

Stephen GRAHAM*

PLANNING FOR THE TELECOMMUNICATIONS-BASED CITY: EXPERIENCE AND PROSPECTS

Abstract: This paper analyses the experience in applying ‘telematics’ networks and services to confront the urban policy and planning challenges facing cities. Telematics – the result of the convergence of telecommunications and computing technologies – are important facilitating technologies behind current processes of urban restructuring. But they are also a prime focus of current urban policy innovation. Three particular areas of such innovation are discussed in this paper: using telematics for urban economic development, developing social and community telematics applications, and networking between different cities. A wide range of policy experience is analysed in each area. The paper concludes by highlighting the continued importance of national policies in shaping urban policy in this area, and suggests how this new wave of urban telematics policies may play an important role in developing a place-based politics for shaping progressive urban change in the new global era.

Key words: urban policy, telecommunication studies.

1. INTRODUCTION

The radical social and economic restructuring of the past fifteen years, caused by the crisis in Fordist-Keynesian form of capitalist development and regulation, has brought many new and difficult challenges to city authorities. The restructuring of the world economy, and the associated dislocation of the traditional economic base of most cities, has meant that the dominating concern of city authorities has shifted (HARVEY, 1989; LEITNER, 1990). No longer is urban governance concerned solely with managing the delivery of collective and welfare services, as they were during the bulk of the post-war boom (HAMBLETON, 1992). High unemployment, rapid structural economic change

* Centre for Urban Technology (CUT), Department of Town and Country Planning, Newcastle University, UK.

and the growing openness of urban economies to global economic forces has meant that the development of entrepreneurial strategies for economic and social development is now a key urban policy priority (PICKVANCE and PRETECEILLE, 1991). The driving imperative now is to ensure that a city's economy is well situated to grow and prosper as a node in the global economy (AMIN and THRIFT, 1993; KNIGHT and GAPPERT, 1989). This policy shift involves a wide variety of urban policy innovations aimed at attracting new inward investment and urban marketing, as well as mobilising the indigenous potential of cities for shaping new forms of economic and social development and local institutional structures (CAPPELIN, 1991).

Three main urban policy challenges arise as a result of this shift in the orientation of city government. First, how do you ensure that your city competes successfully in the increasingly fierce international marketplace for investment? Second, how do you make sure that your indigenous firm base is dynamic, innovative and competitive as the globalisation of markets develops? Finally, how do you maintain the social cohesion of your city, when most forces for economic development appear to be polarising and fragmenting the city?

The converging set of telecommunications and computing technologies and services – often referred to collectively as ‘telematics’ – hold an ambivalent place in this set of urban challenges. The so-called ‘Plain Old Telephone Service’ (or ‘POTS’) era – where national telephone monopolies developed basic telephone services delivered on universal service criteria – is now being restructured in parallel with the restructuring of the global economy. Technological convergence between now largely ‘digital’ telecommunications systems and massily-diffused computers is laying the foundation for a proliferation of new ‘telematics’ services. These are services which involve communication between computerised equipment over telecommunications systems. They fall into three types: new types of electronic communications services such as electronic mail and other type of electronic messaging; new types of electronic information services such as on-line databases and viewdata services; and new electronic transactional services such as electronic fund transfer and electronic data interchange (THOMAS and MILES, 1989).

Interwoven with these technological changes are radical political changes, as the national monopolies built up to extend the phone into a universal service are steadily being broken down (NOAM, 1992). Involved here are the progressive liberalisation of communications markets and, in the case of Britain, the privatisation of the public monopoly operator, British Telecom. Thus a complex transition from a public communications monopoly to a private communications marketplace is developing. Cities play a key role in this transition. The continued concentration of information and communications-intensive economic sectors in urban areas makes them the dominant centres of demand in this growing communications marketplace for telematics services (GRAHAM, 1992). Conse-

quently, cities, and the corridors between them, are the main centres of investment in new telecommunications infrastructures; urban markets dominate the minds of old suppliers and new entrants alike (HEPWORTH, 1989). Although the forces surrounding the move from the 'Plain Old Telephone Service' era into the 'telematics era' are general ones, important national differences remain in approaches to the regulation of telematics (UNGERER, 1990; NOAM, 1992). In all western nations, however, technological change, business pressures and political moves towards neo-liberal agendas, means that there is now some pressure for the proliferation and liberalisation of services, the emergence of non-voice telematics services as key areas of innovation, and the development of marketplaces for telematics services (NOAM, 1992).

The application of this wide range of new telematics networks and services is interwoven with the economic restructuring which is going on in cities. The global economic restructuring that has devastated the economic and physical fabric of many cities has been based, at least in part, on the use of the new capabilities offered by telematics networks and services (HARVEY, 1989). Computer networks allow large organisations in manufacturing, services and government to restructure into leaner, fitter and more competitive entities operating in global contexts. The new capabilities they offer for integrating many nodal sites into coherent organisational networks is based on the phenomenon of real-time 'telepresence', developed using telematics networks. Cities need therefore to consider their roles within this restructuring, as localities within the new 'hyperspace' of telematics-mediated globalisation (HARVEY, 1988). This is particularly important because the collapsing barriers of space and time which are associated with these new processes of economic geography fuel the competitive struggle between cities for new sources of economic activity and opens urban economies ever-more to processes of global economic change (HARVEY, 1988).

It is increasingly apparent, however, that – as well as being central in urban economic restructuring and social change – telematics also offer new possibilities for confronting and meeting these new policy challenges at the urban level. Telematics networks and services have considerable potential as policy tools for local economic development, community regeneration and public service improvement within cities. Moreover, there is increasing evidence that this potential is now being actively explored (OECD, 1992; GRAHAM and DOMINY, 1991). All over the western world, city authorities of many political persuasions are now trying to explore the new capabilities offered by telematics as components of new social and economic strategies. Telematics are becoming one of the main foci of urban policy innovation as city authorities attempt to assert themselves in the face of these unprecedented urban challenges using new entrepreneurial strategies (OECD, 1992).

This paper reviews the international experience to date in using telematics to help confront contemporary urban policy challenges. The paper provides an in-

ternational analysis of some of the initiatives in the three main areas of urban telematics policy innovation which have emerged so far. These are: using telematics to boost urban economic development; the use of telematics as stimuli to social and community cohesion within cities; and finally, the recent emergence of telematics-based networks of collaboration between cities. Following this, by way of conclusion, the paper speculates on the importance of national approaches to the regulation of telematics and urban economic policy as factors conditioning how urban telematics policies are developing within that state. This leads on to an assessment of the potential importance of this new wave of urban telematics policy innovation to the search for new concepts of progressive urban politics and development in the global era.

2. BARRIERS TO URBAN TELECOMMUNICATIONS POLICIES

Nearly a hundred years after telephone networks first became a basic part of the infrastructural makeup of cities, city authorities are now beginning to systematically try and shape how telecommunications networks and services develop within their boundaries through a wide variety of urban telematics initiatives. Aside from a few municipal telephone systems in the 1920s and 1930s, only one of which remains – in Hull – this has not happened (PERRY, 1977). Why is this only now beginning? By striking contrast, municipal intervention in urban transport, water, waste, and even energy infrastructures has a long and complex history (cf. WARD, 1990; COLLINGE, 1992). Certainly, intervention in physical urban infrastructural systems such as transport and water systems is, it seems, absolutely central to the history of municipal government (RAINER, 1990).

Three reasons can be suggested for this curious municipal neglect of telecommunications. The first is the intangibility and invisibility of telecommunications infrastructure. The roles and effects of urban telecommunications infrastructures are still far less tangible to policy makers than are those of, say, roads and railways (BATTY, 1990). As infrastructures, telecoms are physically very compact and are generally either invisible or relatively benign to the environment. They are also very much taken for granted, a function also perhaps of the arcane terminology which dominates the field (MOSS, 1987). Moreover, unlike transport and water infrastructures, telecommunications have only a marginal influence on property rights. These characteristics mean that telecommunications are rarely the source of the land use or local political dispute which commonly require local policy intervention in transportation infrastructures and other physical 'conduits' such as energy and water infrastructures. Indeed, the intangibility of telecommunications infrastructure mean that even identifying the

concrete negative and positive externalities of new investments on specific cities is extremely difficult (TUCNY, 1993). This still tends to mean that communication is not generally treated as part of the technical infrastructure of urban life (MANDELBAUM, 1986).

Secondly, electronic communication tends not to be treated seriously in most urban and regional development theory (HEPWORTH, 1989). Most models and theories of urban development give no place to the strategic role of information and electronic communication in the urban development process. The costs of transaction in an urban economic system (information search, collection, storage etc.) are often assumed, wrongly, to be zero (NICOL, 1985).

The third factor is that, telecommunications development has, for the bulk of the post-war boom, been nationalised through the development of Postal, Telegraph and Telephone authorities (or PTTs) with monopoly control over telecommunications (NOAM, 1992). Because PTTs were geared to develop telecommunications for universal social and geographical access, this led to a process of geographical equalisation between and within cities in terms of their telecommunications infrastructure (CORNFORD et al., 1992). This reduced the salience of telecommunications within cities and served to divorce city policy makers from telecommunications policy makers.

3. EMERGING DIMENSIONS OF URBAN TELEMATICS POLICY

It is clear, then, that city authorities tend to face many difficulties in even finding out about their telematics infrastructures, let alone attempting to begin influencing them through new policy innovations. Positively addressing the new field of telecommunications in ways that help meet the new challenges to urban policy makers is certainly no easy task. It is, however, a task that is now being undertaken in city authorities right across the advanced industrial world. The sheer weight of the new urban political imperative to develop entrepreneurial development strategies for cities is irresistible (MAYER, 1992). When combined with the growing realisation that telematics hold great potential as policy tools, the result has been that there are even signs of an urban telecommunications policy 'bandwagon' beginning to roll (GIBBS, 1993).

Within this broad and complex picture of policy innovation, three separate areas of emerging urban telematics policy stand out. These reflect efforts to begin applying the new informational, communicational and transactional capabilities of telematics to the different dimensions of the urban policy challenge mentioned above. The three areas are: using telematics to boost urban economic development; developing social and community applications of telematics in cities as a way of improving social cohesion; and, finally, developing collabora-

tive networks between cities based on telematics applications. Table 1 draws together examples of new communications, information and transactional services are being applied to these different types of urban policy area.

3.1. Telematics and urban economic development

Not surprisingly, it is the economic imperative that is proving the most powerful stimulant to urban telematics policies at present (CORNFORD et al., 1992). This concern to secure urban economic 'regeneration' at least partly through intervention in telematics takes two forms. The first is the concern to enhance the competitive position of the city's economy as a node in the national and, increasingly, international urban system. The second is to use telematics as tools for promoting the cohesion of the local economy, by linking together local – usually small – firms, business development agencies and business service providers into collaborating networks, thus making the most of the indigenous economic and technological potential of the city.

Nationally and internationally-focused urban economic initiatives which use telematics are usually called 'teleports'. The thirty or so operational teleports in western cities actually involve a variety of different kinds of initiatives (IBEX, 1991). Municipal and central government involvement in teleports also varies considerably. The one thing they have in common is that they are attempts to use advanced telecommunications and telematics networks and services to enhance the development prospects of cities, or parts of cities, in the national and international urban system. This ambition to catalyse the economic regeneration of cities through telematics is epitomised by the views of the Mayor of Metz, a declining industrial city in France which has developed a teleport. He declares that "from a disabled region we have succeeded in building a centre of excellence in telecommunications" (quoted in BAKIS, 1992).

Teleports effectively consist of nodes for advanced national and international telecommunications services, implanted into a part of a city and linked usually to local telecommunications networks for distributing access to the services. Many other telematics based and non-telematics based shared access services are often provided to teleport users. Services offered usually include high capacity international telecommunications (often with direct satellite uplinks), media transmission, centralised data processing services, security services, video conferencing, advanced communications management and shared access information services. Transactional telematics services such as Electronic Data Interchange are sometimes promoted, such as at Bremen teleport, where the aim is to enhance the global competitiveness of the city as a seaport and logistics centre (IBEX, 1992).

Table 1. Emerging examples of urban telematics initiatives: communications, information and transaction

Types of telematics services	Policy objectives			
	indigenous local economic development	inward investment and international competitiveness	social and community cohesion	interurban networking
COMMUNICATION SERVICES (electronic mail, messaging etc.)	Local host computers and viewdata messaging between small firms (e.g. Prato Italy, Kirklees 'host'). High technology support networks in France.	Advanced Teleport, ISDN and cable services for broadband international communications, Metropolitan Area Networks (e.g. Roubaix Teleport, New York Teleport).	"Electronic Public Spaces" – 'host' and viewdata messaging between voluntary groups and social organisations, community e-mail services (e.g. Manchester 'host').	Inter-municipal electronic mail and viewdata messaging (e.g. Réseau Villes Moyennes (RVM) network in France). Interurban technology support networks.
INFORMATION SERVICES (on-line databases viewdata information etc.)	Business and European data-bases, trading opportunities, access to commercial information services (e.g. Manchester 'host')	Specialised Services to large network users in teleports.	Voluntary sector databases and bulletin boards (e.g. Manchester 'host').	Municipal troubleshooting services on Réseau Villes Moyennes (RVM) viewdata system in France. Databases of 'best practice'.
TRANSACTION SERVICES (electronic data interchange, electronic fund transfer, trading systems).	Local Electronic Data Interchange (EDI) systems and trading networks e.g. Prato textiles network.	Yet to be developed – private networks predominate.	Alternative trading systems on-line.	Global trading networks (e.g. Manchester – Bangladesh trading links).

Often teleports form the centrepiece of ambitious urban redevelopment plans, with new office, industrial and housing property developed around the facility. This is the case as at Amsterdam, Osaka, Cologne and Tokyo. The eight French teleports, designated in what are called *zone de telecommunication avancée* (or ZTAs) by France Telecom, are integrated into the wider set of ambitious high technology development strategies – known as technopoles – which are developing there (BRIOLE and LAURAIRE, 1990). Teleports have potent marketing potential for place marketing (CORNFORD et al., 1992). Indeed, teleports can be seen as part of an effort to make urban telecommunications infrastructures less invisible, so conferring ‘hi tech’ images to places as part of the wider imperatives of securing inter-area competitiveness or high value-added property development.

More widely, through their catalytic function, municipal authorities see teleports as potential centres of excellence and innovation in business telematics. A common approach is to tailor the teleport to the specialised needs of a key local economic sector, whether it be media industries (Cologne Media park), financial services (Edinburgh Teleport), textiles (Roubaix teleport), high technology research and development (Sophia Antipolis in France) or maritime, port and logistics industries (Le Havre maritime city initiative and Bremen teleport). Increasing policy efforts are going into educating and training firms to be able to use and develop teleport applications. After all, without the infrastructure being actually used there is little chance of it having any positive effect on local economic fortunes.

Through the creation of ‘hot spots’ of telematics demand in these key sectors, teleports aim to emerge as centres for the diffusion of innovation into the wider urban economy, as well as providing new linkages between the urban and the global economy. This may improve economic competitiveness and the chances of attracting inward investment as a result and linking these new services to the needs of key sectors of the city economy. Technological change is taking away the *raison d’être* for teleports. Satellite earth stations are becoming much cheaper and more compact; national and international optic fibre infrastructures are now developing to the level where teleport-style services can be delivered to virtually any city, without the need for a teleport. There are also questions over the efficacy of municipal investment in such schemes. Because new teleport based networks are most likely to service existing private interests of multi-site organisations, the policy may simply exacerbate the problems of weak urban economies through opening them up further to the whims of large global firms (GILLESPIE, 1991; GIBBS, 1993). Andy Gillespie even suggests that:

[...] the first element of ‘local interest’ strategy’ for advanced communications, and perhaps the most difficult conceptually as well as politically, is to face the possibility at least that the bias inherent in existing networks is unlikely, given the prevailing balance

of power within society, to be deflected and that, in consequence, rather than embracing such networks with the intention of deflecting their deleterious impact upon local economies, such networks should instead be resisted (GILLESPIE, 1991).

The second urban economic objective driving telematics policy innovation in cities directly reflects this concern to add coherence in the indigenous local economy, rather than simply to open it up to global economic forces using telematics. Certain cities, realising that a telematics strategy geared towards the needs of indigenous industry would be very different to the 'local – global' initiatives epitomised by teleports, are now trying to use telematics to forge new local economic networks. This stems from the common view that urban economies are, in a sense, disintegrating into those parts, dominated by multinational, large firms which are linked into national and international telematics networks – and so 'disembedded' from the city (LOVERING, 1988; CORNFORD and GILLESPIE, 1992) – and the less sophisticated, usually small firms who tend to be excluded from the benefits offered by telematics services (cf. GIBBS, 1993; LOVERING, 1988).

It is increasingly recognised that the telematics-mediated development of large organisations, where cities fight to emerge as network nodes in global networks, has been a key facilitating factor behind the growing disintegration of the economic fabric of many cities (WARK, 1988). Instead of the tightly integrated 'industrial districts' upon which many urban economies were initially founded, modern cities tend to lack large sectors of cohesively integrated industrial production, being dominated instead by services and large organisations who cross-cut the city's economy. Thus, globalisation "represents, above all, a greater tying-in and subjugation of localities (cities and regions) to the global forces" (AMIN and THRIFT, 1992). This apparent economic disintegration creates great concern to urban policy makers. Moreover, the much-celebrated (and often over-hyped) reemergence of a few new industrial districts, based on flexible networks of highly innovative small firms (PRATT, 1991) – such as Emilia Romagni in Italy – has led many city authorities to begin exploring the potential for adding greater integration and cohesiveness into their own local economies. Telematics networks are widely being seen as a useful potential policy tool for helping to stimulate this renewed local economic integration and cohesion. Again, as with teleports, however, there are dangers of relying on technological determinism here – assuming that the simple existence of technological potential for small firm linkages will mean that new industrial districts will automatically develop. The institutional barriers to small firm collaboration within cities are often formidable. The potential of telematics will only be useful when an existing culture for the sharing of information and services exists between small firms in a locality. Research on local economic networking suggests that, to have any impact of stimulate local linkages between innovative small

firms, a whole series of innovation-policies are needed, driven by a densely-interconnected range of development institutions (COOKE and MORGAN, 1991). Unless these certain basic structures already exist (AMIN and THRIFT, 1992), and the existing institutional fabric exists within which the necessary trust can develop between firms and development agencies, the potential impact of telematics in supporting the growth of new industrial districts will be marginal.

The first examples of telematics-based small firm networks developing in city economies were in central Italy. In Prato, the European-funded SPRINT initiative is using viewdata systems to link together 300 small textile firms so that common information exchange and collaborative mutually beneficial networks can develop (RULLANI and ZANFEI, 1988). The system is now under review, however, because of problems concerning competitive rather than collaborative use of the services and the asymmetry of information flows. The services offered include update on which firms are doing what, update on demand and supply of goods and services within the network of firms, teleconferencing, and fund transfer. Information, communications and transactional telematics services are therefore possible over the system. In addition, the system delivers shared services to the small firms: accounting, marketing, consultancy, management, which are organised over the viewdata system. The philosophy behind the initiative is that:

[...] the use of the telematics network not only entails easier communication within a district. It will also allow, in the future, the establishment of closer contact with outside firms and the projection of new products and structures. Telematics also constitutes a chance for a small district's small firms to reach an adequate degree of governance of complex problems, at least comparable to that of large firms, especially in the fields of technology, globality and the interaction with an advanced demand (RULLANI and ZANFEI, 1988).

Many other urban authorities are attempting to use telematics to boost their own efforts at stimulating similar networks of innovative small firms. In Kirklees, England, for example, a 'Host' computer system – simply a computer attached to the phone system delivering telematics services – is being developed primarily to support the area's small firm base. This initiative is a response to the local decline of textiles and the lack of technological innovation in the local small firm sector. The system will deliver, over the normal phone network, databases on local firms, business support information from development agencies, European information, and electronic messaging services both locally and internationally. The key is to develop local linkages and networks of small companies as a boost to competitiveness and innovation. In Manchester, applications of 'Host' messaging and information services are being designed to support a network of music and design companies in mutual collaboration. In the city of Duisberg, Germany, support services have been established to assist small firms

in using telematics applications and hardware, the objective being to "help the small and medium sized enterprises solving problems by using telematics facing the intransparency of the market" (LANGE, 1991). Similar initiatives to support telematics based innovation in small firms are also now underway in many west European cities.

3.2. Social and community applications of telematics

There has been much concern expressed recently that the main social effects of telematics applications is to promote the fragmentation and atomisation of urban society and local communities (e.g. NOWOTNY, 1982; CALHOUN, 1986; MURDOCK and GOLDING, 1989, ROBINS and HEPWORTH, 1988). This is for two reasons. First, because social access in cities to telematics networks and services is usually restricted strictly according to ability to pay in private markets. This creates great inequities in access to viewdata, electronic mail and computer hardware between the social groups and geographical neighbourhoods that make up cities (GOLDING and MURDOCK, 1986). Secondly, the concern is that the current focus on linking individual households into telematics networks will serve to reduce physical and face-to-face interaction in cities, so undermining the fundamental social and public foundations of cities.

This vision of the privatised, home-based city divided between network users and the excluded 'information poor' is captured by Kevin ROBINS and Mark HEPWORTH (1988). They speak of the possible emergence of cities made up of 'electronic households' – homes in which work, consumption and leisure activities are focused through the use of telematics networks geared only to those who can afford access to them. They argue that:

[...] the electronic household is the emblem of a new political economy in which the individual is addressed not as a citizen with social and political entitlements, but now as a consumer valued according to their ability to pay (ROBINS and HEPWORTH, 1988, p. 167).

Obviously, the poor, computer-illiterates and other disadvantaged or peripheral groups such as the disabled, ethnic minorities, women and remote rural communities would face further marginalisation from the sources of power, employment, information and services within such a scenario. This is especially so given that more and more of the mainstream aspects of society seem likely to become themselves mediated by telematics. Helga Nowotny has even suggested that "in the end, the kind of hyper-individualism which is promoted by the foreseeable users of new technology, is socially self-destructive" (NOWOTNY, 1982).

The challenge to urban policy makers is to provide more desirable and egalitarian alternative mechanisms whereby such dystopian scenarios can be avoided. New demonstrations of community telematics policies which support social integration and cohesion rather than atomisation are necessary. City authorities are increasingly attempting to develop social telematics networks to bolster urban cohesion. These address the interstitial space between the world of business and large administrative organisations – the production sphere – and the world of private homes – the domestic sphere. These are the two main foci of telematics investment and application in advanced Western cities so far. Thus, ‘community’ is conceptualised as the intermediate ‘public’ space between economic and domestic life (NOWOTNY, 1982).

The main types of services being used for developing social and community applications are cable, viewdata and HOST-based electronic messaging systems. A wide range of community access initiatives involving cable has recently been developed by city authorities in the USA. Using the First Amendment and local regulatory powers, cable access programming involving channels dedicated to community TV production are now common. These channels can be considered as ‘electronic public spaces’, which offer a counter to the extreme commercial dominance of the television marketplace found in the United States (AUFDERHEIDE, 1992).

Strikingly similar ideas fuel a wide variety of viewdata experiments in France linked with the ubiquitous Minitel system, (which now has 5 million terminals in use). The initiatives of the municipality of Marne la Vallee, near Paris, is typical (WECKERLE, 1991). Aiming to structure a whole new set of ‘modern public spaces’ based on publicly accessible information and communication services on Minitel, the city authority has made great efforts to develop a diversity of local social applications on the system, aimed at widening participation in telematics as much as possible. The hope is nothing less than a ‘reinvention of local democracy’ through Minitel-based networks between citizens, centres of education, social, organisations and municipal departments (WECKERLE, 1991). Most large French cities are now developing comprehensive strategies for communicating with their citizens, utilising dedicated communications budgets to tap into all the media at their disposal for engaging with their citizenry and local firms. Included here are: Minitel, cable, telephone helplines, radio and television, newspapers and brochures, films and audiocassettes (SIMON, 1991). Equally significant are current efforts in Santa Monica, and other Californian cities, to develop electronic messaging system between municipal departments and citizens, allowing conferencing to develop on key local issues (WITTEG, 1991). The resulting Santa Monica Public Electronic Network (PEN) allows for electronic town meetings between citizens across the city and elected representatives. It represents the best-developed example of a proliferating range of ‘public information utilities’ under development in US

municipalities. These aim to support new patterns of political participation and social debate which are unconstrained by constraints of space and time (GUTHRIE, 1991; DUTTON and GUTHRIE, 1992)

A slightly different approach is being taken by Manchester City council in the UK. In 1991 Manchester developed the first municipally-funded 'Host' computer system in the UK. Driven by the goal of developing a telematics culture in the City, beyond the enclaves of big organisations, the 'Host' offers electronic mail, bulletin boards and database services. These are accessible through any registered user by the use of a normal personal computer attached to the phone system. Through access to global electronic mail networks, the 'Host' also allows non-local communications. Social and community applications of 'Host' services are proliferating, linked to a network of community centres equipped to train a wide range of voluntary organisations and groups on computer and 'Host' skills. These centres are known as Electronic Village Halls or EVHs. Some represent geographical communities; others are geared towards the needs of 'communities of interest' on a city wide basis (women, the Bangladeshi community, disabled people etc). Their purpose is to ensure that "information disadvantaged groups are able to get access to the 'Host' facilities" (LEACH et al., 1990). Ultimately, the hope is to use 'Host' services, linked with EVHs and other social organisations, to found a wide range of social telematics networks in Manchester, so helping to overcome the risk of social atomisation and polarisation.

3.3. Collaborative networks between cities

The search for competitive advantage, and the disadvantages of cities engaging in unbridled competitive behaviour, fighting out a 'zero sum game', has begun recently to stimulate efforts at inter-urban collaboration rather than just competition. With the current 'hollowing out' of national approaches to urban policy (JESSOP, 1993), and with cities now engaging directly in negotiations with global economic actors, city authorities increasingly see the advantages not only of developing mutually advantageous networks with partners in their own nations, but also international networks with similar cities abroad. In the words of Eric Lavocat, of the French IDATE agency, a new set of urban policies are emerging based on a network of 'inter-town solidarity' (LAVOCAT, 1989).

Cities with shared experiences of economic restructuring or geographical position are therefore striving to develop mutual complementarities (ROBSON, 1992). Thus experiences and policy lessons can be exchanged, the lobbying for extra resources from national and supranational governments can be coordinated, and cultural links strengthened (PARKINSON, 1992). Such policies can

also work to enhance the economic integration between city economies, making the most of existing economic specialisations for mutual benefit (LAVOCAT, 1989). Finally, although there is little evidence of this so far, there are chances that the strategies of multinational corporations in promoting unbridled competition between cities may be countered in some way by these new collaborative urban networks.

Telematics are becoming a key focus of this emerging urban networking. This is an important trend, as it may signify the emergence of networks of inter-linked cities, based on telematics networks, as counterweights to the dominating telematics-based networks of global corporations, which fuel and benefit from competition between cities at present. They may help to overcome the 'asymmetry of information' in negotiations between global corporations and city authorities be reduced or overcome (CLAVEL and KLENIESKI, 1990). Manuel Castells even suggests that:

[...] on-line information systems linking local governments across the world could provide a fundamental tool for countering the strategies of flows-based organisations, which would then lose their advantage, deriving from their control of asymmetric information flows. Information technologies could provide the flexible instrument to reverse the logic of domination of the space of flows built by the processes of socioeconomic restructuring (CASTELLS, 1989, p. 353).

The ability of telematics networks to radically reduce the costs of transaction between city authorities offers great potential in facilitating new types and patterns of urban networking. Moreover, the first tentative signs are emerging to suggest that cities are beginning tentatively to explore Castells' vision of networks of collaborating cities based on telematics services. As with small-firm collaboration, however, telematics networks themselves are not sufficient to ensure that network collaboration develops between cities – a mutual organisational and institutional culture must develop also based on sharing complementarities and using the technological links in practice (see CLAVEL and KLENIESKI, 1990). The capabilities of telematics, however, for real-time interaction based on electronic information exchange, are particularly appropriate to the development of inter-urban networks.

Interurban networking is growing rapidly between cities in their own regional contexts. In the UK, the 'Host' computers in Kirklees are being offered as the 'mother' for applications in adjacent cities, bringing the new prospect of policy sharing between cities, in a literal sense which is simply not possible with conventional urban policies. In the border area between Germany and the Netherlands, 80 urban and rural public authorities are trying to use electronic mail service to overcome the problems caused by national boundaries as part of the 'EUREGIO' project (LANGE, 1991). Using electronic mail linkages, interaction between cities on either side of the border become both much cheaper than tele-

phone communications and much faster than post – both of which are inhibited by the national border.

France is particularly active in forging regional networks of urban collaboration, based on telematics networks (LAVOCAT, 1989). 'Le Reseau Villes Moyennes' (the medium-sized town network) – RVM, for example, links together hundreds of municipalities with an electronic messaging services for up-to-date information exchange. This is especially invaluable given the extreme fragmentation of the French municipal system. Also included on the RVM project is a project directory co-produced by all the towns so that data files can be accessed outlining the latest policy lessons from a wide range of different urban projects. Based on the ubiquitous Minitel telematics systems, the RVM "was born of a need to resolve the countless problems arising in daily municipal management: that of finding out, when faced with a problem, what solutions have been designed and tested elsewhere" (MARCOU, 1990). To avoid exploitation of the system, individual towns are obliged to balance their consumption of information with their production of new information of use to the rest of the network.

4. CONCLUSIONS: TELEMATICS AND THE PROGRESSIVE CITY ?

This paper has traced how city authorities across the developed world are beginning to use telematics networks and services in their efforts to respond to the new policy challenges facing them. In addition we have begun to analyse the emerging technological, institutional, economic and social issues surrounding these new policies, using various examples from a range of western cities. Telematics certainly seem to be providing one of the most promising directions within which urban policy innovation can begin to address the new challenges prompted by global economic restructuring. As a result, many western cities are now beginning to use telematics widely as policy tools. This can be understood as part of their wider attempts to mobilise all available local powers so that enterprising responses can be developed to the global economic and technological restructuring in which they are increasingly caught up.

Despite the fact that urban intervention in telecommunications networks and services has historically been curiously absent, the new dynamics of urban change seem to be bringing telecommunications and telematics rapidly to the top of the urban policy agenda. The result, as we have seen, is a complex and fast-moving vein of urban policy innovation encompassing the full breadth of urban economic, social and political issues. This wide front of policy innovation involves new urban economic initiatives involving telematics (teleports and interfirm telematics networks), new models for social and and community development (viewdata and community electronic messaging systems), and, in re-

sponse to the perceived dangers of unbridled competition between cities, new telematics-based efforts to develop mutually beneficial collaborative networks.

Despite their variety, at the strategic level, all urban telematics initiatives are being conditioned by new municipal efforts at defining and pursuing the 'public interest' in cities through exploiting the new technological potentialities of telematics. A tension running through all three policy areas described is the need to secure urban integration and cohesion, and to bolster the declining public dimensions of cities. Telematics policies are therefore being seen as potential counterpoints to the processes of economic and social fragmentation within cities which seem to be associated with the current era of global capitalist restructuring. Interestingly, though, telematics are themselves implicated as facilitating infrastructures for many of these processes of global economic restructuring and fragmentation, through the growing role of corporate telematics networks.

The new electronic messaging, information and transaction services are widely being seen as policy tools for resisting fragmentation and promoting cohesion within and between cities: between local small firms, between voluntary and social development organisations, between citizens and municipal government, and between different cities in regional, national and international collaborative networks. This wide variety of applications is summarised in figure 1. The growing use of telematics therefore represents an important component in the wider search for a new place-based politics within cities, as the response to the deconstruction and fragmentation of place gathers pace across the western world (KEATING, 1991; MAYER, 1992). The new capabilities of the technology clearly have much to offer this process, as city authorities continue to withdraw from their service management orientation and move towards what Robin Hambleton calls:

[...] an orchestrating role involving outward looking strategies designed to shape the local social, economic and physical environment, [...] 'working across the boundaries' of the public, private and voluntary sectors (HAMBLETON, 1992, p. 18).

Telematics clearly have a role to play in this new process of institution building, as cities attempt to find 'homes' for themselves in the global economy (AMIN and THRIFT, 1992)

Whilst the novelty of this complex set of urban telematics innovations makes generalisation decidedly hazardous, two concluding points can be made about this new and important vein of urban policy innovation. The first is that the potential 'manoeuvring space' within which cities can use telematics as new policy tools tends still to be conditioned by national approaches to telematics development and urban economic policy. Cities vary greatly in the financial, institutional and regulatory influence they have over the ways in which telecommunications develop within their boundaries and in the potential scope they have

available for influencing new developments and applications. Sweeping generalisations about this new area of urban policy are therefore likely to be misleading (GRAHAM, 1992). Different policy styles and different institutional alliances are necessary in different cities in order to begin the process of policy innovation in this new and complex area.

The second conclusion is that, in order to consolidate on initial policies, new visions of progressive urban life in the current era of intense global-local interplay will need to be developed within which the appropriate social, economic and political roles of telematics can be defined. The redefinition of the nature of the 'progressive city' in the current global era is already generating much literature. (e.g. KNIGHT and GAPPERT, 1989; HAMBLETON, 1992; KEATING, 1991). City authorities will never be able to counter the sheer political and economic weight behind the current transformation of telecommunications into 'telematics' and the emergence of the global communications marketplace. What they can do is develop specific initiatives which use these new technologies in socially and economically progressive ways which are especially suited to their areas. The key here is to maximise policy effectiveness within existing financial, institutional and regulatory constraints, so that telematics can be used as policy tools to help meet the needs of these new urban visions. Creating 'electronic public spaces', or 'public information utilities' as in France and the United States, is a good example of this. Another is the potential offered by local economic telematics applications to, as Ash Amin and Nigel Thrift put it, help "unlock new mechanisms for attaining some form of local economic integrity within global networks" (AMIN and THRIFT, 1993). However, the difficult learning curves facing urban policy makers when developing telematics initiatives mean that the level of debate surrounding telematics and cities will need to continue intensifying.

REFERENCES

- AMIN, A. and THRIFT, N. (1992), *Neo-Marshallian nodes in global networks*, "International Journal of Urban and Regional Research", 16(4): 571-587.
- AMIN, A. and THRIFT, N. (1993), *The local in the global*, Paper presented at the Challenges to Urban Management Seminar, Newcastle upon Tyne, March.
- AUFDERHEIDE, P. (1992), *Cable television and the public interest*, "Journal of Communication", 42(1): 52-65.
- BAKIS, H. (1992), *Geographical study of networks and telecommunications*, "Netcom", 6(2), April: 297-308.
- BATTY, M. (1990), *Invisible cities*, "Environment and Planning B", 17: 127-130.
- BRIOLE, A. and LAURAIRE, R. (1990), *Technopoles, teleports: les nouveaux enjeux*, "Netcom", 4(2), June: 359-379.
- CALHOUN, C. (1986), *Computer technology, large-scale social integration, and the local community*, "Urban Affairs Quarterly", 22(2): 329-349.

- CAPPELLIN, R. (1991), *International networks of cities*, [in:] CAMAGNI, R. (ed.), *Innovation Networks*, London: Belhaven: 230–244.
- CASTELLS, M. (1989), *The informational city: information technology, economic restructuring and the urban-regional process*, Blackwell, Oxford.
- CLAVEL, P. and KLENIESKI, N. (1990), *Space for progressive local policy; examples from the United States and the United Kingdom*, [in:] LOGAN, J. and SWANSTROM, T. (eds), *Beyond the city limits: urban policy and economic restructuring in comparative perspective*, Philadelphia: Temple: 199–233.
- COLLINGE, C. (1992), *The dynamics of local intervention: economic development and the theory of local government*, "Urban Studies", 29(1): 57–76.
- COOKE, P. and MORGAN, K. (1991), *The network paradigm: new departures in corporate and regional development*, RIP report, 8, University of Cardiff.
- CORNFORD, J., GILLESPIE, A. and ROBINS, K. (1992), *Telecommunications and the competitive advantage of cities in the European urban system*, Paper presented at the Communications and Economic Development Conference, Manchester, May.
- CORNFORD, J. and GILLESPIE, A. (1992), *The coming of the wired city? The recent development of cable in Britain*, Programme on Information and Communications Technologies Working Paper, 7, Swindon: ESRC.
- DUTTON, W. and GUTHRIE, K. (1992), *An ecology of games: the political construction of Santa Monica's public electronic network*, "Information in the Public Sector", 1: 279–301.
- GIBBS, D. (1993), *Telematics and urban economic development policies: time for caution?*, "Telecommunications Policy", May/June: 250–256.
- GILLESPIE, A. (1991), *Advanced communications networks, territorial integration and local development*, [in:] CAMAGNI, R. (ed.), *Innovation Networks*, London: Belhaven: 214–229.
- GOLDING, P. and MURDOCK, G. (1986), *Unequal information: access and exclusion in the new communications marketplace*, [in:] FERGUSON, M. (ed.), *New communications technologies and the public interest*, London: Sage: 71–83.
- GRAHAM, S. (1992), *Electronic infrastructures and the city: some emerging municipal policy roles in the UK*, "Urban Studies", 29(5): 755–781.
- GRAHAM, S. and DOMINY, G. (1991), *Planning for the information city: the UK case*, "Progress in Planning", 35(3): 169–248.
- GUTHRIE, K. (1991), *The politics of citizen access technology: the development of community communication and information utilities in four cities*, unpublished PhD dissertation, University of Southern California.
- HAMBLETON, R. (1992), *Another chance for cities? Issues for urban policy in the 1990s*, "Papers in Planning Research", 126, Cardiff University.
- HARVEY, D. (1988), *Urban places in the 'global village': reflections on the urban condition in late twentieth century capitalism*, [in:] MAZZA, L. (ed.), *World cities and the future of the metropolis*, Milan: Electra.
- HARVEY, D. (1989), *From managerialism to entrepreneurialism; the transformation of urban governance in late capitalism*, "Geografisker Annaler", 71 (series B): 3–17.
- HEPWORTH, M. (1989), *The geography of the information economy*, London: Belhaven.
- IBEX, (1991), *Review of possible roles of teleports in Europe*, Parts 1, 2 and 3, Report to the European Commission.
- JESSOP, B. (1993), *From the Keynesian welfare state to the Schumpeterian workfare state*, Mimeo.
- KEATING, M. (1991), *Comparative urban politics*, London: Elgar.
- KNIGHT, R. and GAPPERT, G. (1989), *Cities in a global society*, London: Sage.
- LANGE, S. (1991), *Telematics for regional development – a way to cohesion*, Mimeo.
- LAVOCAT, E. (1989), *From networked towns to town networks: new solidarities, new territories and the impact of telecommunications*, "Netcom", 2(2), November: 381–403.
- LEACH, B., GIRBASH, C., WALKER, S. and FENSOM, S. (1990), *The Manchester host feasibility study*, Centre for Employment Research, Manchester Polytechnic.
- LEITNER, H. (1990), *Cities in pursuit of economic growth: the local state as entrepreneur*, "Political Geography Quarterly", 9(2): 146–170.

- LOVERING, J. (1988), *The local economy and local economic strategies*, "Policy and Politics", 16(3): 145–157.
- MANDELBAUM, S. (1986), *Cities and communication: the limits of community*, "Telecommunications Policy", June: 132–140.
- MARCOU, T. (1990), *Ville Moyenne Network; a flow of information and experiences*, [in:] ELISE, *On-line services: a tool for local development*, Brussels.
- MAYER, M. (1992), *The shifting local political system in European cities*, [in:] DUNFORD, M. and KAFKALAS, G. (eds), *Cities and regions in the new Europe: the global-local interplay and spatial development strategies*, London: Belhaven: 255–274.
- MOSS, M. (1987), *Telecommunications, world cities and urban policy*, "Urban Studies", 24: 534–546.
- MURDOCK, G. and GOLDING, P. (1989), *Information poverty and political inequality: citizenship in the age of privatized communications*, "Journal of Communication", 39(3): 180–193.
- NICOL, L. (1985), *Communications technology: economic and spatial impacts*, [in:] CASTELLS, M. (ed.), *High technology, space and society*, London: Sage: 191–209.
- NOAM, E. (1992), *Telecommunications in Europe*, Oxford University Press.
- NOWOTNY, H. (1982), *The information society: its impact on the home, local community and marginal groups*, [in:] BJORN ANDERSEN, H. et al., (eds), *Information society: for richer for poorer*, Amsterdam: North Holland: 97–113.
- Organisation for Economic Cooperation and Development (OECD), (1992), *Cities and new technologies*, Paris: OECD.
- PARKINSON, M. (1992), *City links*, "Town and Country Planning", September: 235–236.
- PERRY, C. (1977), *The British experience 1876–1912: The impact of the telephone during the years of delay*, [in:] POOL, I. (ed.), *The social impact of the telephone*, London: MIT Press: 69–96.
- PICKVANCE, C. and PRETECEILLE, E. (1991), *State restructuring and local power: a comparative perspective*, London: Pinter.
- PRATT, A. (1991), *Industrial districts and the flexible local economy*, "Planning Practice and Research", 6(1): 4–8.
- RAINER, G. (1990), *Understanding infrastructure*, Wiley, NY.
- ROBINS, K. and HEPWORTH, M. (1988), *Electronic spaces: new technologies and the future of cities*, "Futures", April: 155–176.
- ROBSON, B. (1992), *Competing and collaborating through urban networks*, "Town and Country Planning", September: 236–288.
- RULLANI, E. and ZANFEI, A. (1988), *Area networks: telematic connections in a traditional textile district*, [in:] ANTONELLI, C. (1988), *New information technologies and industrial change: the Italian case*, London: Kluwer: 97–112.
- SIMON, J. (1991) *Panorama des pratiques de communications des grandes villes*, "Netcom", 5(1), February: 79–133.
- THOMAS, G. and MILES, I. (1989), *Telematics in transition*, London: Longman.
- TUCNY, J. (1993), *Space and the new technology of information – French experience*. Seminar paper, Centre for Research in European Urban Environments, University of Newcastle.
- UNGERER, H. (1990), *Telecommunications in Europe*, Brussels: CEC.
- WARD, S. (1990), *Local industrial promotion and development policies 1899–1940*, "Local Economy", 4, August: 100–118.
- WARK, M. (1988), *On technological time: Virilio's overexposed city*, "Arena", 83: 82–100.
- WECKERLE, C. (1991), *Telematiques, action locale et 'espace public'*, "Espaces et Societies", 62–63: 163–211.
- WITTEG, M. (1991), *Electronic city hall*, "Whole Earth Review", Summer: 24–27.