, boosted by the Federal Government's target to cut greenhouse gas emissions by 40 per cent by 2020. This year, the German Renewable Energy Federation (BEE) expects turnover to grow by 17 per cent compared to 2006 to a grand total of 32 billion euros. At the same time, 15,000 new jobs are planned in Germany this year. According to the BEE, approximately 214,000 people were already employed in the industry in 2006. A study conducted by the Federal Ministry for the Environment projects that 150,000 new jobs will be created by 2020. The background is that German companies are already market leaders and are now benefiting from the increasing global demand for clean and innovative energy technologies.

Burkhard Schwenker forecasts that by 2030, green industries could be generating a turnover of one trillion euros. And he cites the areas where

Germany has already attained the lead: it has the largest installed wind power input, has the most modern power station technology, and leads the world in the output of efficient household devices. Germany produces one third of all the solar cells and almost a half of all the wind turbines in the entire world. Renewable energy exports rose to six billion euros in 2006: a 30 per cent increase on the previous year.

The export potential is huge. Already, Germany is systematically promoting sustainable energy in the developing world: solar energy in China, wind power in Egypt and Morocco, hydro in Indonesia, biomass in Nepal, geothermal in Kenya. This kind of deal, long pioneered by France in areas like transport technology (TGVs in Korea and Taiwan as well as the UK and Spain), makes huge economic sense: once a technology is perfected, it can be confidently sold in the certainty that it will work without hitches the first time (the Channel Tunnel Rail Link), and that each iteration will generate progressive economies of scale.

All this is creating a huge demand for new qualified workers: engineers, mechanical engineers, chemists, physicists and project developers. They have to be produced, and the German government is busy at work on the issue. Sigmar Gabriel, Federal Minister for the Environment, launched a training initiative: *Umwelt schafft Perspektiven* (The Environment Creates Prospects) last year. It too has been a success: companies and employers' associations have already promised 5,100 new training places. Many universities and colleges already offer special programmes or options in this area within their courses. For example, degree courses in mechanical engineering often allow students to concentrate or specialise in fields such as renewable energy and materials technology, energy supply and renewable energies for power generation. Similarly, traditional courses in electrical engineering and information technology now frequently offer specialisations in renewable energies and electrical energy systems. Universities and colleges offer further subdivisions such as technical building services, energy plant technology, power engineering, environmental technology and wind energy technology. In addition, there are numerous further training courses on offer, such as a solar or energy consultant. The degree courses are modular in structure and usually last seven semesters. They are very practice-oriented: and practical work — experience within a company is usually part of the main study programme.

The German government recently completed an evaluation of their 4th energy research programme, covering the period 1996 to 2005, in the field of renewable energy. They conclude that Germany has the most successful research promotion in the field of photovoltaics, is second only to Denmark in wind energy, and comes in joint top position with Austria in low temperature solar power research.

This underlines a rare historic irony: Germany's original rise to world economic power in the 1880s and 1890s was based on its ambition to rival the UK and France and Russia as a global military power. The fairly direct result, in 1914, was World War One. The indirect result, following the fiasco of the Versailles treaty and the rise of Hitler, was World War Two. Now, one could fairly say, we are witnessing the beginnings of World War Three. But this is a war like no other: it is a war of humanity itself, in a desperate struggle to save the world it inhabits.

## IMPLICATIONS FOR CITIES

What are the implications for the location of the economic activities that will form the core of the new knowledge economy? One point is certain: reports of the death of the city have been much exaggerated. We sometimes hear the argument that cities have no future at all. Frances Cairncross has 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 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 (Cairncross, 1997). Yet although telecommunications costs have fallen spectacularly and the internet is almost frictionless, it is surely significant that the leading cyber-gurus have finally rejected this hypothesis.

In fact, significantly, some of the key locations for the new industries are the cities: Los Angeles, San Francisco, New York City and London. That is because the development of new ideas demands serendipity and synergy between minds, and it is easier to find this in great cities. It is also because there is a special relationship between multimedia and other activities that have always been clustered in great cities: the media, including the live performing arts, advertising and public relations, and tourism.

As many civic leaders have found to their cost, cities, at least in the developed world, are no longer locations for mass-production manufacturing: they are places for high-technology R&D and prototype production, creative and cultural industries of all kinds from theatres and museums to publishing and broadcasting, tourism, for command and control functions in government and transnational corporations, and specialised finance and business services. In all these, creativity plays a crucial role: witness the innovations in the financial sector in the 1980s, such as securitisation and corporate bonds, and the role they have played in hugely extending the total volume of business.

The evidence shows that although telecommunications substitute for personal movement, they can complement and stimulate it. It was immediately after the invention of the telephone, in 1876, that we saw concentrations of high-rise business offices in the centres of New York City and Chicago; and 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 (Graham and Marvin, 1996). Consider the growth of personal business traffic by air and rail, and the development of the conference/convention industry: they strongly suggest that the more telecommunication we have, the more it will be followed by face-to-face meetings. The fundamental reason is that the advanced business services — financial and business services, command and control functions, creative and cultural services, and tourism — which are the real drivers of the new knowledge economy, depend vitally on information exchange, often with a very high degree of immediacy. The investment analyst trading shares, the lawyer offering advice, the board of a major corporation in a meeting, the television producer at work on a show, or the tour guide taking a group sightseeing all imply specialised information to be processed and transmitted by highly qualified people in real time. Further, much of this activity involves face-to-face exchange of information, either as a central feature or as an essential ancillary (as when the stock analyst has lunch and picks up important market information). These activities are highly synergistic: hotels, conference and exhibition centres are simultaneously business services and a part of tourism. Museums and galleries are creative/cultural but also parts of tourism. Advertising is both creative

and a business service. For this reason, not only does each of the sectors have strong agglomerative trends set by the need to process and exchange information, but there are also strong agglomerative forces between the four main service sectors.

So communications — a major international airport hub, a key interchange on the fast-spreading high-speed rail systems of Japan and Europe, top quality telecommunications — are a must. But there is another key requirement: quality of urban life. Just as cities had to guarantee pure water and sewerage systems a century ago, they now compete to make their cities attractive to visit and to live and work in. Urban innovation matters as much as it did when city engineers were struggling with problems of pure water and sewage disposal.

In this scheme, there are no fixed rules: cities can lever themselves up or fall down. In particular, they can achieve several objectives simultaneously with the right kind of policies. They can clear the ruins of the lost industrial economy, provide new flagship buildings to act as symbols of an urban renaissance, and create a high-quality urban ambience for visitors and residents. Barcelona, Bilbao and Glasgow in Europe, San Diego and Seattle and Toronto in North America, are classic illustrations.

Of course, urban quality does not guarantee creative genius. Nobel Prizes can and do come out of slum laboratories, and great undiscovered artists will always languish in garrets. Increasingly however, universities build laboratories to retain and attract international star scientists, while the garrets of the starving artists soon become immensely fashionable and expensive. Creativity is no longer an incidental miracle that happens occasionally in exceptionally favoured cities; in a globalised economy where no place can rest on its laurels for long, it is now a central part of the business of being a successful city. This is a principle that no city can ignore.

## **THE CITY OF URBAN INNOVATION**

It is for this reason that we now come to the second of the two basic requirements I outlined at the beginning, and to yet a fourth kind of innovation. Cities must promote “urban innovations” that will improve the quality of life in their cities and make them models of sustainable urban living. These are subtly different in kind from the three varieties so

far considered. They consist of cities attempting, generally through public administration but also through private enterprise, to solve the emerging problems caused by their own growth: water supply and waste disposal, traffic and transport, police and criminal justice, provision for the poor and destitute. None of these problems is unique to large cities. The point is that in such large cities, roughly those with one million and more people, they attain a new dimension of complexity: local wells and cesspits no longer suffice, people have to move over long distances, crime can no longer be handled by informal means, destitution can no longer be managed within the extended family. In every case, cities have to respond through organisational innovation, and often through technological innovation as well. So the places that make urban innovations are usually the biggest and most complex places of their time: cities like ancient Rome, London or Paris in the 19th century, or New York in the early 20th century and Los Angeles at the mid-century, or London again in the 1980s; though we can legitimately include a much smaller city like Stockholm or indeed Helsinki, that made important urban social innovations after World War Two.

Such cities make urban innovations because they have to (though not all cities that need to succeed in doing so, as 20th century history plainly shows). This means that they have reached a certain threshold of size and complexity. Rome, London, Paris and New York were among the three biggest cities of the world when they first made urban innovations; with the exception of Rome (estimated at 650,000 in 100 A.D.), London (861,000 in 1801) and Stockholm (889,000 people in 1950). All had one million or more people within their city boundaries. Los Angeles, however, was the 27th city in 1925 and Stockholm the 80th in 1950, so rank or size in itself is no guarantee of innovative power.

What may matter more is the speed of growth. London had doubled in size in the century before 1800, Paris had grown by two and a half times in the century before 1850; New York had doubled in the quarter century before 1900 (albeit with a major boundary change) and Los Angeles grew 10 times in the first quarter of the 20th century. Such cities had to cope quite suddenly with a drastic increase in the scale and complexity of urban organisation. They had the capacity to do so, because all were in countries that were highly evolved economically and technically. Further,

because they were well networked both nationally and internationally, there were only minor barriers to importing knowledge from other places. Knowledge of urban innovations like water aqueducts, collector sewers, streetcars, subways and motorways all diffused very rapidly, though there were significant differences in the rate of takeup from city to city; European cities, in particular, were relatively slow in absorbing technological and transport improvements like the telephone, the electric streetcar and the urban motorway.

Demographic growth often went hand in hand with economic growth, if only because aggregate growth was almost bound to increase in line with population. That meant buoyant demand for new services and a supply of surplus capital to fund infrastructure, whether out of municipal coffers or out of private pockets. There seems to be a relationship between urban innovation and long waves of economic growth: London was highly innovative at the start of the second Kondratieff long wave (1842–97), New York and Los Angeles at the start of the third (1897–1954), Stockholm at the start of the third (1954–); Paris fits less well, though its major urban investments were all made before the crash of 1873. Further, such periods of growth by definition brought the immigration of talented and energetic individuals, some of whom at least were major agents: Edwin Chadwick, architect of many of the London reforms, was a Mancunian by birth, Harry Chandler in Los Angeles was an Easterner, though other key players — like Haussmann in Paris and Veiller in New York — were native-born sons of their cities.

There is however a basic distinction: Rome, London and Paris were unambiguously at the centres of their respective worlds. New York was the emerging commercial centre of the most dynamic part of the world of 1900. Los Angeles in 1925, as already remarked in discussing Hollywood, was by any measure at the edge of the American urban system; and Stockholm was a relatively small city at the periphery of the European system. Los Angeles, a city that combined political conservatism with maverick capitalism and eccentric philosophies, seems to have been a very special case, a frontier city that had thrown off most of the trammels of older cultures. Stockholm may have been an equally special case, a Protestant society in the course of secularisation, in which particular ideas of social responsibility developed as a response to the depression of the 1930s.

Finally, London represents an equally specific development: its regeneration in the 1980s represented the quintessence of the Thatcherite vision in an urban context, and that vision represented a kind of cultural counter-revolution, a systematic attempt to demolish the established institutions of British life and to replace them by a return to unfettered entrepreneurial capitalism. Equally however, the Docklands enterprise represented the idea that property development in itself could equate with substantive economic regeneration, as if one would axiomatically produce the other. This was an assumption that many were to question, especially after the great crash at the end of the 1980s. Wrong or right or partially right, this view is consistent with the Thatcherite notion that Britain as a manufacturing economy was largely finished and that the aim was to rebuild a new service economy on the ruins of the old. This belief, never as consistently expressed as in Britain, nevertheless formed a belief underlying much radical right rethinking, worldwide, in the 1980s.

We can conclude that, while earlier urban innovations were directly driven by hard physical problems and had an element of the inevitable, more recently, innovation has come from a variety of far more specific conditions. Nevertheless, it remains a fact that once made, innovations tend to provide some kind of model to the rest of the world. Stockholm in the 1950s became the model of the socially-conscious city. Los Angeles in the 1960s came to be seen as model of a new kind of urban society, one based on style and mobility and hedonistic conspicuous consumption; London in the 1980s, even while it repelled some observers, became almost a television soap opera parody of itself, the city driven by creation of new forms of wealth and power against a background of a new high-tech urban landscape. All these urban images have powerfully persisted even while the attempts at imitation have often collapsed in failure and recrimination perhaps because urban archetypes do not lend themselves so easily to imitation.

The need however — as with the other kinds of innovation — consists in trying to identify what kinds of urban innovation, what kinds of resulting city, will most effectively provide a physical and social environment in order to foster the kinds of creativity that will prove most significant in the new knowledge economy. I believe that we can answer this by looking at cities worldwide, and asking what kinds of cities seem to be most effective at attracting talented and creative people to live and work in them.

It soon emerges that such cities are in fact quite varied in their past histories and their present potential. The first category is the *established metropolis*: leading older cities that have maintained their position as outstanding centres of both artistic production and consumption, like London, Paris or New York. They succeed simply because of their historic endowment of human and social capital. They have long been leading centres of consumption for theatre, music and the graphic arts. Partly because of this, they continue to attract creative people who live at the margins, as they always have. To this select group we can add a second category which we can call *sunbelt cities*: newer and emerging cities in new world locations like Los Angeles, San Francisco, Vancouver, Sydney, Auckland or Cape Town. These attract migrants because of their physical qualities — waterside location, mountains, climate — and resulting lifestyle. They are often major university cities and have strong local concentrations of cultural facilities. They are in effect commercial and cultural capitals for wide hinterlands around them. All this makes them attractive as alternative destinations for creative individuals who cannot or will not make the long migration to the older more established cities.

There is now a third category, the most interesting of all: *the city undergoing urban renaissance*. This is an older industrial or port city, usually the biggest city in its region that has recently suffered from decline of traditional manufacturing or port functions. Manchester, Glasgow, Barcelona, Bilbao and Baltimore are prime examples. All have regenerated themselves through intelligent investment in new cultural artefacts which in turn have helped generate urban tourism: museums, art galleries, concert halls, conference centres. Since they are also strong university cities, they attract young people, some of whom remain after completing their education because they have put down roots and find the city an attractive place in which to live. They have often invested considerable amounts in improving their physical environment, especially in and around their city centres and in neighbouring waterfront areas, so that they can consciously compete in life quality and lifestyle with larger longer-established cultural cities. In consequence, these are some of the most interesting cities in the world today, simply because they have been so successful in rapidly shedding their 19th century industrial image and replacing it with a 21st century cultural image.

All this indicates that traditional advantages and disadvantages are no longer fixed and unchanging. Cities can literally remake and remarket themselves. Perhaps not every city can do this: to achieve the change, a city must have certain necessary prerequisites — a certain size and scale, a previous history of cultural achievement and a strong university infrastructure. Yet many cities worldwide are not perhaps achieving all that they are capable of achieving.

Most important of all, history shows that achieving true eminence as a city of culture is not something that can be achieved instantly, or even in a few years. It is a long process taking decades or even centuries. Certainly, a city can open a new art gallery or concert hall and thus achieve instant fame as an attractive tourist centre. That, however, means the creation of a pure city of cultural consumption, which is not the same thing at all as building a truly creative city, a city of cultural *production*.

Maybe an initiative like that of Barcelona, which in the summer of 2004 held what it called a cultural Olympic Games — a five-month, 141-day series of seminars and cultural events, attracting over three million visitors directly and perhaps as many again indirectly — provides a possible model. The question has to be what permanent legacy will remain. I do not, mean physical legacy — there is a high-quality convention centre which will bring continuing year-long business tourism to Barcelona — but the deeper cultural legacy. The right strategy must be to build a physical infrastructure for cultural production, in the form of educational and training facilities at the same time as the centres for consumption, side by side, as they are now trying to do at Gateshead in Northern England with the new Baltic Centre for the visual arts and the nearby Sage Centre for music. Yet, we should not expect that as a result Gateshead will turn itself immediately into a new Paris or a new Florence. It could take a long time and it might not happen at all. Meanwhile, places for consuming art can be pleasant places in which to live and work, and may even be the way to attract new life, and new work, of other kinds into the city. Cultural strategies can thus become just one part of a multi-pronged approach to urban regeneration. For many cities faced with the challenge of economic transformation, that will prove the most successful strategy. The new model of the creative city remains of great significance as cities throughout the world — established global cities,

emergent cities, cities in the developed and developing countries alike — seek to remake themselves by understanding and applying new economic paradigm.

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