

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/268359932>

Planning Cyber-Cities? Integrating Telecommunications into Urban Planning

Article in *The Town planning review* · January 1999

DOI: 10.3828/tpr.70.1.w34454x3475g2858

CITATIONS

41

READS

57

2 authors:



[Stephen Graham](#)

Newcastle University

124 PUBLICATIONS 4,726 CITATIONS

[SEE PROFILE](#)



[Simon Marvin](#)

Durham University

139 PUBLICATIONS 2,847 CITATIONS

[SEE PROFILE](#)

All content following this page was uploaded by [Simon Marvin](#) on 08 April 2015.

The user has requested enhancement of the downloaded file. All in-text references [underlined in blue](#) are added to the original document and are linked to publications on ResearchGate, letting you access and read them immediately.

**Planning Cyber-Cities?
Integrating Telecommunications
into Urban Planning**

Paper published in *Town Planning Review*, 1999, 70(1), 89-114.

Dr. Stephen Graham and Dr. Simon Marvin,
Reader and Senior Lecturer; Both at
The Centre for Urban Technology
Department of Town and Country Planning
University of Newcastle
Newcastle upon Tyne NE1 7RU
U.K.

Abstract

This paper attempts to show how urban planning strategies can creatively address the complex interlinkages between telecommunications, urban forms and transportation. It has three parts. In the first, we set the context for local, planned intervention on IT and telecommunications by exploring the broad relationships between the development and spread of new information technologies, and the changing form and development of cities, and systems of physical mobility and location. We do this, first, by setting the context by looking in turn at the four key areas of city-telecommunications relations. These are: transport-telecommunication relations; the broad links between urban economies and the so-called 'information economy'; the relations between urban and so-called 'cyber' cultures; and the ways in which urban communities and 'virtual,' IT-based, communities are interdependently linked. In part two we go on to review a broad, international range of emerging urban planning and policy initiatives which are trying to shape the articulation between urban built forms and electronic interactions. In North America, Europe, and Asia, three broad types of policy are identified: integrated transport and telecommunications strategies, city-level new media policies, and so-called 'information district' and 'urban televillage' plans. Finally, we conclude by assessing the significance of these policies and suggest ways for creatively integrating telecommunications into urban policy and planning practices and strategies.

Introduction: Urban Planning and the Technological Future of Cities

It is now widely argued that the increasingly pervasive applications of linked computer, media and telecommunications technologies constitute nothing less than a wholesale shift of our economy, society and culture. Social scientists regularly now talk of a new, emerging 'digital age', an 'information society,' or a 'network society' (see Gosling, 1997; Castells, 1996). Such a transition is widely believed to be a new industrial revolution, a societal technological and economic shift across capitalist civilisation of similar magnitude to the industrial revolution through which every aspect of society is transformed (Graham and Marvin, 1996).

As part of this shift, cities, and the corridors between them, are being permeated with widening arrays of telecommunications grids - conventional 'phone networks, wireless and radio systems, cable networks, satellite systems, Internet, data and video networks. These silently and (usually) invisibly underpin booming flows of voice, data, video and images across all walks of city life and development. Indeed, every aspect of the life of advanced industrial cities is now cross-cut with all manner of computerised and 'tele-mediated' communications exchanges, and transactions, most of which are now based on digital principles (meaning that they are based on the streams of zeros and ones used in computers). As Geoff Mulgan (1991) once put it, "the re-definition of the city as a system for producing and switching information is highly visible".

IT and telecommunications networks are thus becoming, in a very real sense, the very sinews of our society. For our profoundly urban societies, and for the whole gamut of actors, agencies, policy makers, organisations, and individuals who currently depend on cities in various ways, the relationship between new media and telecommunications technologies and the future of our cities is clearly of critical importance. But what does this so-called 'digital age' really mean for our cities? What future is there for our urban areas, as more and more of the traditional roles and functions, which first generated the need for urban concentration, seem likely to be possible across distance via advanced telecommunications links? Will our cities face some electronic requiem, some nightmarish *Blade-Runner*- style future of decay and polarisation ? Or can they be power-houses of economic, social and cultural innovation in the new electronic media ? And, perhaps most importantly from the perspective of urban planning, what roles are there for urban policies, plans and strategies, and for urban design, community development and transport policies, within the shift to a so-called 'tele-mediated' urban life, based more and more on all types of on-line interactions?

The co-evolution of cities and electronic interactions is increasingly emphasised in technological debates within academia. Debates about 'cyberspace', telecommunications and the future of cities are currently

proliferating within disciplines as diverse as architecture, cultural studies, communications studies, science and technology studies, and urban sociology and geography (see, for example, Mitchell, 1995; OTA, 1995; Graham and Marvin, 1996; Castells, 1996). Attention is increasingly being directed to exploring how the economic, social and cultural aspects of cities interact with the proliferation of advanced computer-based telecommunications networks in all walks of urban life (Graham, 1998). Here, the common 1980s assumption that the new communicational capabilities of new media technologies will somehow 'dissolve' the city has waned. Rather, it is now clear that most IT applications are largely metropolitan phenomena. They are developing out of the older urban regions and are associated with new degrees of complexity within cities and urban systems, as urban areas across the world become relationally combined into a globally-interconnected, planetary metropolitan systems (Graham and Marvin, 1996). Research here now centres on the degree to which city economies can be maintained in a world of on-line electronic flows; the ways in which place-based and 'virtual communities' interact; and the related interactions between urban cultures rooted in traditional public spaces, and 'cybercultures' operating within the virtual spaces accessed from computers (see Mitchell, 1995 and Graham and Marvin, 1996, for reviews).

Despite the central importance of the 'urban' in cyberspace debates, however, issues of urban policy and planning have been virtually absent within both the popular and academic sides of the discussions. New information and communications technologies are usually seen to be some disembodied, external 'wave' of change. Their urban 'impacts' are usually seen to follow inevitably from their effective "collapse of distance" as a constraint on human life (The Economist, 1995). Such scenarios also usually imply that all cities (say, for Europe, London, Leeds, Charleroi, and Athens) will somehow all be 'impacted' in the same ways. Such so-called 'technological determinism' is attractive because it creates powerful scenarios, clear stories, and because it accords with the dominant experience in the West, where, as Stephen Hill (1988) puts it, the pervasive experience of "technology is one of apparent inevitability".

Questions of agency and local policy and planning therefore tend to be ignored in the simple recourse to either generalised, future-oriented debates, or to macro-level, binary models of societal transformation. In these, new technologies are seen to be somehow autonomously transforming society *en masse* into some new 'information age', 'information society' or 'cyberculture'. As the American geographer Robert Warren (1989; 344) argues, "benign projections [about telecommunications and the future of cities] give little indication that there are significant policy issues which should be on the public agenda". In the emphasis on private entrepreneurship and the transcendence of place, the discourses of the 'information society' thus tend to imply that local municipalities, policy agencies and planners might even be little more than irrelevant distractions in this exciting and epoch-making transformation driven by private media, communications and property interests. Consequently, little thought is being put towards how urban policies, plans and

strategies can *engage with* new technologies as policy agents to try and help shape *desired* urban futures in a purposive manner.

With utopianism and crude technological determinism often dominating popular (and, in many cases, academic) debates, it is not surprising that the potential roles of urban policy makers and planners in 'socially shaping' new technologies in cities at the local level are usually overlooked (see, for example, Negroponete, 1995; Martin, 1995). This neglect, however, is problematic. It means that a fast-growing wave of urban experimentation with telecommunications, which is currently emerging across advanced industrial cities, is largely ignored within urban planning and policy debates. This is a problem, because such innovation promises to have major practical and theoretical implications for how we might consider the future of cities, urban policy and planning. It may also offer lessons on the broader question of how we might best understand the relations between cities and new communications technologies, and how we might address the crucial question of thinking about the 'local' and the 'urban', in an increasingly tele-mediated and globalised era.

This paper attempts to address this problem by inserting urban planning into debates about new technologies and the future of cities. It has three parts. In the first, we set the context for local, planned intervention on IT and telecommunications by reviewing the evidence on the complex interdependence between cities, transportation and face-to-face interactions, and electronically-mediated interactions. We do this by looking in turn at transport-telecommunication relations, the broad links between urban economies and the so-called 'information economy', the relations between urban and so-called 'cyber' cultures based on IT systems, and, finally, the ways in which urban communities and 'virtual,' IT-based communities are interdependently linked. In the second part of the paper we go on to review a broad, international range of emerging policy initiatives which aim to help shape the articulation between the built form and socio-economic development of cities, and the electronic interactions within such cities, and between them and the 'outside' world. Finally, in section three, we assess the significance of these policies and suggest ways for creatively integrating telecommunications into urban policy and planning practices and strategies.

The Metropolitan Dominance of the 'Digital Age'

To understand why cities will be central to the 'digital age', we need to explore the *complex inter-relationships* between electronic and urban interactions in the economy, culture, and society. We need, in short, to understand how our urban life stands in a state of subtle, two-way, *articulation* with electronic interactions (see [Robins, 1995](#)). We also need to understand why the level of the city and urban region might be a crucial one for exploring new policy innovations which make the most of the potential of new technologies, in a way which has meaning in relating to the urban worlds in which the vast majority of us live, work and act out our lives.

To further explore the co-evolution of cities and telecommunications, which is essential as a basis for successful urban policy and planning innovation in these areas, we need to look in more detail at its four key aspects: transport-telecommunications interactions; the links between urban economies and the 'information economy'; interactions between urban cultures and cybercultures; and the subtle interactions between place-based and 'virtual' communities in cities.

Transport / Telecommunication

Conventional approaches to transport - telecommunications relations stress the environmentally beneficial role of telecommunications technology. It is often assumed that telecommunications can unproblematically substitute for physical transport flows and movement, reducing the need for travel, and so lowering levels of pollution and urban congestion. For example, BT's Environmental Manager argues that: "telecommunications technology is likely to play an increasingly important role in offering a more environmentally sound alternative to travel... Apart from a saving in energy the switch to telecommunication services would have other environmental benefits such as reduced noise levels, fewer new roads and lower levels of urban pollution". Jonathon Porritt, one of the UK leading environmentalists, "hails this fusion of communications and computing technologies as one of the 'tools for sustainability'".

Early research on the potential for trade-offs between telecommunications and transportation networks was commissioned by the US government in the mid 1970s in response to the energy crisis . This work simply compared the energy costs associated with communications through the telephone, and physical forms of communication such as personal travel by car, train and aeroplane (Nilles et al, 1976). The energy savings associated with communications by telecommunications created much excitement about the potential for trade-offs between telecommunications and transportation.

Initial interest in the role of telecom - transport trade-offs focused on the potential for the displacement of work-related commutes. In the mid 1970s, Jack Nilles invented the term 'telecommuting' to describe home or neighbourhood-based working using computers and telecommunications technology (see Nilles et al, 1976). Tele-based communication was seen as a solution to the problem of congested urban environments and long commutes to centralised offices. It was assumed that telecommunications would simply substitute electronic flows for the transportation of people and freight along more polluting road, rail and air networks. There were a number of attempts to demonstrate the potential substitution effects of teleworking on travel patterns and estimate energy savings. In the US context, these demonstrate that telecommuting has the potential to save between 1 -3% national energy consumption, figures which were not as great as the early proponents of teleworking might have expected (Nilles, 1988). These reports also have highlighted some of the "rebound" implications of teleworking including extra energy consumed in home, movement out to higher-amenity areas, increasing total commute distances and the rapidly filling of road space through high latent demand. (see [Marvin, 1997](#)).

The UK Department of Environment, Transport and the Regions' traffic projections show how demands for mobility and movement, both within and between cities, are unlikely to reduce, even whilst telecommunications use continues to burgeon. Overall, transport and telecommunications *actually feed off and fuel, more than simply substitute, each other*. While telecoms undoubtedly have some potential to substitute for journeys and more routine interactions there is considerable evidence that the relationship between transport and telecoms is more complex (Graham and Marvin, 1996). Rather than simply substituting, telecoms have highly *complementary* relationships with physical travel. This, we would argue, can actually result in three forms of traffic *growth*.

First, telecommunication play a central role in *improving the efficiency and effectiveness of transport networks*, so reducing the cost of travel. Complex computer ticketing, transaction systems and air-traffic control systems help reduce the costs of air travel, making it more attractive as our perceptual understanding of the world increases. Electronic information exchange also plays a major role in the organisation and management of transport networks. Such innovations help to extend the reach, reliability and usefulness of transport flows through air travel, auto-route guidance, fax, mobiles, e-mail, real-time information, and electronic data interchange-based 'Just-in-Time' logistics systems. A single flight of a 747, for example, has been estimated to generate 50,000 electronic exchanges in booking, maintenance, refuelling, airport management etc.

Second, access to cheaper telecommunications increases an individual's or organisation's 'perceptual space', creating more opportunities for physical travel. The more we get to know about the world, whether from a leisure, recreation, or business opportunities point of view, the more we demand new forms of physical

travel to support flows of goods or to directly experience the quality of interaction that can only be achieved through physical contact -- usually in cities. The people with the greatest demands to use phones and mobile computers are business travellers. People who telework and move far from cities may actually travel further overall because they travel further for other trips like shopping or because there fewer commutes are over longer distances.

Finally, congested roads create new demands for telecommunications. Mobile phones may actually help to sustain larger traffic jams because they allow 'dead' time to be converted to 'live' working time. It is no accident that some car manufactures now sell cars with car phones, faxes, or mobile computers - the ideal way of staying in touch with work and home, once a driver is stuck in a gridlock or slow moving traffic. In this way telecommunications helps overcome our resistance to travelling by cars on roads which are congested, as real time information overcomes many of the uncertainties and difficulties of travel. In short, what appears to be happening is a major expansion in all forms of communications. Although some substitution may undoubtedly be taking place, overall growth of electronic and physical mobility simply overwhelms the contribution of substitution.

Urban Economies / Information Economy

Current advances in telecommunications are a phenomenon which is overwhelmingly driven by the economic dynamism of cities, particularly larger, internationally-oriented, metropolitan regions. City-regions have important assets in an internationalising economy, based more and more on flows of information, services and 'symbolic' products like media, advertising, cultural services, and electronic entertainment (as well as movement of people, goods, and commodities). They support face-to-face interactions, especially for higher-level decision-making functions, in a world of fast flows and great volatility. We should not forget the sheer infrastructural advantages of cities. Cities also have the high-quality physical, service and telecommunications infrastructures to extend access efficiently to distant places and markets. Whilst remote, rural areas might still have old-fashioned and poor quality analogue telecoms infrastructure of the old monopoly (BT), our main city centres now have three or more separate, high capacity digital systems competing in price and quality (with many others selling specialised services). London's City and West End districts has at least four superimposed optic fibre grids (those of BT, Cable and Wireless, MFS and COLT) and countless other service providers who deliver over these networks. 80% of investment in telecoms in France goes to the Paris city-region.

But cities still offer unrivalled place-based, as well as electronic, contact potential. Today's uncertain and globalising economies make trust, constant innovation, and 'reciprocity' more and more important, which can only be fully-forged through on-going face-to-face contact. Stressing "the extraordinarily social nature

of modern economies,” the geographers Nigel Thrift and Kris Olds (1996, 316) write that “it is clear that face-to-face interaction has not died out. Indeed, in some sense it has become more important as reflexivity (including and enhanced ability to see oneself as others see us) has become built into economic conduct”. Tony Fitzpatrick, (1997, 9) the Director of Ove Arup, argues that “cities reflect the economic realities of the 21st century. Remote working from self-sufficient farm steads via the Internet cannot replace the powerhouses of personal interaction which drives teamwork and creativity. These are the cornerstones of how professional people add value to their work. Besides, you cannot look into someone’s eyes and see that they are trustworthy over the Internet”. On the consumption side, too, the whole range of consumer services, now so important in urban economies -- tourism, shopping, visiting museums and leisure attractions, eating and drinking, sport, theatre, cinema etc. -- are all growing and seem likely to resist any simple, substantial substitution by 'on-line' equivalents.

Major urban places support dense webs of face-to-face links, transactional opportunities, agglomeration economies, access to wide pools of specialised labour, services, property and infrastructure, and ‘soft’ cultural and social advantages. Here the emphasis is increasingly on the *qualitative* aspects of urban economies and urban places, and the increasing dominance of urban economies by symbolic and representational flows and outputs, which may or may not be linked closely to commodity flows and outputs (what Lash and Urry (1994) term ‘economies of signs and space’). Thus, in today’s urban economies, the spiralling use of telecommunications becomes combined with the spiralling use of transport and a continuing, perhaps even growing, reliance on face-to-face contacts and meetings, largely in cities: what the father of the 'Megalopolis' concept, the geographer Jean Gottmann, used to call the "spiralling mass of bits of information". What many people interpret to be a post-urban shift might actually be a transition from traditional, core-dominated, monocentric cities towards complex, extended and polycentric city-regions made up of a multitude of superimposed clusters, grids and internal and external connections.

This is an important argument, which leads us to stress four points. First, growing flows of electronic information may require *more* face-to-face contact to make sense of it all (as the Bristol geographer, Nigel Thrift, has shown with his work on City of London electronic traders). Second, much of the electronic exchange on networks like the Internet actually represent cities as places to visit, consume, travel to, or live within, as the many tourist and municipal and urban services sites on the Web demonstrate. In the US, the fastest-growing web sites are those that try and integrate the Internet at the level of the metropolitan region simply because this has most salience to Net users. Private operators of integrating city-level web sites in the USA have grown massively recently, attracted by the increasing maturity of the web as a diffused medium and by their calculations that "80% of purchases are made within a 20 mile radius of the home" (McElvogue, 1997, 2).

Third, it is easy, given the hyperbole about globalisation, to radically underestimate the degree to which tele-mediated flows operate to sustain very local relations. The vast bulk of electronic exchanges, for example, are very local indeed: 60% of all phone calls and e-mails move within single buildings (Graham and Marvin, 1996). And, finally, even when stories are apparently about decentralisation and substitution, essentially urban dynamics are usually at play. Most teleworking, for instance, is done for part of the week in the zones within and around the large cities that allow people to go to the office on one or two days a week for face-to-face meetings. When IT does support so-called 'dis-intermediation', directly linking consumers and producers across distance -- as is the case with many call-centres delivering routine services on-line -- their destinations tend not to be rural spaces but smaller, provincial, cities (or, in sectors like on-line computer programming, far-off cities like Bangalore in India).

Urban Cultures / Cybercultures

Thirdly, the centres of many of our larger cities are experiencing renewed growth as interlinked centres of growing cultural industries (arts, theatre, dance, music, publishing, fashion, media, graphic design, photography, architecture, leisure, sport etc.). The importance of city centres has recently been re-emphasised, based on the widening assertion that such 'cultural' industries' may, with appropriate policies, interlace positively within a framework of public space to support the emergence of "creative cities" (Landry and Bianchini, 1995). The central idea driving such policies is that cities can only thrive when strategies recognise that "the defining characteristics of cities are high density, mixed use, stimulus, transactions and above all diversity" (Montgomery, 1995). But how do urban cultures interrelate with much-vaunted 'cybercultures,' at a time when *electronic* cultural interactions are exploding, fuelled by digital technologies, and the blurring of boundaries between computing, media, and telecommunications industries and technologies ?

It is clear, at the level of large organisations, that large cities *already tend to dominate* the sectors that are blurring together with the emergence of multi-media: TV, publishing, art and design, film, and media and telecommunications. Such firms continue to rely on large cities for all the reasons stated above. But the prospects for creative synergies between urban and cybercultures seem extremely strong at the much more dynamic level of small and micro-firms. In an apparently paradoxical twist, the continuous innovation in the Internet, digital media, and multimedia content industries, so often hailed as supporting the 'death of distance' by media and industry pundits, is being fuelled by intensely local networks based on face-to-face interaction in selected urban districts.

In fact, as the value-added in IT industries shifts from the zones dominated by hardware production to places that can sustain innovation in software and content, so the focus of the industries may actually be

shifting from Silicon--Valley--like Research and Development campuses, to central, old-city, locations. In the cultural industries, the creative small firms that dominate Internet software, digital design, and World Wide Web services, far from scattering towards rural idylls, seem, in fact, to be concentrating into (a small number of) gentrifying metropolitan 'information districts' like SoHo and Tribeca in New York, Shoreditch in London, and Temple Bar in Dublin. As well as having good (broadband) telecom connections and tailored, 'Internet-ready' office spaces, such districts are thriving through processes which, arguably, are analogous to those which spawned the first industrial districts in 19th century cities. In a detailed study of SoHo and Tribeca in Manhattan, for example, Dan Hill (1997) found that the raw material for such industries is the sort of informal networks, high levels of creativity and skill, tacit knowledge, and intense and continuous innovation processes that become possible in an intensely-localised culture, based on on-going, face-to-face contacts supported by rich, dense and interdependent combinations of meeting places and public spaces. Clustering in certain 'information districts' may thus support the informal and on-going innovation networks and serendipitous contacts that seem central to the success of small and micro digital arts and creative firms (Hill, 1997)

Most importantly here, the Internet, with its 'spiralling mass' of information, communication, transactions and specialised media flows, is now weaving into support every aspect of urban functioning in contemporary city-regions. Such trends are most advanced in the USA, which demonstrates the strong metropolitan bias of both the production and consumption sides of the Internet. On the *production* side, for example, down town New York's 'Silicon Alley' has emerged, along with districts in downtown San Francisco and other large cities, as a remarkable concentration of micro and small firms, based on digital art and design, Web production, and digital and multimedia services. These draw on the City's unparalleled arts, cultural industries, and literary traditions. One of the main motors of the recent economic renaissance in Manhattan, Silicon Alley encompasses over 700 new media firms who rely on intense, informal, local contacts to sustain continuing innovation and interaction (Hill, 1997). Interestingly, urban planning and policy is beginning to find ways of supporting this new information district, as we shall see in the next section. It must be stressed however, that currently only a relatively small number of urban districts are being redeveloped in this way. Moreover, these 'organic' spaces are very difficult to develop 'artificially' - that is, in the absence of a existing appropriate, high skill levels, contact networks, supportive services, and local entrepreneurial culture.

On the *consumption* side, it seems that the metropolitan dominance of the Internet might actually grow rather than decline, as it becomes massily diffused, accepted and gradually weaves into all aspects of urban life. This is certainly the recent experience of the world's most mature Internet market, the USA (Moss and Townsend, 1997). The top 15 metropolitan core regions in the US in Internet domains accounted for just 4.3 % of national population in 1996. But they contained 12.6% of the US total in April 1994. By 1996

this had risen to almost 20%, as the Internet became a massly-diffused and corporately-rich system. As Moss and Townsend (1997) suggest, “the highly disproportionate share of Internet growth in these cities demonstrates that Internet growth is not weakening the role of information-intensive cities. In fact, the activities of information-producing cities have been driving the growth of the Internet in the last three years”. Manhattan now has twice the ‘domain density’ (i.e. concentration of Internet hosts) of the next most ‘Internet-rich’ US city - San Francisco - and six times the US average (Moss and Townshend, 1997) and

In such a context, there are many opportunities for weaving “access points” - Internet and service kiosks - into the fine-grained fabric of cities, to animate, enliven and inform what goes on in the public and private realms of cities and metropolitan regions. Whilst there are many problems here to do with the high costs on technologies, highly uneven social access and skill levels, and dangers of oppressive surveillance, a growing range of initiatives at the urban level are currently experimenting with new media solutions to support the improved delivery of public services, support community networking, and enhance local economic, social and cultural development.

But such public initiatives are far outweighed by the sheer *economic* logic of the Internet. already, private Internet providers are themselves starting to develop integrating web sites at the urban level. These aim to support coherent and legible relationship between the many services on the web that fall within a particular city and the population of that city. The need for 'urban Internet guides' is especially powerful in the larger 'global' cities that dominate Internet innovation and use. New York, for example, how has over 10 dedicated 'virtual city' web sites that aim to draw together various portfolios of local Internet-based services (Graham and Aurigi, 1997).

Urban Communities/ Virtual Communities

Finally, all aspects of the social use of telecommunications remain highly dominated by, and bound up with, the lives and social worlds of urban populations and communities. It is in our metropolitan regions that the most rapid diffusion of mobile phones, cable systems, and the Internet, have developed, and where the rich communicational and transactional fabric of cities is increasingly supported by complex tapestries of telecommunications networks. One only has to witness the recent explosion of the use of mobile phones on our city streets to understand this. Thus, for example, the many virtual communities on the Internet are made up of both globally-stretched Use-net groups and Multi-User Dungeons (MUDs) etc. and a growing range of community networks at the local level in towns and cities, aimed at feeding back positively onto the social dynamics of individuals cities (Graham and Aurigi, 1997).

Some writers have even suggested that local urban community networks like the Cleveland Freenet, Santa Monica Public Electronic Network and Seattle Community Network, as well as the more recent 'virtual ' or 'digital city' movement, represent hope for truly interactive, democratic, media systems which might help revive, enliven and inform the public realm of their host cities (see Schuler, 1996). The hope here is that local IT systems that support interactive community debates, will help to bring together the diverse social, cultural and geographical fragments of extending city regions, adding important coherence and legibility to a city's 'electronic realm' in the process. In the long run, computer networks 'grounded' in particular local communities, might be more sustainable, effective and meaningful than those which rely purely on IT-based exchange across global distance. Wakeford (1996) argues that 'grounded' community IT networks can often support higher degrees of trust (with "persistent" rather than "transient" identities). They can also relate more effectively to real problem-solving, can inter-relate with training centres and face-to-face contact, supporting reciprocal, frequent and supportive interactions which relate strongly with the wider public realm. Finally, these advantages can often allow them to draw in wider cross-sections of people than global Internet newsgroups.

But such assertions and rhetoric need to be tempered by the realisation that profoundly deep social divisions in access to all communications technologies are woven deeply into the fabric of our cities (see, for example, Demos, 1997). Whilst elite groups are 'super connected' to phone and IT networks at home, school, in their cars and at work, even the humble telephone is an expensive luxury in many more marginalised urban neighbourhoods. One neighbourhood in inner Newcastle, for example, had only 27% of its households connected to the telephone in the late 1980s (Graham and Marvin, 1996; Chapter 5). Home access to the Internet, with its pre-requisites of skills, electricity, space, hardware, software, telephone, modem, Internet account, and cash for on-line and phone charges, is unlikely to be a priority for the large proportion of socio-economic groups facing poverty, debt, and problems paying for essential bills. This places a premium on supporting access to community IT networks and Internet-based systems into the public spaces of cities.

One of the key policy issues for the tele-mediated city, therefore, is how to address deep social segmentations based on access to, and exclusion from, the new communications media, and the growing ranges of information, resources, and transactional and working opportunities offered over them (see Schön et al, 1998). As more and more IT-based systems become the norm -- for example with growing reliance on home and mobile telephones, home IT systems, and electronic cash -- so it becomes more and more disadvantageous to experience 'network poverty' beyond the reach of such systems. But this is not to assert that systems like the Internet can act as some 'silver bullet' to complex problems of social exclusion, in the manner of the US Speaker, Newt Gingrich's absurd, utopian, and patronising "laptops to the ghettos" rallying cry in 1995. Rather, it is to stress that new community-based electronic networks are required

which, as a matter of course, work to enrol the broadest possible range of users and voices. Such experiments must be seen as attempts to explore the fullest potential of the new media, as realms for social communications at the most meaningful geographical level to most people - that of the metropolitan region.

Emerging Telecommunications-Oriented Urban Planning Strategies

Clearly, it is no longer adequate to consider policies for cities and those for telecommunications and new media entirely separately. The above imperatives suggest that only through addressing the complex interactions between cities and telecommunications will the potential of the technology be realised. This realisation is currently leading to a wide range of policy experiments which aim to positively shape how the new media relate to specific cities or parts of cities. Early examples can be drawn from a 'bricolage' of evidence, drawn from cities in the US, Canada, Malaysia, Europe, the UK and elsewhere around the world. These examples have not yet coalesced around a coherent new paradigm of urban policy. Many can be criticised as technologically determinist, environmentally problematic, or socially exclusionary.

But we would argue that, together, they point to a new style of planning and urban policy. Such urban strategies try to shape face-to-face interactions in place (and the transport flows that sustain these) in parallel with electronically mediated ones across distance. Currently, we can identify three emerging styles of such 'urban telecommunications planning': integrated transport and telecommunications strategies, city-level new media strategies, and so-called 'information districts' and 'urban televillages'.

Integrated Transport and Telecommunications Strategies

The first set of initiatives attempt to shape and manage the relations between physical movement and mobility through the application of new media, combined within particular forms of urban physical development. Each embodies a particular conception of the relations between different forms of communication and their role in the development of the city.

Urban and Regional Teleworking Initiatives

First, there are Urban and Regional Teleworking Initiatives. There are a growing set of initiatives, especially in the USA, that are attempting to grapple with the problems of developing a metropolitan-region approach to teleworking to make a positive contribution to environmental improvement - particular reducing vehicle emissions. For example, Telecommunications for Clean Air is a two year programme funded by the Californian South Coast Air Quality Management District to use telecommunications to meet rigorous air quality standards. The main aims of the programme are to identify cost-effective solutions to air quality and congestion, to contribute to economic growth, and to develop a regional approach to problem solving.

The Telework Facilities Exchange is designed to expand telecommuting participation in local government by providing low-cost, flexibly-located facilities and marketing these practices to other organisations joining the exchange (Telecommunications for Clean Air, 1994). A public sector employee would normally commute 35 miles each way to their office. Instead, they commuted to a vacant office a few miles from their home to use a workstation connected to their office. Those workers participating in the Programme reduced their normal vehicle miles travelled by 88%. As a result, if 30% of the region's 484,000 local government employees and each worked one day a week at the exchange, nearly 500,000,000 vehicle miles travelled could be saved each year (Telecommunications for Clean Air, 1994).

These findings have to be treated with caution because studies indicate that teleworking can generate "rebound effects". Although commute trips and time can be saved, additional recreational and shopping trips may be generated. Telecommuters may also decide to live further from the city, so increasing the length of remaining commutes. And the space freed on highways is quickly filled with new commuters. (see [Mokhtarian, 1990](#); Department of Energy, 1994). But these tensions could be managed at a metropolitan level, as teleworking is co-ordinated within the context of wider transport and landuse strategies. The US initiatives are particularly interesting because of the high degree of organisational innovation in the delivery mechanisms for teleworking, and the much stronger links to more mainstream transport, air quality and landuse planning policies than tends to exist in Europe.

Assessments of the environmental potential of teleworking in the UK have largely remained at the level of national aggregate assessments (British Telecom, 1992; CEED, 1992). Overall, the conclusions are that the beneficial impact of telecommunications may be limited. Even assuming that teleworking continued to grow at a fast rate, the Royal Commission on Environmental Pollution concluded that it would only have a small role to play in the reduction of emissions. But, although the national environmental benefits may be small, there could be potential in large conurbation's in the UK to develop initiatives within a wider environmental policy framework. A recent study by a Cambridge-based consultant, for example, argued that 1.25 million miles year could be saved by 2000 office-based staff at Cambridge council telecommuting (Environment, 1997). Further development work is necessary, perhaps drawing critically on the US experience. For instance, BT provides limited guidance for local authorities attempting to integrate telecommunications into Agenda 21 Strategies. And the Association of County Councils has started to consider how IT and telecommunications could be linked with the green agenda (BT, 1997; Association of County Councils, 1996). The key issue is the need to carefully integrate teleworking within the context of wider transportation and landuse plans.

Communication Corridors

Second, there are new forms of communication corridor strategies which attempt to shape how telecommunications, transport and land use interplay within broader urban commuting corridors. Those based on existing rail/transit networks attempt to manage travel demand both on the road and rail network through the provision of teleworking centres and incentives to travel off-peak. The Metro Net initiative in Los Angeles, for example, involves retrofitting a high capacity fibre optic network along side the 300 mile regional Metro Rail and Link network (Siembab, 1992). The proposals are designed to achieve three objectives: to generate revenue through leasing capacity, to develop services to enhance ridership of the system, and to improve regional mobility through developing station-based employment and service centres. The mobility strategy has been designed to fit in with the objectives of a series of wider regional communications and landuse strategies. More specially, it is hoped that the strategy will contribute towards the implementation of the Air Quality Management Plan, the Development Plan, the Regional Congestion Management Program, and the promotion of regional economic growth. The proposals would develop telecommunications facilities at or near stations for conferences, education, and job-training, to make the Metro system a destination itself.

Further development would link both the metro and telecoms networks to targeted parcels of adjacent land, in order to attract new employers whilst maximising public transport usage. These ideas mirror proposals in the UK to set up telecommuting offices along the Folkestone to Waterloo rail line, in order to reduce the number of rush hour commuters and enable a channel tunnel link to run on existing tracks (Roarke Associates, 1994). A more recent proposal suggested building a ring of teleworking centres around the M25 to deal with predicted car traffic growth. The architects, Roarke Associates, argued that the teleworking centres would cost £450 million whereas road widening would cost £1450 billion - a saving of £1 billion (*Times*, 1997). Both these initiatives are at the proposals stage and have not been implemented. However, they illustrate some interesting ideas about how communications planning could integrate telecoms and transport, and start to make wider links to landuse strategies. Yet, at an institutional level, there is still considerable uncertainty as to which organisations could take the lead with such complex initiatives involving so many different dimensions of planning.

Road Transport Informatics (RTI)

The third type of initiative focuses on the development of Road Transport Informatics (RTI). City-wide initiatives are rapidly emerging here, concerned with the use of RTI systems to more effectively manage transport networks. There are major initiatives in Europe, the US, and Japan and the National Economic Development Council estimate that the global IT and traffic management market will be worth £29 billion

in 2010. However, objectives of RTI are often poorly defined and are not often closely linked with landuse and work patterns. These initiatives are more often characterised by a form of 'technical fix,' dominated by strong producer-led interests. RTI strategies have assumed importance in the context of EU funding programmes where the technologies are seen as making a major contribution to sustainable development (CEC, 1995).

There have been a large number of feasibility schemes evaluating the potential of various forms of RTI and electronic tolling in the UK. But, again, there has been a failure to link such debates within the context of wider urban management, regeneration, and landuse strategies. These issues are being considered more widely in North America. The Highway 407, which is currently being built in Toronto, is billing itself as "Tolls but No Jams" (*Toronto Star* July 29, 1996 pages A6-A7). Located in one of the most congested highway corridors in North America, a \$1 billion dollar 36 km highway will eventually connect the airport to downtown Toronto. The scheme is being developed by Canadian Highways International Corporation -- a private consortium of 4 companies who will be funded by the receipts from electronic tolls. In return for the higher charges, users will benefit from higher road speeds than the current limit, and no traffic jams. If demand increases, the highway can be expanded to 10 lanes and tolls can be raised to reduce peak travel volumes. The scheme is being marketed at those firms operating just-in-time production methods who require high degrees of certainty in travel times for the movement of goods and services. There is now major development interest in highway land involving commercial, retail, leisure and recreation and housing adjacent to the new road. This initiative is an interesting example of the combined planning of electronic, transport and landuse infrastructure, designed to develop a congestion-free, higher-speed and lower travel-time corridor through the congested region. But this new development trajectory is extremely socially exclusionary. It is very much designed to meet the needs of large international corporations and elite users prepared to pay the premium for increased certainty.

Other RTI initiatives focus on the development of local and regional initiatives in driver information and control systems. These initiatives are based on proposals to carry more traffic by making better use of the existing road network, through pre-trip planning, route guidance, traffic management and control, and network management applications. It is hoped that the provision of information to drivers on road conditions can increase the efficiency of the network to minimise delays, unreliability and environmental damage. For instance, it is estimated that driver information could increase the capacity of the road network by 1% provide a 10% saving in journey times and a 6% reduction in mileage. The Scottish consultative document argues that the region is well-placed to use these technologies because 80% of the population live within a relatively self-contained belt across the country (The Scottish Office, 1993).

There are a number of problems with the emerging set of urban communications strategies in the UK. They tend to remain largely disconnected from mainstream urban strategies and have poorly developed links with landuse planning. They also tend to narrowly represent a limited and technologically-determinist view of urban futures based around notions of a producer-led 'technical fix' to the problems of urban mobility. Nevertheless, taken as a package, they do begin to illustrate some of the ways in which integrated urban planning for physical and electronic mobility.

City-Level New Media and IT Strategies

The second broad emerging policy area is City-wide new media strategies. IT strategies for community networking, local economic development, and public service delivery have been underway in many UK, European, and American cities for a decade or more. Following American experience, community networks like Free-nets, the Manchester, Kirklees, and Nottingham Hosts, and the Newcastle NewNet system, based on the Internet, have emerged which try and use computer communications to support grassroots, local economic, and voluntary activities (see Graham and Marvin, 1996). Many local authorities are also experimenting with videotex systems, electronic kiosks and smart cards systems to deliver information on public services, and aim to improve the services themselves. Nationally in the UK, the new government report, *The New Library: The People's Network*, proposes to wire up both schools and libraries as places where IT networks can be made widely available for local communities.

Local services have developed patchily on the new urban cable networks developing across the UK. And virtually all major UK cities now have a presence on the Internet, where so-called 'virtual cities' range from simple tourist promotion and local databases, to sophisticated spaces which attempt to add coherence to all local activities on the Internet, to widen local access and skills, open up interactive services for local debates, and to develop information and communications services which feed back positively onto the development of the home city (Graham and Aurigi, 1997). Interestingly, the most innovative virtual cities use the analogies of city 'spaces', 'squares' and 'districts', so that the many services they offer relate directly to their counterparts in physical urban space. The most sophisticated on these in the UK currently is Virtual Bristol, supported by a partnership of the City Council, Universities, and Hewlett Packard, launched in April 1997. Not to be left out, BT is exploring the concept of "urban intranets" - Internet services that are only accessible to specified local communities.

This disparate range of local new media initiatives have two problems, however. First, they have tended to be fragmented local 'IT islands', largely ignoring each other. And second, they have usually been developed with little or no respect for how they relate to the physical urban realm or to the broader development dynamics and geographies of their subject cities. Thus, the challenge for UK cities is to shape coherent

partnership-based strategies aimed at harnessing all types of new media applications - Internet, cable, kiosks, telephone, infrastructure - to their economic, social and cultural development needs. Such issues need to begin with social, geographical and institutional issues and policy needs and move onto how new technologies might meet these needs - rather than the other way round. Institutional solutions need to be found that harness the entrepreneurial energies of the new media industries, and their growing interest in market-based local initiatives (like the booming commercial metropolitan Internet sites in the US), whilst linking creatively and positively to the fragmented sets of agencies involved, in the broadest sense, in the governance of UK cities (local authorities, development agencies, health, education and information institutions, firms, schools, the community and voluntary sector etc). Clearly, urban media 'Master plans' will be impossible: what is needed are strategic frameworks so that the innumerable local media investments and initiatives emerge to be more than the sum of their parts.

Finally, and most importantly, from the point of view of this paper, there needs to be a much more thorough-going attempt to link urban media strategies to the development of cities themselves, so ensuring that, wherever possible, synergies can be developed between media and place-based exchanges. Progress is being made here, however, at both the urban and regional levels. At the city level, strategic planners in cities like Amsterdam and Lille have already attempted to integrate new media into the future urban visions. In dozens of cities across the world, 'teleports' and 'telezones' have been designated in particular urban districts blending advanced office and business space and sophisticated telecommunications facilities. In the US, ambitious 'Smart City' new media strategies are tentatively starting to consider land-use planning and urban policy issues - as our discussions of strategic urban corridors and information districts demonstrate. Already, in some such (highly affluent) communities like Palo Alto and Blacksburg Virginia, very high levels of Internet and e-mail access and use have begun to transform the communicational fabric of urban areas as these new media become woven into the fabric of urban life (see Graham and Marvin, 1996) Predictably, in a private-sector-led planning process, the consultancies engaged in 'Smart Community' planning argue that "cities unprepared for these [new media-based] changes risk being consigned to geopolitical obsolescence before they even know what hit them" (International Center for Communications, 1997).

In the UK, the packaging of IT infrastructure with individual land-use developments - business parks, 'telecottages', 'wired villages' etc - is increasingly common. But efforts are also starting to link broader urban media strategies with urban-wide development strategies. After a period when grant, training and technological support was 'pepper-potted' through the city, Manchester is increasingly gearing its broad telecoms and IT initiatives to specific urban redevelopment and re-use projects, and to strategic discussions about combating social exclusion in the City. A widening range of new physical, IT-oriented projects have emerged linked into the network services on offer: the Electronic Village Halls (linked to community centres

and initiatives through the City), existing managed workspaces in New Mount Street, and proposed ones in the 'Northern Media Quarter', and a centre for Multimedia development and applications in Hulme (Carter, 1996). A similarly broadly-based IT and new media strategy, known as the GEMESIS project, is underway in adjacent Salford, backed by a broad partnership between the cable company, IT firms, local universities and training providers. In partnership with its university sector, Manchester/Salford, like German cities such as Berlin and Bochum, is also building a new broadband Metropolitan Area Network ('MAN') infrastructure ring in the City that will spur efforts to regenerate the inner city through research and development and scientific innovation.

Europe-wide, cities at the vanguard of new media strategies are co-operating through the 'Telecities' network to exchange experience, develop lessons for best practice, support pilot initiatives, and lobby the EU for further support. Telecities also links into Europe's efforts to support the emergence of what it terms a 'Regional information Society' through its broadly based Inter-Regional information Society Initiative (IRISI). This supports integrated packages of ICT based pilot projects in designated regions in sectors as diverse as education, health, social services, transport and logistics, media and public services. But, again, there exist few links between the way the EU is considering ICT applications, services, and infrastructure, and its broader considerations about its spatial development in the future (CEC, 1997).

'Information Districts' and 'Urban Televillages'

The final area where new media policy is becoming directly linked with policies for particular urban spaces is the emergence of 'information districts' and urban 'televillages'. Building on the debates about 'urban villages' in Europe, and the 'new urbanism' movement in the US, interest is growing rapidly in how media infrastructure and services can be designed and managed, geared to sustaining and feeding back on particular urban districts. In California, the concept of the 'TeleVillage' -- an integrated urban place supported by a whole suite of ICT infrastructures and services -- is gaining support. The Blue Line TeleVillage, a two square mile area on one of the new public transit corridors in LA, is based on a holistic strategy to manage land use, transport trips and electronic communications so that synergies emerge between the three, creating a 'liveable' community with reduced automobile use, higher community-based activities, and higher urban densities than in the usual LA suburbs (Siembab, 1995).

Physical places for supporting IT training and services - community centres, computer centres, telework centres, IT links in schools, hospitals, transport facilities and libraries, and electronic kiosks in public and semi-public spaces - are integral to the plan which is backed up by a broad, public-private-community partnership, and an extensive array of on-line public services. In partnership with the public transport operators in the LA region, a new fibre network is being developed to link together whole constellations of

TeleVillages across the region. Different packages of IT and telecoms infrastructure and services are being offered for different land uses; 'distributed' organisations are being encouraged; and attempts are being made to include more marginalised social groups. The philosophy is that IT-based retrofitting in existing US urban areas will mean that many urban problems might be addressed "with very little new physical construction and no dramatic changes in density" (Siembab, 1995).

The other emerging example of combining new media and urban regeneration at district level is the concept of the 'information district'. Here, the emphasis is on creating urban 'milieux' that sustain economic growth in new cultural and 'symbolic' industries, where informal face-to-face contact is essential, whilst also providing high capacity on-line linkages to the wider world. Such strategies are inspired by the emergence of 'information districts' described above. Most often, information district strategies emerge organically, as in the cases considered above - New York's Silicon Alley, Dublin's Temple Bar, and Manchester's Northern Quarter - where clusters of such industries emerge spontaneously in inner urban districts. Then, the challenge is to intervene to further support the growth of small and micro firms in the relevant sectors, whilst also ensuring appropriate property is available and that broader efforts are made to improve the broader urban realm and the contribution of the industries to the economic and social revitalisation of the city as a whole (Hill, 1997). Thus, both New York and LA have offered grant schemes and tax exemptions to small and micro firms in the new media sectors. Backed by the powerful New York New Media Association (NYNMA), specialised multi-media centres, offering managed workspaces and high-level telecoms bandwidth, have also started to emerge in Silicon Alley, as have dedicated venture capital funds and orchestrated events and programmes designed to encourage local face-to-face networking. Elsewhere in the USA, the city of Spokane, in Washington State, has wired up much of its downtown to attract multimedia firms.

In Europe, strategies at the neighbourhood and district level have begun to look to coherent interventions in the urban realm, new media, and, at the institutional level, to try and either sustain, develop or encourage, local clusters of multimedia firms Manchester has explicitly adopted the Silicon Alley model to support its Northern Media Quarter, on the edge of the city centre. Sheffield's well known Cultural Industries Quarter (CIQ) strategy, aimed at clustering the broadest possible range of media, design, music, film and cultural-related industries firms in one part of the City centre, is now backed-up by widening range of on-line services financed by a public private partnership called NEO (Hill, 1997). Dublin's Temple Bar district is backing up its physical regeneration efforts, weaving a parallel infrastructure for electronic, multimedia exchange.

In London's Soho media core, mean while, a specialised telecommunications network was recently constructed by a consortium of film companies called 'Sohonet'. This system links the tight concentration

of film and media headquarters in the district directly to Hollywood film studios, allowing on-line film transmission and editing over intercontinental scales, via highly-capable, digital, broadband connections. The network is seen as a critical boost to the broader global ambitions of the UK film and cultural industries.

Conclusions: Integrating Telecommunications into Urban Planning

In this paper we have attempted to demonstrate that new information technologies actually resonate with, and are bound up within, the active construction of urban places, rather than making them somehow redundant. Urban places and electronic spaces are increasingly being produced together. The power to function economically and link socially increasingly relies on constructed, material places which are intimately woven into complex media infrastructures which link them to other places and spaces. "Today's institutions" argues William Mitchell (1995; 126) "are supported not only by buildings but by telecommunications and computer software". Thus the articulation between widely-stretched media and telecommunications systems, and produced material places, becomes the norm. It is, indeed, a defining feature of contemporary urbanism. "Constructed spaces", continues Mitchell, "will increasingly be seen as electronically-serviced sites where bits meet the body -- where digital information is translated into visual, auditory, tactile or otherwise sensorily perceptible form, and vice versa. Displays and sensors for presenting and capturing information will be as essential as doors" (Mitchell, 1994). As cities extend into polycentric metropolitan regions, the spaces of the city are being constructed within broader, and more complex, urban fields, networked together by more sophisticated, integrative technological networks.

With the above examples, we have started to map the emergence of a potentially significant shift in urban strategies based around the idea of trying to shape how built spaces and electronically-mediated interactions work in parallel. Reviewing a set of innovative initiatives, it is apparent that planning initiatives are proliferating which try to actively shape the articulations between the development, and use of new media and communications technologies and urban places. Such initiatives are supported by widening efforts by planners, urban development agencies, transport bodies and media firms to understand the complexities through which electronically-mediated communications interact with land use, the urban realm, transport and face-to-face contact. Moreover, it is clear that the initiatives reviewed above are only the start. Virtually every western city worth its salt now seems to use 'cyber' and 'silicon' as obligatory prefixes in its urban marketing campaigns. Many beyond those discussed above are also exploring how they can address places and IT networks in parallel.

We would argue that the current growth of explicitly urban telecoms strategies and initiatives are broadly to be welcomed. This is for three broad reasons. First, they are acknowledgements that city-telecoms interactions are intrinsically bound up with contemporary metropolitan life. Second, these policies are based on much more sophisticated understandings of the complex and subtle relations between new media and urban life than those 'Death of Distance' or 'End of Cities' ideas generally implied by dominant 'information society' debates. And third, these proliferating policies suggest that the articulations between

urban spaces and new media technologies are open to innovative, local, and planned interventions which can bring benefits which neither untrammelled market forces nor distant central state hierarchies can deliver.

But what might these nascent policies mean for urban planning and urban development more broadly ? Obviously, speculation is difficult in such an embryonic policy arena.. In these conclusions we would therefore like only to address two key questions. First, are urban telecommunications initiatives likely to be able to succeed in shaping positive synergies between place-based interactions and development and electronically-mediated interactions and development ? Or are they merely stylistic and symbolic, aimed at adding value and high-tech kudos to prestigious real estate developments ? Second, what might these initiatives mean for broader notions of the 'city' and for ideas of integrated metropolitan-wide planning? More particularly, are these initiatives likely to reinforce and recreate new forms of socio-economic exclusion and environmental damage, or might they genuinely emerge as useful attempts to develop a more inclusionary and sustainable urban futures?

Turning to the first question, we must first sound some notes of caution. For, despite the widening range of initiatives, we remain highly cautious of their current usefulness, in terms of both their magnitude and direction. In terms of their magnitude, we must raise serious warnings against *overstating* the potential role of telecommunications and information technology in urban strategies. Whilst most approaches to urban strategies are still grappling with new ways of planning for transportation grids and urban places in parallel, it is still the case that electronic interconnections and networks are most often still hidden and taken-for-granted.

In terms of direction, it is clear that even when land use, transport and telecoms are considered in parallel, real progress will only come when two further problems are addressed. Firstly, policy makers will need to actively fight against prevailing assumptions (which are actually deeply embedded within western culture as a whole) that new technologies can somehow be rolled out as technical 'quick fix' solutions to complex urban problems. In a context where most urban policy-makers and planners lack knowledge and experience of the telecommunications sector, there is the danger that urban strategies could uncritically embrace the transformational rhetoric that characterises contemporary notions of technology 'impacts' upon the city that we touched on at the start of this paper. New telecommunications initiatives are still often intimately connected with utopian and deterministic ideas of technology's beneficial and linear impacts upon the social, environmental and spatial development of cities. Developing more nuanced and sophisticated concepts of the potential roles of telecommunications in urban strategy will require policy-makers to look more critically at the role of technology in contemporary urban strategies.

Achieving this, however, is difficult for another reason. Powerful media and technology firms are exploiting the hyperbolic rhetoric of 'cyberspace', the 'information superhighway' and the 'global information society' to enrol poorly-informed urban public policy makers into making local 'partnerships' to develop new information districts, communications corridors, and 'high tech' economic development zones of various sorts. Growing inter-urban competition, and the tendency for urban policy makers to jump on the latest policy band wagon, is being exploited by a wide range of consultants and media conglomerates. Such organisations are keen to add value and symbolic kudos to their own efforts to build up demand for new configurations of real estate and developed spaces, and all the associated technological hardware and services embedded in them. Public subsidies, discounted land deals, infrastructural assistance, credibility and the sheer marketing weight of public policy makers can do much to raise the profile of new, planned 'high-tech' spaces (and, therefore, developer profits).

But the real benefits of such initiatives to localities may be dubious or massively over blown because they remain inappropriate to real local needs. Thus, planners and local policy makers need to educate themselves as quickly as possible about the burgeoning worlds of new media technologies,. They need to be wary of being seduced into expensive partnerships of dubious real local benefit by the lustrous promises of information age hyperbole. It is here that critical local debate about the real communicational needs of urban places, and the policy models that derive from these, is necessary.

Above all, planners must be sensitive to the important *symbolic* power of information and new media technologies, as signifiers of 'high tech' modernity. They must also be attentive to whose interests this symbolic power serves and how. Arguably, this symbolic power (which, by its very nature is very visible), is as significant, perhaps more significant in some cases, than real new applications or telecommunications infrastructures (which often remain unknown or hidden). Labelling a place 'cyber' this, 'silicon' that, or 'tele' something else, is an affirmation that it is switched in to global circuits of economic, cultural or social exchange via electronic networks. It is a potent, symbolic, attempt to lure in mobile capital, people and investment, which adds value to fixed infrastructure, land, and real estate even when they are clearly in tension with highly dynamic and mobile flows of services, media, information and money over telecommunications grids.

Such symbolism can take extreme forms. At one stage, for example, Edinburgh city council considered building an artificial satellite dish on its Maybury business park because BT argued that there was no technological need for there to be one in the City (which still has 'world-class' satellite facilities accessible from other places) (Graham, 1999). Of course, if local policy makers willingly embrace this symbolic power and use it creatively to their own advantage, through place marketing strategies and the like, all well and good. But they must be careful not to be duped by it, and not to uncritically believe all the promises of

corporate and media firms that this new (publicly subsidised) media or IT network will miraculously solve all local problems of traffic congestion, social polarisation, economic development, environmental sustainability, and so on.

Which brings us on to our second question: what might these initiatives mean for broader notions of the 'city' and for ideas of integrated metropolitan-wide planning? Here, too, there is a need for concern. In the light of the above discussion, we clearly need to unpack the social assumptions and biases built into current urban telecommunications initiatives. We need to ask how urban telecommunications initiatives might link to wider urban debates around social equity, the public realm and culture, economic development, and environmental improvement. With such a strong supply push from powerful media and real estate interests, there are clearly dangers that urban telecommunications strategies are being configured in highly biased ways that might perpetuate and reinforce widespread existing trends towards social and spatial polarisation in urban areas.

The danger is that the foci of initiatives will centre overwhelmingly on configuring new media technologies according to the needs and geographies of affluent, privileged nodes, spaces and corridors in metropolitan regions whilst ignoring and excluding marginalised zones. The former, of course, are already at the vanguard of IT applications and are the 'hot spots' of demand for all forms of telecommunications and media applications and services (Graham and Marvin, 1996). In the context of liberalising telecommunications regimes, the risk is that market forces will encourage both corporate and media interests and urban policy makers to invest their efforts in communications corridors for the highly mobile, information districts for the information elites, and media consumption spaces for affluent professionals with high disposable incomes. In short, urban telecommunications strategies may simply work to extend the existing relational privileges of powerful zones, spaces and interests in the city.

Such fragmented policy 'packages,' superimposed as patchworks across the urban landscape, reflects wider trends within urban governance towards the collapse of the notion of coordinated, metropolitan-wide planning (Graham and Marvin, 1999). Complex patchworks of special interest zones and public-private governance initiatives are tending to replace systematic, metropolitan-wide public planning (Boyer, 1996). As Bosma and Hellinga (1998, 16) argue, in contemporary planning practices, "the primary matter of importance is no longer an integral approach, but the cheerful acceptance of regions as an archipelago of enclaves".

Urban telecommunications initiatives are clearly contributing to such an 'archipelago of enclaves'. The worrying thing about the urban telecommunications initiatives reviewed above may work to both reflect and sustain wider social polarisation trends. Thus, within cities, smart transport corridors and 'wired' enclaves

might support forms of “telematics super-inclusion” (Thrift, 1996) for elite groups, allowing them to live in cocooned (often sometimes walled) enclosures, whilst still accessing personal and corporate transport and telematics networks. Meanwhile, however, a short distance away, in the interstitial urban zones, there are likely to be “off-line” spaces (Graham and Aurigi, 1997), or “lag-time places” (Boyer, 1996; 20). In these, often-forgotten places, access to the new technologies will remain highly problematic. Time and space will remain profoundly real, perhaps increasing, constraints on social life, because of welfare and labour market restructuring and the withdrawal of banking and public transport services.

But perhaps we are being too negative here. For we must also stress the positive potential of urban telecommunications initiatives as well as the need to be wary of their symbolic power and cautious of the possibilities that such initiatives may reinforce urban social and spatial polarisation. Progressive, inclusionary telecommunications and IT policies, integrated into particular urban strategies and designed to tie cities together rather than split them apart, might have important, positive roles in shaping the articulation between place-based and electronically-mediated realms. They might help, quite literally, to ‘ground’ the globally-integrating world of new media interactions, making them more meaningful in real places, real communities, real lives. Such initiatives may help to ‘embed’ new technological innovations in particular places, rather than just supporting an ever-more momentous de-localisation through market-driven forces of globalisation in the economy, society and culture. And, given enough stress on the needs of low income communities, such initiatives might actively counter wider urban polarisation trends (see Schön et al, 1997).

Indeed, one might even argue that *without* active, progressive resistance to untrammelled globalisation and the colonisation of local spaces by global media markets, mobilised through the rubric of creative, place-based, IT strategies, social need, the particularities of place, freedom of expression and local cultural diversity may tend to be squeezed out of the corporate, commodifying logic of globalisation. As Grossman (1995) puts it, “media conglomerates will not fill the vital educational, civic, and cultural needs” of real places and real cities. Strategies like the one in Manchester show that, just because privately-inspired urban IT initiatives have followed a particular trajectory, this does not mean that these cannot be challenged by incorporating wider social and environmental concerns into policy development.

Acknowledgements

We gratefully acknowledge the support of DEMOS and COMEDIA, particularly Ken Worpole, Bill Solsbury, and Liz Grenhalgh, which allowed us to undertake this research. Thanks also to the anonymous referees who provided very useful comments on earlier drafts. Responsibility for contents, of course, rests with the authors.

References

- Association of County Councils (1996) *Green Communications: planning for telematics, teleworking and telecounties*, Environment Committee.
- Bosma, K. and Hellinga, H. (1997), "Mastering the city". In Bosma, K. and Hellinga, H. (eds.) *Mastering the City*, Rotterdam; NAI Publishers.
- Boyer, C. (1996) *Cybercities: Visual Perception in an Age of Electronic Communication*, New York: Princeton University Press.
- British Telecom (1992) *A Study of the Environmental Impact of Teleworking*, A Report by BT Research Laboratories.
- British Telecom (1997) *Telecommunications technologies and sustainable development - a guide for local Authorities*.
- Carter, D. (1996), "'Digital democracy ' or 'information aristocracy '? Economic regeneration and the information economy". In B. Loader (ed) *The Governance of Cyberspace*, London: Routledge, 136-154.
- Castells, M. (1997), *The Rise of the Networked Society*, Oxford: Blackwell.
- CEC (1995) *Contributions of the information society to sustainable development*, ECOTEC (1996), *Information and communication technologies for sustainable technical development*, Final report.
- CEC (1997) *European Spatial Development Perspective*, CEC: Brussels.
- CEED (1992) The Environmental Impact of Teleworking, pp.10- 11, UK *CEED Bulletin* No 38, March-April.
- Demos Collection (1997), *The Wealth and Poverty of Networks*, London: Demos.
- Department of Energy (1994) *Energy, Emissions and the Social Consequences of Telecommuting*, Energy Efficiency in the US Economy, Technical Report One, DOE/PO-0026.
- Economist, (1995), *The Death of Distance*, Telecommunications Survey, 30th September- October 6.
- Environment* (13th Nov 1997) Flexible working could reduce traffic.
- Fitzpatrick, T. (1997), "A tale of tall cities", *The Guardian On-Line*, Thursday February 6, pp 9.
- Gosling, P. (1997), *Government in the Digital Age*, London: Bowerdean Press.
- Graham, S. (1998), "The end of geography or the explosion of space ? Conceptualising space, place and information technology", *Progress in Human Geography*, 22, 2.165-185.
- Graham, S. (1999), "Satellite dishes". In S. Pile and N. Thrift (eds) *City A-Z*, Wiley, London

- Graham, S. and Aurigi, A. (1997), "Virtual cities, social polarisation and the crisis in urban public space", *Journal of Urban Technology*, 4(1), 19-52.
- Graham, S. and Healey, P. (1998), "Relational theories of time and space: Issues for planning theory and practice", Paper submitted to *European Planning Studies*.
- Graham, S. and Marvin, S. (1996), *Telecommunications and the City: Electronic Spaces, Urban Places*, London: Routledge.
- Graham, S. and Marvin, S. (1999), *Splintering Networks/ Fragmenting Cities: Urban Infrastructure in a Global-Local Age*, Routledge: London.
- Grossman, L. (1995), "Maintaining diversity in the electronic republic", *Technology Review*, November/December, 23-26.
- Hill, D. (1997), *Cultural Industries in the Digital City*. Unpublished MA Dissertation, Manchester Metropolitan University.
- Hill, S. (1988), *The Tragedy of Technology*, Pluto: London.
- International Center for Communications (1997), *Building Smart Communities*, Guidebook, January.
- Landry, C. and Bianchini, F. (1995), *Creative Cities*, London: Demos.
- Lash, S. and Urry, J. (1994), *Economies of Signs and Space*, London, Sage.
- McElvogue, L. (1997), "Bright sites, big city", *Guardian On-Line*, Thursday February 20, 2-3.
- Martin, W. (1995), *The Global Information Society*, Aldershot, ASLIB.
- Marvin (1997) "Environmental Flows,: Telecommunications and the Dematerialisation of Cities", *Futures*, Vol 29, No1.
- Mitchell, W. (1994) "Building the bitsphere, or the kneebone's connected to the I-Bahn", *I.D. Magazine*, November 1994.
- Mitchell, W. (1995), *City of Bits: Space, Place and the Infobahn*, Cambridge, Ma: MIT Press.
- Mokhtarian, P. (1990) Relationships Between Telecommunications and Transportation, pp.231-242, *Transportation Research*, Vol.24A, No.3.
- Montgomery, J. (1995) "Urban vitality and the culture of cities", *Planning Practice and Research*, 10,2: 101-109.
- Moss, M. and Townshend, A. (1997), "Manhattan leads the Net nation". Available at http://www.nyu.edu/urban/ny_affairs/telecom.html.
- Mulgan, P. (1991), "The changing shape of the city". In Stuart Hall and Martin Jacques (eds). *New Times*, London: Lawrence and Wishart.

- Negroponte, N. (1995), *Being Digital*, London: Hodder and Stoughton.
- Nilles, J., Carlson, F., Gray, P. and Hanneman, G. (1976), *The Telecommunications-Transport Trade Off*, Chichester; Wiley.
- Office of Tecehnology Assessment (1995), *The Technological Resahping of Metropitan America*, Washington: Congress of the United States.
- Roarke Associates, (1994) *Telecommuting offices - A proposal for congestion relief on London and S E England Rail services*, Roarke Associates.
- Robins, K. (1995), "Cyberspace and the world we live in" in Mike Featherstone and Roger Burrows (eds.), *Cyberspace/Cyberbodies/Cyberpunk* London: Sage, 135-156.
- Schön, D., Sanyal, B. and Mitchell, W. (eds) *High Technology and Low Income Communities*, MIT Press, Cambridge, Ma.
- Schuler, D. (1996), *New Community Networks: Wired for Change*, New York: Addison Wesley.
- Scottish Office (1993) *A national driver information and control strategy for Scotland*, A consultation document.
- Siembab, W. (1992) *Metro Net, Fibre Optics and Metro Rail: Strategies for Development*.
- Telecommunications for Clean Air (1994) South Coast Air Basin, *Institute for Local Self Government* .
- Thrift, N. (1996) "New urban eras and old technological fears: reconfiguring the goodwill of electronic things", Urban Studies, 33(8), 1463-1493.
- Thrift, N. and Olds, K. (1996) "Refiguring the economic in economic geography", *Progress in Human Geography*, 20(3), 311-337.
- Times*, (9 July 1997), "Teleworking could save a billion".
- Wakeford, N. (1996), *Developing Community Intranets: Key Social Issues and Solutions*, Paper for BT.
- Warren, R. (1989), "Telematics and urban life", *Journal of Urban Affairs*, 11(4), 339-346.