Chapter 4

Virtual Working: public and private presence in cyberspace

Chapter 2 described the consequences of shifts in sovereignty flowing from the advent of the World Trade Organisation and other supra national constraints. The diffusion of state power through agreement to and participation in multilateral regulation in areas such as trade, security and environment has been matched by the emergence of trans-national corporations operating in internationalised financial and labour markets. These changes impact not only at national and sub-national levels, but increasingly flow through to the individual household. Chapter 3 linked the emergence of computer-based information systems with the theoretical underpinnings of modernism and bureaucracy and provided a definition of wicked problems not amenable to solution through positivist assumptions of hierarchical models of design and development.

The increasing porosity of national boundaries means that the household becomes the end-point of trans-border data flows. This disintermediation and the consequent collapse of hierarchies required the coalescence of communication and computing technologies. These changes transformed government attitudes to communication infrastructure. National monopolies with a remit to provide equal access for all citizens have been replaced though privatisation and de-regulation by governments perceiving this as the only way to meet the rapidly expanding demand for capitalisation to deliver new forms of service.

Similarly national broadcasters now compete with a range of domestically and externally based competitors. This demonstrates the eclipse of the ability of national governments to form and control key areas of policy for technologies which impact on both urban and rural infrastructure (Camilleri and Falk, 1992). In such conditions new understandings of place and association are required.

Beyond physical place: Non-Place Realms in Planning and Development

As indicated in the previous chapter, the systems approach had entered planning and development discourse by the nineteen-sixties (eg. Doxiadis, 1968; McLoughlin, 1969). It had shifted the focus from built form to the processes that underpinned the development of those forms.

In the U.S.A. Melvin Webber (1964) went a step further by seeking to move away from the agenda of city planning with its focus on "small scale physical aspects of urbanisation" (Webber, 1964, p.80). He suggests his view is

> oriented to metropolitan processes (a verb view) from which it seeks to identify the matching spatial form (a noun view), and hence it seeks to pose a dynamic portrait of metropolitan form in action (a gerund view).
> (Webber, 1964, p.80, emphasis in original)

Urban communities are presented as spatially structured processes, with the physical fusing of US Atlantic seaboard settlement providing a striking example of the outcome of such processes.

In order to move from the physical bias of established planning conceptions, Webber proposes the "city as communications system" (Webber, 1964, p.84). Planners "share a conviction that the physical and locational variables are key determinants of social and economic behaviour and of social welfare" (Webber, 1964, p.85). According to Webber, the unique commodity offered by the city is accessibility and he cites Meir's (1959) development of a system of social accounts as the basis of an index of cultural wealth reflecting the volume and variety of information flowing through public communication channels (Webber, 1964, p.87, note 9). Such an approach switches the emphasis of urbanity from physical built form to the quality of interaction in cultural life through the exchange of information. Castells (1989) produces a corresponding analysis of economic activity in terms of the "space of flows" into which a location must enter in order to fully participate in the emerging global economy. Webber argues that this new definition implies that suburban and exurban dwellers enjoy a measure of urbanity not previously acknowledged.

Webber argues that planning must engage with three components of metropolitan social structure:

1: spatial flows of money, people and goods
2: location of the physical channels and adapted spaces that physically house activities
3: locations of activity places
(Webber, p.96)

The third component is approached through the traditional land-use view of development.

He suggests that the first component can be derived from the effectiveness with which communications systems may substitute messages for physical movement of persons or goods (p.97).

He cites the significance of railroad location in North American development as an indication of the importance of the second component in determining urban form. The subsequent significance of street car and suburban lines, and freeways suggests that developments in telecommunication capability and capacity had been equally instrumental in freeing access and range of locational choice.

Face-to-face communication becomes a special need, and traditional central locations are therefore still of value for particular forms of business.

Webber provides a descriptive schema for spatial structure using the three components, and points out that "(p)atterns of functional interdependence will become increasingly complex at the same time that major developments in transportation and communications systems will be opening up unprecedented possibilities for whole new spatial patterns." (p.107). He constructs a matrix to facilitate the exploration of the character of accompanying change in spatial structures.

Webber formulates a "non-place community" in terms of Interest-Communities. Accessibility, rather than the propinquity aspect of "place" is the necessary condition for this form of community (p.109). Extensive webs of specialised professionals can be regarded as communities without propinquity. Specialised professionals are acknowledged to be at one end of the spectrum of residents in a metropolitan area, with many other similar association patterns present in non-professional communities. Webber argues that such a traditional "place community" is in fact a special case of a larger genus. With developments in technology and education allowing wider participation in non-place groups a hierarchical continuum from highly specialised communities spanning the entire world via less specialised intra-national networks, to metropolitan and neighbourhood networks may be envisaged. Individuals can expect to play roles at a number of these levels at any one time. At each level, the appropriate

spatial field is shared by a number of interest communities, and Webber calls such levels of interdependence and interaction "urban realms" (p.114). Webber is providing new definitions of adjacency which fit with those now created by ICTs.

Place in urban theory, design and development

Webber argues that if an analysis of the distribution of each individual's time between realms were possible, it would reveal that rich and diverse human communication was present in conditions of low density and low concentration. He suggests that, in his terms, the urbanity of Los Angeles may not be that different from that of New York. Webber argues that certain approaches to the classification of urban centres were more amenable to the consideration of the range of interactions which he identifies, but that any reconsideration of definitions of centrality in the terms outlined by him would call into question the traditional notions of centre and hinterland, citing locational decisions of emerging high technology companies in California at that time.

A range of other approaches combined to shift attention from the physical to the social and psychological dimensions of environment. Mental mapping is the application of a technique from geography, evaluating perceptions of actors in an environment, coupled with observations of their actions in space. This allows a cognitive approach to the definition of place and neighbourhood. Environmental psychology emerged as a discipline providing support for spatial decisions at a "proxemic" level of personal space (Hall, 1966; Canter, 1977), at a regional level mapping geographical preference revealed striking distortions in perceptions of geographically and culturally remote regions (Gould and White, 1974).

Spatial formation can be approached from the phenomenological perspective of the post-modernist Robert Venturi in which, with luck, the "relationships and power will take care of themselves" (Venturi, 1966, p.12). A Marxist approach from Feenberg (1980), argues that the alienating effects of urban existence, in contrast to the contentment of rural community, may be seen as potentially politically liberating. In this context, non-spatial relationships, and the wider networks provided through greater private mobility can be seen as destructive of the cohesion of traditional urban centres.

Advances in information technology have problematised definitions of centre and periphery in development. The contrast between the telecommuting scenarios of technologically optimistic futurists such as

Toffler (1970) and Bell (1979) and subsequent developments in trans-national work organisation is considerable, however. Telecommunications have allowed real-time off-shore location of white collar work, for example from the U.S. mainland to the Caribbean or from the United Kingdom to India. While information technology appears to offer a means of redressing relative locational disadvantage, and widening access to the "non-place realm" described by Webber, practical experience suggests that the impact on locational mobility has been overestimated for the majority of the working population. Webber himself discusses the relative disadvantage of the "by-passed pre-industrial locals" (Webber, 1968, p.1101). Whether the elite component of the workforce required by trans-national corporations are the only actors meeting Webber's definition of non-space interest communities will be explored later in this book.

Place, Non-place, Community and Network

The "global village" concept, a cousin of Webber's non-place realm, is perhaps the culturally acceptable face of globalisation, but it represents a top down diffusion of cultural hegemony. Only now can the diffusion of information technology at various levels of sophistication support a two-way traffic. Gender was little theorised in relation to the application of technology in the nineteen-sixties, and Aungles (1994) demonstrates how it can still be largely ignored in technological debates through her examination of electronically monitored domestic detention. The state places the burden of incarceration upon the family and responsibility for monitoring that process on female members in particular. When coupled with Sewell and Wilkinson's analysis of electronic surveillance in the workplace (Sewell and Wilkinson, 1992), there is a complete penetration of both the domestic and employment sphere by the technologies of global commerce. Sewell and Wilkinson describe an electronics factory transferred from British to Japanese ownership. Both unobtrusive electronic monitoring of work and error rates plus highly visible physical labelling of under-performing workstations are used to engender an atmosphere of close self-monitoring by the workforce.

At the same time as the separation of domestic and public space is being eroded, the concept of nation state is becoming problematic. The close of the twentieth century saw the revival of sub-national and regional sovereignties. Such shifts have been readily supported by developments in global communication technology. The most striking example was the briefly canvassed suggestion during the 1992 Iraqi occupation of Kuwait that the dispossessed national government might continue to function on

the world financial markets without access to its country, but with electronic access to its funds.

Jane Jacobs was one of the first to report the negative effects of applications of modern urban planning theory in terms that affected the popular consciousness of the sixties (Jacobs, 1961). She illustrated how the strict hierarchical decomposition of mainstream land-use planning failed to acknowledge either long established economic mechanisms, or more recent changes in the nature of industry and employment which made rigid separation of housing, industry and commerce less important than accessibility and diversity. This positivist view of planning and development and the strict hierarchical view of systems were discussed in the previous chapter. Twenty years later Jacobs (1982) placed the development of Quebec separatism in a global context. Sub-nationalism can be seen as an inevitable outcome of changes wrought since the post-World War II high point of modernism.

Webber (1968) argues that the replacement of the city state by the nation state weakened the power of the traditional urban community. Supranational government may in turn revive city and regional status, as it erodes the status of national governments. The nature and quantity of European Community funding directed to research into definitions of citizenship reflect concerns over the implications of continuing enlargement of the European Union. However, equally significant funds are directed towards the development of physical communications infrastructure in the candidate states and beyond.

Experience with the development of transport informatics in support of road pricing policies suggests that direct negotiations between European Community institutions, metropolitan governments and trans-national corporations may diminish the influence of national governments over crucial standards for information and communications technologies. Indeed, as will be discussed later, many of the key standards are essentially de facto, as the rate of change in the relevant technologies outstrips the pace of formal processes of ratification.

Ohmae (1990) argues that regional and city level interests have replaced direct international competition. However the question remains how powerful “city states” might be in the face of direct competition with their neighbours for the attention and resources of trans-national corporations (TNCs). The TNCs strive for a position of “currency neutrality” so that relative shifts of exchange rates between the major world currencies have a negligible impact on their activities across the “Triad”. Similarly location policy is also informed by the potential formation of trading blocks, and facilities and resources are planned so that operations are self-sufficient

within each potential block. Ford Europe first implemented a policy of "complementarity" across Europe by replicating key facilities in two or more European states (Dicken, 1992). During pay negotiations, British workers could be compared unfavourably with their German counterparts in terms of productivity, while the German workers were compared unfavourably in terms of pay levels. The relative capitalisation of the two locations was conveniently ignored. This strategy has been overtaken by the development of the single European market, but is now played out in a different form on a global scale by Ford and other large corporations[1].

Webber (1964) considered the growing importance of non-governmental and specialised governmental groups and bodies in urban life. Industry and de-facto standards as well as formally agreed international standards are key elements of the emerging supranational infrastructure, just as railways, roads, and national telecommunication carriers were cited by Webber as historically significant influences on locational decisions by individuals and organisations. In this context, the widespread deregulation of national telecom carriers may mark the final decline of purely national sovereignties. As these are privatisated their key social role of equalisation of access to communication resources under their control is replaced by various targeted funding initiatives aimed at communities and groups identified as being the wrong side of the national digital divide.

The situation is even more problematic in countries such as Russia where neo-liberal policies unleashed unfettered privatisation in a situation of much greater existing inequity between centre and periphery (Giglavyi, 1993). By the end of the twentieth century, local governments were competing for the availability of new communication resources, just as they competed for access to railway routes during the nineteenth.

In developing states the national telecom carrier may be seen as a source of income and political leverage by government and be priced and controlled in a way that discourages growth and diversity of telecom-based services. Nevertheless, the privatisation and/or corporatisation of national telecommunications carriers and broadcasters and the introduction of market competition means a loss or reduction of the redistributive, social role implied by such public monopolies.

This produces a paradox, private providers are delivering the access once regarded as a social responsibility of the state. In Britain, cable television companies initially attracted a significant proportion of first-time local telephone subscribers for whom the economic barriers to entry to the former state system had been set too high. Pre-paid cellular phones now fill

this gap in the social marketplace and their contribution to developing economies will be dealt with later.

Non-place Resources and Developmental Inequities

Obstacles to infrastructure development are not a simple reflection of relative lack of resources and experience, but of the very specific skills and techniques necessary for full integration into the global economy. Unlike the "appropriate technology" approach promoted during the 1970's, the current situation requires an "appropriated technology" approach which implies access to the key technologies at the core of the global economy[2].

The new forms of virtual adjacency delivered by recent developments in information technology challenge the value of physical centrality. Recognition of the existence of "cyberspace", a non-place realm of computer-supported relationships, has taken Webber's original conception of non-place realms considerably further, as we will see below. The key issues around access and equity which are highlighted by the emergence of "non-place" reflect the tensions between big technologies and small implementations. Big technologies drive the processes of globalisation but small scale implementations of the same technologies can facilitate local and regional development initiatives. The big technologies include the complex wide area networks which support global business exchanges and global broadcasting: synchronous satellites, fibre optic networks and massively distributed computing facilities, such as Internet. Here an institutional perspective is needed to understand the driving concerns which are shaping the emerging "new world order". The small scale implementations are those points at which entry cost, in terms of both finance and skill acquisition, is low enough for individuals and small groups. Often this is because of tranferrable social learning from older infrastructures which provides the "windows of opportunity" to be discussed in Chapter 5. The fax and mobile phone, for example were sufficiently close to existing technical experience for users such as self-employed trades-people to appropriate them rapidly and successfully.

Trans-national companies themselves are undergoing a series of transformations. Real-time off-shore location of white collar work from the U.S. mainland to the Caribbean was the logical extension of the less dramatic division between "front office" tasks which remain in the prestigious Central Business District and "back office" tasks (Nelson, 1988). The latter often involve part-time and female workforces relegated to the periphery of suburbia.

While information technology appears to offer a means of redressing relative locational disadvantage, experience so far suggests that the impact on employment opportunity has been overestimated for the majority of the working population, raising the prospect of Webber's "by-passed pre-industrial locals being joined by many post-industrial workers.

Belussi's (1989) study of the Benetton company fuelled discussion of an alternative to the established form of international enterprise which links small and medium companies with global markets. Clegg (1990) and Perez (1985) describe the utilisation of a number of technical strands by the company which result in a computer-based network which is both trans-national and trans-organisational in extent. In this example, ownership and control of the core of the information network substitutes for ownership of production and distribution and for a formal hierarchy. The core of this enterprise links a network of world-wide franchised retail outlets and a network of subcontractors who provide the wholesale products.

One view of the advent of the network organisation sees it as an opportunity for smaller players to access resources from and to compete within global networks. The decreasing cost of Internet access has already allowed more spontaneous associations such as "virtual villages" described in Chapter 2 in which small enterprises form and reform alliances in order to service large companies (Inoue, 1998). These have been observed in Asia and Europe.

However, the additional accessibility and flexibility of advantage offered to smaller players is accompanied by the equivalent capability of larger firms to restructure in such a way that they can enter niche markets yet still draw on their much wider resource base. Castells (1996) describes the temporary "network enterprise" which allows global competitors to collaborate in a specific context, for specific purposes. While Castells provides examples from the electronics sector, the pharmaceutical industry presents the most radical structure with key research and pre-clinical development activities de-coupled from the core companies. These crucial specialised activities are increasingly handled by separate contracted partners, and specialist companies are offering to orchestrate the re-integration of these efforts into a research-discovery-development chain. This leaves the core pharmaceutical companies free to concentrate on brand management, and marketing.

Potential advantages to smaller players are thus offset by the ability of some larger firms to de-couple key business units better to target customers and markets traditionally served by much smaller competitors. For developing regions this exacerbates the dilemma of encouraging the entry

of foreign firms and capital which may displace less well resourced and less experienced local capacity. By locking in scarce local skilled labour with superior conditions and rewards, the incoming companies may actually restrict indigenous development (see Dicken 1998).

Non Place and Cyberspace

As noted, nation states are relinquishing one of their last remaining means of redressing regional imbalances in accessibility through the privatisation of telecommunications. One result of such withdrawal of state influence can be seen in the highly selective targeting of cable services in U.K. cities. This has produced results comparable to those of the earlier "red-lining" of areas deemed a poor risk by mortgage providers. The denial of access to housing finance hastened the development of urban blight in those areas. Despite the potential of emerging technologies and concepts such as Virtual Reality and computer supported collaborative work (CSCW), uneven infrastructure means the comparable exclusion of a significant minority of any region's citizens. Redressing the imbalances of global development will involve not just technical prescriptions, but an awareness of location within global production networks. Potential participation strategies achievable with the assistance of a design paradigm, and sensitivity to windows of opportunity are discussed in the next chapter. However, in questioning the value of physical centrality, the contrast between the telecommuting scenarios of technologically optimistic futurists such as Toffler (1970) and Bell (1979) and the reality of emerging practice highlighted in Chapter 2 must be considered.

The potential of computer-based information systems to facilitate or even substitute for organisational structure and standards has been evaluated from a variety of social and organisation theory perspectives. Little (1988) shows how very different strategies may be pursued with the same equipment, but that technical developments may lag behind organisational ambitions. Sproull and Kiesler (1991) emphasise the difference between immediate technical gains from such technologies and the longer term process of social gains for organisations. Specific technologies like computer-aided design may substitute for organisationally enforced standards, while software standards and electronic date interchange are increasingly presenting organisations with externally derived standards and procedures.

The ethnocentric focus of much of the thinking in this area is reflected by the equation of modernism with Western (US) urban forms and structures which are seen as the end product of a process of social

evolution. Clegg (1990) indicates how North American organisational forms are established as a norm, and argues that cross cultural examination of alternative organisational form, building on Lammers and Hickson (1979), is necessary to evaluate the full range of available possibilities.

As noted, Clegg (1990) and Perez (1985) use the practices of the Benetton company to show how a clever weave of technical strands can result in a computer-based network which is both trans-national and trans-organisational in extent. The physical non-space aspects of ARPANet, mentioned in Chapter 3, are a striking indication of how far such tendencies may take organisations. The operating software could relocate itself across its own network to the least busy host machines. Such non-space aspects of "netland" have been exploited by "cyberpunk" enthusiasts but have also attracted more respectable attention from researchers such as Canter and Perin, who apply respectively their cognitive mapping and environmental psychology methods to the mental images and organisational relationships developed by users of complex interactive computer systems (see Canter, 1977; Perin, 1970, 1991).

The critics of the urban planning of the seventies attacked redevelopments that privatised previously public spaces, yet the virtual space of computer networks is primarily private, with the deregulation and privatisation of common carriers widening this trend. The process of globalisation and deregulation has accelerated the privatisation of this infrastructure.

Contesting the Core Technology: The Household as public and private place

The relatively benign scenarios of increased personal choice which have been built around the prospect of "telecommuting" and "electronic cottages" are already compromised by the realities of tele-marketing and other forms of white-collar outwork. The background of casualisation across all sectors of the workforce in developed and developing countries should be grounds enough for caution. With a renewed emphasis on the productive role of households, competition between cities and sub-city regions might be reflected at the micro-level in competition between neighbourhoods or even households.

Silverstone, Hirsch and Morley (1992), in describing the moral economy of the household, identify "boundary maintenance" as one of the problems set for the household by information and communication technologies. Concerns in this area have generally been aimed at the content of mass media and other leisure activities such as video games and,

most recently, the Internet. The boundary problems of the "globalised" household are as likely to revolve around the technologies of production as around those of consumption, as evidenced by the work of Aungles (1994) on home detention and Sewell and Wilkinson (1992) on workplace surveillance described above.

A considerable body of work covers the development of Western domestic technology up to the Second World War (e.g. Cowan, 1983; Hayden, 1981), and the significance of the reorganisation and re-definition of the household in utopian enterprises, particularly in the United States (Hayden, 1976). The pre-industrial household was a locus of production, and the redefinition of the household as locus of consumption and reproduction, distinct from public sphere of "work" emerged with the onset of the industrial revolution.

Ravetz (1987) points out differences between the pre-industrial situation prevailing in North America as described by Cowan (1983) and that in Britain, where paid domestic employment was a significant feature of economic life, so that "housework" retained both domestic and public association. The change in the domestic division of labour continued into the twentieth century, with many pre-industrial features surviving in the agrarian sector of developed economies to within living memory (Kleinegger, 1987). The separation of domestic and productive spheres was never complete, and in some senses current technological and economic developments are simply reversing a trend.

Electronic networking alters the size/performance equation and removes many of the traditional buffers between smaller and larger social and economic players and between public and private places. The key issues which are revisited in Part III revolve around access to the big technologies driving the processes of globalisation and to those related technologies underpinning the small scale implementations which facilitate meaningful participation at local and regional levels.

The staggering development of information and communication technology in the forty years following Webber's formulation of "community without propinquity" (Webber, 1964) has confirmed many of his assertions. Globalisation and deregulation of economies has produced a number of nomadic communities. Attali (1991) predicts the emergence of a nomadic international elite, in line with the examples provided by Webber but movement is not restricted to the elite employees of trans-national corporations. A range of skilled, semi-skilled and unskilled workers, legal and illegal are moving into and between the more developed economies in growing numbers (Castles and Miller, 1993).

Migration patterns and improved physical and electronic communications have produced transcontinental extended families in all types of society, and the anxiety and confusion between categories such as asylum and economic migration point to the tensions produced by the growing scale of physical movement within the globalising system. Remittances from these workers to their relatives and dependants in the home country have become a significant component of global financial flows and they represent a very different form of global workforce than that posited by Webber in 1964. The establishment of a Los Angeles office by the British Labour Party prior to the 1997 general election was one indication that the legal and semi-legal flows of migration are not just from developing to developed regions.

Information networks are emerging as the social milieu of non-place communities and the next chapter looks at a number of examples. However, the emerging problem of "information asymmetries" (Lamberton, 1995) raises a wider problem than the "digital divide", since it encompasses the significant proportion of humanity living in communities more than forty minutes travelling time from even basic telephonic communication. The concept of "information justice" is required (Lamberton, 1995). The next chapter looks at the technologies which now offer to bridge this gap. Meanwhile the ubiquity of the base technology of the Internet means that access to non-place community does not depend on large investment, nor on esoteric technical skills, a point sometimes missed in otherwise justifiable criticism of technological optimism. The growing maturity of the contributing technologies means that relatively stable standards are emerging, allowing both commodification (and consequent cost reduction) of components and the diffusion of appropriate technical literacy and skills among the general population. The major hurdle at present is the selection of an appropriate strategy from the confusing range of opportunities currently being promoted with a great deal of hype.

As noted earlier, the fax and mobile phone were sufficiently close to existing technical experience and practices for users such as self-employed trades-people to appropriate them easily. These relatively simple technologies can alter the size versus performance equation for businesses, equally significantly, even the smallest companies may employ state-of-the-art technologies. Diffusion of technology to smaller players may be sponsored by the larger players as with the deeply layered subcontracting systems in Japanese manufacturing. These link top-level suppliers, themselves TNCs, with small family companies which may be assisted with the acquisition of key technology (Miyashita and Russell, 1994).

However, big technologies still underpin the complex wide area networks which support global business exchanges and global broadcasting, for example geo-synchronous satellites, fibre optic networks, the massively distributed computing facilities, supporting the Internet. Here an institutional perspective is needed to understand the driving concerns which are shaping the emerging "new world order" and Part II of this book considers how design processes, technology and institutional structures interact.

Cyberspace and Citizenship

Webber's original conception has been extended by the emergence of "cyberspace" as a non-place realm of computer-supported relationships.

Benedikt (1991) traces the term "cyberspace" to William Gibson's dystopian novels of the nineteen-eighties and nineties (eg. Gibson,1984). The cyber-punk culture which has grown around the themes first articulated by Gibson has both utopian and dystopian strands. Their value lies with their focus on the gap between technologically optimistic futurists such as Toffler (1970) and Bell (1979) and the reality of technical determination driven by the assumptions of neo-classical economics.

Cyberpunk literature emphasises the intellectual and cultural possibilities of the emerging global "non-space realm". The non-space aspects of "netland" have been explored by the enthusiasts but have also attracted more respectable attention from a number of researchers. Harasim (1993) assembles a broad overview of the "official" dimensions of its use and development. In line with Webber's observations in the nineteen-sixties, specialised scientific communities provide the most impressive evidence of global social networks.

The adverse publicity given to the use of the World Wide Web to distribute pornography and its association with other unsavoury forms of criminal activity has obscured the positive aspects of its accessibility. It has also led to a variety of attempts at control of either access or content, doomed in essence by the Cold War lineage of the underlying technology and its ability to continuously reconfigure itself, an asset during nuclear bombardment.

It has been argued that the pornography industry has also promoted web-based commerce, by providing a paradigm for on-line business and web-based forms of revenue collection (Robinson, 2002). The globalisation of organised crime (Castells, 1998) which has accompanied the globalisation of more legitimate economic activity has also made use of the web.

The phenomenon of "hacking" is indicative in part of resistance to emerging patterns of ownership and control. It can be seen to parallel earlier resistance to privatisation and regulation of public space within the physical environment, from mass trespass in Britain in the nineteen-thirties to "green bans" against urban re-development in Australia in the nineteen-sixties and seventies.

Early attempts at commercialisation of the Internet, brought retaliatory responses from the established "hacker" community who promoted their libertarian notion of freedom of access as incompatible with commercialisation. The "cyberpunk" sub-culture represents the first example of an increasingly global non-space community inhabiting the "virtual space" of communication networks. It became global as the technological base diffused from the nations that developed it.

The view of hackers as romantic outlaws was enhanced by the association of virus attacks with political resistance at the close of the twentieth century. A great deal of traffic across the networks in the summer of 1991 originated in Russia and described the events of an abortive coup to the outside world. In Britain at the height of the anti-Poll Tax campaign an elaborate hoax was staged to persuade local authorities that a computer virus had been introduced in order to corrupt the databases essential to the collection of this unpopular charge. In China, following the suppression of the democracy movement in 1989 there was a massive increase in the incidence of computer viruses. Subsequently the Ministry of Public Security became a market leader in computer virus protection in China. The employment of faxes and laptop computers by the Mexican Zapatista rebels (Newsweek: 1995) is the latest manifestation of an effective incremental and interstitial use of relatively low tech aspects of the emerging global infrastructure first seen in the Russian Interfax news agency[3].

In this context there may be a positive role for the cyberpunk sub-culture, if the collective community action of the seventies can be facilitated by the technologies of the nineties. However, the "hacker" in the spare bedroom has been demonised. Criticism of the sub-culture focuses on the genuinely criminal and destructive activities of a minority and Sterling (1992) recounts the lengths to which national authorities may go to control such activities.

In a post-Cold War environment it is clear that a number of institutions are reassessing their roles, just as enforcement institutions shifted their attention from alcohol to other drugs after the repeal of prohibition laws in the United States (Grinspoon, 1994). "Cold Warriors" are viewing this non-space arena as their new fiefdom and Chapter 3 described how the

U.S. National Security Agency has become involved in the development of data verification and encryption, to the extent of proposing standards for commercial transactions which would enable them to monitor traffic. The proposals have been vigorously opposed by groups such as Computer Professionals for Social Responsibility (CPSR[4]). At the same time NASA has become involved in a reconfiguration of SDI or "Star Wars" projects which are directed not at the defence of the United States, but at denial of near-earth space to competing nations: policing the infosphere for the benefit of one nation.

If the respectability of CPSR brings to mind the ACLU or the NAACP of the nineteen-sixties, then the demonised hackers of the networked world may yet emerge as the twenty-first century equivalent of the Black Panthers and urban guerrillas of the nineteen-sixties. "Hacking" itself can be traced back to "phone phreaking", an activity at the fringes of the anti-war movement in the U.S.A. in the late nineteen-sixties and early seventies, which targeted the traditional telephone system to "liberate" communication resources (see Bowcott and Hamilton, 1990).

Each new stage of development in information and communication technology has led to exploitation and counter-exploitation by criminals and regulators. In the post 9/11 environment, the urgency of Cold War data analysis has returned. Surveillance and intelligence are once again seen as the thin line separating us from oblivion. Even closer attention is paid to these flows of information and resources by national and international security agencies.

In the next chapter Webber's paradigm of non-place realms, is set alongside that of appropriate technology and windows of opportunity in the formation of that technology. This will provide some guidance for the development of effective local responses to the globalising pressures resulting from the continuing development and coalescence of advanced information technologies.

Notes

1 This strategy had its origins in the strategic dispersal of wartime production in Britain and the United States (Little and Grieco, 2003).

2 This shift can be seen in the focus of the Intermediate Technology Development Group from the re-discovery of superseded but sustainable technologies applicable to developing countries, to the appropriation of aspects of state-of-the art technologies. See http://www.itdg.org

3 This approach to access to and use of technology will be returned to later in the book.

4 http://www.cpsr.org