

CHAPTER TEN

Permeable Boundaries in the Software-sorted Society: Surveillance and Differentiations of Mobility¹

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Values, opinions and rhetoric are frozen into code.

(Bowker and Star 1999: 35)

The modern city exists in a haze of software instructions. Nearly every urban practice is becoming mediated by code.

(Amin and Thrift 2001: 125)

Introduction

Differential mobility is in no way a new phenomenon; from the moment some people rode or were carried while others walked, there have existed differences in mobility which reflect and reinforce existing social structures. However, differential mobility is not always a matter of a simple correlation between greater wealth or status and greater speed; for example, in British cities, bicycle commuters tend to be better-educated with white-collar jobs. Mobility has always been configured by borders and boundaries composed of a multiplicity of hybrid objects, from infrastructure and technology to law and culture.

These boundaries are permeable to different degrees creating societies that are differentiated by speed and access, and the values attached to both. These values, in turn, reflect trends towards privatization, social polarization and the development of a risk-society, which might collectively be called neo-liberal or post-Fordist capitalism. That much is relatively uncontroversial: however, the role of technologies, those inhuman things, remains more problematic. What this chapter seeks to show is that there is a tendency towards technological

lock-in, which threatens to divide contemporary societies more decisively into high-speed, high-mobility and connected and low-speed, low-mobility and disconnected, classes. The relative permeability of the boundaries that separate such groupings are increasingly orchestrated by automated systems of surveillance which continuously categorize and encode those categorizations and enforce them upon individuals or groups, based on the perceived danger that they are deemed to pose to the preferred social order of the 'kinetic elite' (Sloterdijk 1988). This is leading to an increasingly coded or software-sorted society and 'splintered' urban landscape characterized by highly differentiated mobilities: corridors of high mobility and easy access for some, and slow travel and difficult, expensive and blocked access for the majority. However, for neither class is the permeability particularly negotiable, whether or not such controls were originally accepted voluntarily or even requested (as most are in the case of higher income groups) or were enforced. Once introduced, both access and blockage are increasingly functions of encoded categorization. In this sense such a landscape of permeable boundaries is part of the broader edifice of 'new social control' identified by Michalis Lianos (2001, 2003), which threatens to remove the space of the city from everyday social construction.

In this chapter we explore the theoretical implications of these automated systems of surveillance, mobility control and boundary enforcement. We attempt to combine the work of Lianos on social control (which is still relatively unknown in the English-speaking world) with recent literature on code (Lessig 1999), the automatic production of space (Thrift and French 2002), and the actor-network-theory (hereafter, ANT) work of Latour, Callon, Law, Bowker and Star and others, which deals with the ordering processes of modern society. Our motivation for this approach is our belief that the work of actor-network theorists – as well as others working around the sociology of technology in areas such as Social Worlds Theory (Bowker and Star 1999) and Communities of Practice (Brown and Duguid 2000) – need to be far more integrated into mainstream social science understandings. This is especially necessary, we would argue, given the widening influence of attempts to reconstruct social theory using paradigms of flow, mobilities and process (for example, Urry 2000).

In all the enthusiasm for flows, it is crucial to remember that barriers and boundaries are as important as the flows themselves. In terms of structure, the chapter will first draw on ANT to outline the notion of the hybrid collective. The challenge of conceptualizing boundaries within this framework will then be addressed. We then move on to examine two recent approaches to the role of software in the construction of urban space and society – those of Lianos and Thrift and French – and discuss how their respective conclusions might be combined with an actor-network approach to boundaries, particularly with regard to systems of surveillance. Some examples are given, and we conclude by discussing how to establish the nature and location of power within a system of hybrid collectives which is both increasingly strongly ordered through technological systems and productive of class divisions. No firm answer is possible or perhaps even desirable, but we do give a number of alternative interpretations

and trajectories. We emphasize, however, that this is not a technologically determinist vision, rather, it is a potential outcome of the extension and increasingly strong alignment of hybrid collectives, every component of which has human, nonhuman and inhuman elements mixed to some degree.

Hybrid Collectives

Deriving from the philosophy of Michel Serres and Michel Foucault, and originating in the sociology of science and technology, ANT is an evolving theoretical and methodological grounding for the social sciences, which seeks a middle ground between the extremes of structuralism and agency-centred approaches such as ethnomethodology and microsociology. Some have gone so far as to claim that ANT seeks to break down all the dualisms that are felt to afflict the study of society, for example: global/local, social/natural, technical/social etc. Despite its origins, empirical and theoretical work based on or adapting ANT has proliferated and infiltrated other disciplines.²

ANT attempts to derive explanations for two fundamental problems in the study of societies: first, the way in which long-lasting social structures appear out of social interactions; and, second, the method by which power can act at a distance. Actor-network theorists argue that the key element in both these processes is the interaction between humans, nonhumans (other living beings, natural processes etc.) and inhumans (man-made objects, materials, texts and so forth). These nonhumans and inhumans are not merely passive in the sense of being things imbued with value by society; rather, they carry, change and produce power and value in a symmetrical relationship with individuals and groups of human beings. Thus, human societies do not exist solely by the interactions of individuals, but only because of the crucial role of nonhumans and inhumans in making these interactions last beyond their specific occurrence in time and space. This, in essence, is the origin of social power: it is always an outcome of interactions between actants, neither a property of any one actant, nor an abstract force.

ANT therefore accepts a performative conception of social relations but extends it (Latour 1986): ANT argues that, through their *programmes of action* (from innate tendencies to volition), *actants* attempt to enrol other actants to fulfil those programmes, producing hybrids. These relationships develop through the passing of intermediaries between actants. In this way actants perform, and are performed by, complex, shifting sociotechnical networks, which produce space, identity and social relations (Michael 1996; Murdoch 1997a, 1997b). Importantly, *actor-networks*, or *collectives*, are neither amorphous nor uniform. Collectives can be variably stable over time (irreversibility). They can contain actants whose programmes of action are more or less strongly aligned (convergence). And they can be variably bounded or territorial (Callon 1991). It is to this last concept of boundaries that we shall now turn as it is key to notions of differentiated mobility within societies orchestrated by code.

Categorization and Boundaries

This chapter adopts a philosophical base from surveillance theory (see Lyon 2003) and which has been explored further elsewhere by one of the authors (Donaldson and Wood 2004). This is that processes of categorization or classification are central to both the practice and understanding of social control. This notion of social ordering as control is also present implicitly within ANT-type approaches: John Law (1992) has defined ‘ordering’ as a key characteristic of modern society and Bowker and Star (1999) argue that modernization has created more and more detailed and differentiated, and increasingly enforced or policed, classifications. These categories can only function because of boundaries that delineate one category from another.

Within the study of technologies, Michel Callon has reintroduced the notion of the boundary (Callon 1991).³ In Callon’s variation on ANT, which refers to techno-economic networks (TENs), boundaries of TENs relate to the level of convergence within a TEN: ‘an element may be treated as lying outside a network if it weakens the alignment and coordination – that is the convergence – of the latter when moved into the network’ (p. 148). Convergence ‘measures the extent to which the process of translation and its circulation of intermediaries leads to agreement’ (p. 144).

Agreement consists of two dimensions: *alignment* and *co-ordination*. Alignment is the extent to which translation ‘*generates* a shared space, equivalence and commensurability’ (p. 145), its opposite being disalignment. Between these two extremes are various degrees or strengths of alignment. In any process of translation, the imputation of authorship is crucial; this is determined by rules about: the identity of actors, the imputation of intermediaries to actors; and finally ‘who may *speak* on behalf of whom’ (p. 146). Co-ordination refers to the process of ‘organising imputation and limiting the number of transactions that can be easily stabilized’ (p. 147). Codified rules are called *co-ordination* (or *translation*) *regimes*. *Weak co-ordination* refers to general networks with no specifically local rules, whereas *strong co-ordination* refers to a network with strong local and general rules. The stronger the co-ordination, the more predictable the network. Convergence, then, is the degree to which a combination of alignment and co-ordination is in effect.

What is it that these TENs, or hybrid collectives, attempt to do? Akrich and Latour describe this as the production of meaning or ‘how one privileged trajectory is built, out of an indefinite number of possibilities’ (Akrich and Latour 1992: 259). John Law has elsewhere described this as the way in which a social mode of ordering is produced (Law 1992). Bowker and Star (1999) call it ‘categorical work’ – the creation of static categories from a fluid reality. In essence, then, hybrid collectives attempt to define and/or further expand their own boundaries through the hiding or erasure of alternate possibilities through categorical work, that is, the creation of both discursive and material boundaries. It is to the way in which these boundary-making processes affect the space of the city that we now turn.

New Social Control in the Software-Sorted City

Within the city (or indeed any area) boundaries, their permeability (what is allowed to pass through any boundary and how), and the nature of the spaces separated by the boundary, are based on prior categorical work. This is accomplished and enforced through surveillance, which can therefore be conceptualized as a social mode of ordering, in the sense that John Law uses the term. Fundamentally, surveillance is not about individual people, but about defining the relationship of all sorts of actants in relation to boundaries: it is a technocratic form of territoriality and the (attempted) control of mobilities and flows. It is the determination of particular spaces and relationships to those spaces through categorization, boundary maintenance (in terms of both space and identity), observation and enforcement. Surveillance, in its most extremely territorialized manifestations, depends therefore on the purity of categories, and on the cleanest possible demarcations between them, what Graham refers to in passing as ‘the precision of . . . boundary maintenance’ (1998: 449). Without boundaries, categories dissolve, and the enforcement of territoriality through surveillance becomes impossible.

However, the most subtle and successful boundaries are *imprecise*. More accurately they allow different speeds of movement and different actants to move in variable ways and speeds in relation to the boundary. They are therefore *differentially* permeable. Turning such a conceptualization on its side and looking at it from the point of view of mobilities rather than territory, one can see a series of different geographies of mobility overlaid like a palimpsest with territoriality cutting through them in jagged and uneven ways.

Crucially, both the creation of differentially permeable boundaries in cities and their surveillant enforcement are increasingly carried out by computer software. Several theorists have argued that the interactions between systems based on code or software, and the humans subject to software-sorting as they move around the city (or the world), produces a dehumanizing or desocializing process. A paper by Nigel Thrift and Shaun French, for example, argues that the pervasiveness of automated software-driven systems in contemporary Euro-American societies means that it is now possible to speak of ‘the automatic production of space’ (Thrift and French 2002).

At the same time, the French sociologist of surveillance Michalis Lianos has been developing a new theory of social control to address the recognition that technologies are basically about spatial control. As he puts it, ‘a technological system is by definition a system of control of a certain environment’ (Lianos 2003: 418). Automation is particularly important within Lianos’ thinking because such an automated surveillance system ‘transforms the spatial threshold of the institution into a threshold of legitimacy’ (ibid.: 420). In other words, the legitimacy of an action in relation to the automated systems is removed from the sphere of social negotiation. As Lianos and Douglas previously noted, such systems – which they term ‘Automated Socio-technical Environments’ (ASTE) – ‘*radically transform the cultural register of the*

societies in which they operate by introducing non-negotiable contexts of interaction' (Lianos and Douglas 2000: 107, italics in original). Automated surveillance systems, based on computer code, thereby accelerate the trend away from persons towards data images as the basis for trust in society (see Lyon 2001, ch. 5). Automating surveillance can thus potentially mean the automation of social representation.

Lianos argues that a relational perspective is essential to understand such a transition. This is because:

the criterion for deciding what belongs or not to the sphere of control is neither the consciousness of the subject or the group involved, nor the will of those who produce the 'controlling' effect in question, but mainly the conditions that shape the interaction between those two parties.

(Lianos 2003: 416, italics in original)

Indeed, Lianos continues that, in most cases, social control is not the intended effect of the collectives⁴ producing it. To him, 'it is . . . necessary to recognise the existence of types of activity where control arises in many ways that were often not intended to produce a controlling effect' (ibid.).

For Lianos, then, what is occurring is not a deliberate form of oppressive control but an institutional – bureaucratic obsession with function, with the smooth flow of goods and services, and with efficiencies of movement and transactional fluidity:

What the subject thinks, does or believes, is irrelevant to what the institution controls; it is simply meaningless for the technological device. In the thousands of daily transactions with institutional outlets, which weave together the sociocultural resources of the postmodern subject, there is not a single wish to build and promote a cognitive and moral universe. The exclusive objective that is being pursued is to stimulate and facilitate behaviours that are favourable to the effective functioning of organisations.

(Lianos 2003: 423)

What is really going on here, to Lianos, is a decline of collective sociality (in whatever form) and the creation of a new form of institutional sociality, increasingly governed by inhuman rules of automated flow which are orchestrated and enacted through enormous systems of interlinked and computerized elements using code. Thus, in a sense, the mobility of things is privileged ahead of the mobility of persons, or more accurately, certain categories of people. This proliferation of automatic systems generates, as Norris *et al.* note, a concern about exclusion: 'the problem with automated systems is that they aim to facilitate exclusionary rather than inclusionary goals' (Norris *et al.* 1998: 271). As Norris has written more recently, 'it is not the inclusionary project

envisaged in Bentham's panopticon that will become operationalised by the spread of digitalised enforcement, but exclusion' (Norris 2003).

There is a potential problem here with our earlier advocacy of power as an outcome of interactions between hybrid collectives. Lianos does not use the word 'collectives' and appears to dismiss ANT and its variations on the grounds that 'the central question remains that of the "integration" of technology in the context of the distinction between nature/culture/society, rather than the analysis of its content' (Lianos 2003: 419). However, we believe this to be a misreading or at least a failure to recognize the potential of ANT. What Lianos is describing in the quotation above is, in Latourian terms, the 'program of action' of technological devices concerned. Such devices have no ideational content in themselves. However, these devices themselves are not and cannot be isolated: they form part of larger hybrid collectives. As Lianos himself describes, they carry out functions that reflect the programme of action of very strongly aligned and strongly co-ordinated collectives (which he calls organizations).

Such collectives exist within the very large, strongly aligned although less strongly co-ordinated collective of neo-liberal capitalism, which, if nothing else, is the program of action of certain prioritized and privileged actants, translated through practices, laws, and technologies into an increasingly global set of technosocial collectives. That some of the effects of particular technologies are unintentional as far as any organization is concerned is unsurprising – no process of translation is ever complete. But, insofar as the programmes of action of technologies do nothing but regulate the flow of the objects and peoples as the programme of action of the organization intends, why should the organization object?

The Automatic Sorting of Mobilities: Some Examples

There are several examples of how these hybrid collectives create permeable boundaries that are orchestrated to produce vastly differential mobilities. One is electronic road pricing, where new, heavily monitored private premium highways and road spaces are created that are only accessible to drivers with in-car electronic transponders. Access to road space thus becomes a priced commodity dependent on users having the technology in their cars, and the resources (and often bank accounts) to pay bills for a newly commodified good that cannot be bargained for – you either have the intermediary that allows you to pass the automated system or you do not. This reengineering of public roadspace monopolies into separated domains of premium, charged highway space, and uncharged highway space that continues to be freely accessible, is orchestrated and policed through vast hybrid collectives based on code (call centres, tracking cameras, financial management systems, geodemographic marketing systems, enforcement and prosecution systems, and so on).

A second example of the use of code to orchestrate permeable mobilities across boundaries is drawn from international airports. There are several ways

in which surveillance technologies, from the Immigration and Naturalization Service Passenger Accelerated Service System (INSPASS), which uses hand-geometry – a relatively old and unsophisticated system – to the highly advanced iris-scanning programs operated by Amsterdam’s Schipol airport since 2001 and now required by US Naturalization and Immigration services. Such systems effectively automate normative judgements encoded into immigration control databases into boundary-maintenance: frequent travellers and business flyers are ‘trusted’ and automatically allowed to pass, if their biometric signature matches that on a card or in a database. At the same time, all others become suspect or are even automatically deemed ‘treacherous’ because they are not warranted entry into the speeded-up world of elite immigration control which bypasses conventional borders just as the speeded-up flows of computerized and priced highways bypass the world of the public highway system (Curry 2003). National boundaries are thus differentially permeable boundaries increasingly policed by automated systems. Indeed, this challenges the whole political concept of ‘national borders’ for some, while making such borders more rigid and impenetrable for others. The ‘kinetic elites’ discussed by Sloterdijk are enrolled into hybrid collectives that allow them to transgress national borders. At the same time, new surveillance systems are installed so that ‘illegal’ migrants and refugees find that such borders become more fortress-like (see, for example, Verstraete 2001; Flynn 2003).

A final pair of examples are more invisible. First, Internet routers are now being programmed with software that actually prioritizes packets of information differently, based on real-time, corporate judgements of the real or potential profitability of the person sending the traffic. This means that the ‘premium’ users seen to be more commercially attractive may, over the same infrastructure, be able to access web sites in times of Internet congestion while other, less attractive users experience ‘web site not available’ signs. As a result, corporate Internet firms now routinely prioritize the traffic from the ‘premium’, selected users that they think will bring the best revenues and exposure to their brands, their services, and their corporate tie-ins. At the same time, they actually downgrade the priority of web and Internet traffic that is deemed to be of marginal profit potential or that which will benefit competing firms – what they often term the ‘scavenger’ class (Graham 2005). Importantly – and in sharp distinction to the visibility of differentiation in the highways or airports examples – neither the privileged nor the marginalized users in this case are likely to even know that this process has shaped their experience of the network.

In a detailed analysis of how growing corporate control of the Internet is configuring its media spaces, Dwayne Winseck (2003) found that such trends towards the software-sorting of Internet users were highly advanced. In 1999, for example, Cisco, the manufacturer of most of the Internet’s routers, advertised to corporate media and Internet firms offering them:

absolute control, down to the packet, in your hands. . . . You can identify each traffic type – Web, e-mail, voice, video . . . [and] isolate . . . the

type of application, even down to *specific brands*, by the *interface used*, by the *user type and individual user identification or by the site address*.
(cited in Winsbeck 2003: 183, original emphasis)

Given that the Internet was purposefully constructed so that each ‘packet’ of data had equal priority – a system termed the ‘best effort’ Internet – such ‘unbundlings’ or ‘splinterings’ of users’ experiences, based on corporate control and software-sorting, potentially has profound political and social implications.

In our final example, an equally invisible process of differentiated mobilities is emerging in call centre queuing systems. Here, automated systems are rapidly emerging. These can queue incoming calls differently, depending on inbuilt, algorithmic, judgements of the profits the company makes from them. ‘Good’ customers can thus be answered quickly while ‘bad’ ones are put on hold. As with Internet prioritization, neither user is likely to know that such prioritization and distancing is occurring. It is worth pointing out that here, as elsewhere, one could argue that the ‘control’ of customers is an entirely irrelevant part of the system as far as the sorting devices or, indeed, the companies using the software are concerned: their programme of action is to ensure the maximization of profits – ‘good’ in this sense equates to high or prompt-paying – but differentiation and controlling effects are an inevitable outcome.

The Politics of Software-sorted Societies

Automated systems quite clearly enforce (and increasingly create) categories and boundaries. This might sound like the kind of technologically determinist perspective that is often found in writing on ICTs and which relational theories seek to overcome (see Bingham 1996). Thrift and French set out two main reasons why grand visions of automatic cities are overstating the case. First, they argue that software is still designed and initiated by human beings, and are often written with ‘human’ concerns in mind, through a series of virtual moments of mobilization. Second, they suggest that ethnographic understandings of the function of software are necessary which tend to undermine notions of vast, automated, and coded systems orchestrating urban life. Drawing on the work of Andrew Barry, Thrift and French argue that this growth of coded systems of automated flow, mobility and surveillance presents a challenge to politics – the axiom that all politics is effectively now the politics of technology (Barry 2001). The human is thus not eliminated but simply more hidden. Through the use of automated systems of surveillance and control, the world-views, social judgements, and ordering processes that are inseparable from processes of inventing and enforcing boundaries, can be hidden. As ANT would have it, such systems can become black-boxed and punctualized such that the collective itself becomes a seemingly integrated and individual component in broader collectives. In other words, the vast technosocial collectives that constitute boundaries through enacting differential mobilities automatically

emerge to become the very taken for granted and ordinary landscapes of contemporary cities and systems of cities. Such processes of black-boxing do not happen through technological determinism. Rather, processes of technological lock-in of punctualized collectives occur that are utterly social, often accidental, and infused with human and institutional agency and the politics of code. In examining any technology, one finds that what is actually doing the work is a combination of technological, human and natural functioning in some collective form.

However, there is a very serious sociopolitical problem here: this process of ‘looking’, of examination, is itself affected both by the discursive and material boundaries created by the automation of such systems, and the languages and expertise required to understand their functioning. Conventional surveillance systems already influence mobilities within, through and between the public and private spaces of urban everyday life. However, their impact is moderated by the three-fold interaction between the subjects, the technologies and their human operators. With the rise of software-sorting systems that differentiate mobilities across borders continuously, automatically, and in real-time, however, there is an overt attempt to configure human behaviours remotely, whether that is for malign, beneficial or neutral intentions, without the uncertainty provided by direct human operation. The potential for discrimination, and indeed for transgression, has effectively been given to the designers, builders and programmers of such systems, who are able to embody their prejudices and desires into the very functioning code and architecture of the systems themselves. Such systems are often promoted as infallible, logical and free of human prejudice. In fact, many programmers do not understand that they are in any way responsible for the ‘unintended’ effects of discriminatory systems, nor even that the systems themselves can be considered ‘discriminatory’.

The diffusion of these automated hybrid collectives are thus changing the very nature of space, and the balance between deterritorialization and reterritorialization that shapes contemporary urban life. Public spaces have long been the arenas for popular protest and politics at its most raw and direct. The politics of human collective mobility and gathering are, in many cases, being displaced into the more obscure collectives of the technologies themselves, the architecture, and the code that drives them. For politics, which has been internalized, there is still territoriality, but it relates not just to the ‘outside’, to mobility in material space, but also to the ‘inside’, the virtual space of flows of databases and networks. They are perhaps better understood as topologies rather than spaces in the usual sense. Topology has two relevant scientific meanings here: in computer technology, it refers to the physical pattern of connectivity within a computer network or between processors, memories, and peripherals (Harcourt n.d.); and in mathematics, topology is the study of properties of objects that are preserved through deformations – it is the study of spatial objects (Weisstein n.d.). This is the second sense in which boundaries are differentially permeable, beyond the theme of this chapter, in that they flow in and out of and between virtual and material space, changing as they go.

Many of these interior spaces, these topologies, are intrinsically territorial: intranets are controlled through physical barriers as well as informational ones (passwords, firewalls, etc.); databases may exist on computers that have no external connectivity beyond screen, drive and keyboard.⁵ However, there are also more subtle forms of boundary-marking, which are vital to an understanding of surveillance. These boundaries are largely socio-cultural and discursive, produced by such entities as ‘communities of practice’ (Star 1995; Wenger 1998); they are networks formed through learning and work-based activity, or ‘epistemic communities’. Star (1995) shows that it makes sense to portray computer-based social groups as communities of practice, both in terms of the production of situated knowledge and the technologies themselves, and the experience of the users of those systems. In the case of software-driven surveillance, the direct users are other computer systems (though of course the ultimate although indirect users are human), but our attention is drawn immediately to the producers of the systems (the engineers). These producers are often software engineers, or research groups that include software, hardware and network engineers. These collectives are relatively opaque to outsiders. Their arguments do not spill out much beyond particular Internet webzines or books only likely to be read by the already computer literate. In territorial terms, there are some physical barriers (lack of access to appropriate computer hardware), but the boundaries are created more by assumptions of knowledge, interests and other practice-based qualifications. Thus, while the programming communities may be committed to freedom of information, the methods by which they distribute information are intensely circumscribed.

Conclusions and Future Directions

While the ‘spaces of flows’ (Castells 1996) are increasingly being automated, they are also increasingly complex. Surely this poses immense problems for such systems. How can software-sorting, based on categorical judgements and differentiated mobilities, cope with the levels of complexity and the multiple intermediaries that exist? A first option here, of course, is to restructure society so that it is amenable to control. As Lianos suggests, the roll-out of smart ID cards to replace all other forms of identification and trust-substituting intermediaries is but one example. This, of course, requires the integration of databases of all kinds at the highest level at which such information is required – effectively and eventually a global level. In a space of global flows one would not expect national biometric identity cards to remain purely national for very long. Of course, there are problems with various particular surveillance technologies in particular settings – facial recognition does not seem to work very well in public space yet, and may in fact have fundamental flaws as a concept (see Introna and Wood 2004). However, this simply means that other systems – in this case, for example, the automated recognition of human walking styles or gait – will be attempted, instead.

A second approach is to attempt to improve the surveillance systems to cope with multiple ordering, and with the vast complexities of flow across boundaries, to make judgements beyond the binary, in other words to move towards heuristic surveillance. Heuristic systems are learning systems. That is, they are not based on simple algorithms, but have algorithms that enable the writing of additional new algorithms to cope with new knowledge and new situations. The result is self-programming software.

At present, one thing is clear. Within the context of the widespread privatization of urban and mobility spaces across the world, software-sorting techniques are being socially shaped in two very different ways. On the one hand, the surveillance and monitoring capacities of ICTs are being shaped to prioritize and enhance the power and mobilities of privileged human bodies within the many scales of global, neo-liberal capitalism. On the other, ICTs are being configured to *add* friction, barriers or logistical costs to the mobility and everyday lives of those deemed by dominant states or service providers to be risky, unprofitable, or undeserving of mobility.

Crucially, these techniques of prioritization and inhibition are often so invisible and automated that neither the losers nor the beneficiaries are even aware that they are in operation within the complex sociotechnologies that increasingly constitute the ordinary and taken-for-granted environments of contemporary societies (Graham and Wood 2003). Thus, the broadly standardized infrastructures and mobility services and rights to public space that were a key part of the elaboration of Keynesian and Fordist welfare states in many nations are often being replaced or overlaid with consumerist systems through which individualized and market-based entitlements to the rights of mobility and of the city are enacted. Automated software increasingly polices these judgements as cross-subsidies are abandoned between profitable and unprofitable users and areas in the desire to extract profits only from those who can provide it.

Importantly, the use of software-sorting to ‘unbundled’ public spaces and Keynesian, welfarist or redistributive service regimes and domains is extending rapidly. Public spaces and malls in the UK and US are being sorted through face recognition CCTV. Mutual health insurance threatens to be unbundled through individualized assessments of genetic risk based on genomic research. And even retailers have debated the use of software-sorting. In 1999 UK supermarkets debated using ICTs to bring in a two-tier pricing policy which would use high prices at peak times to shift the cash-poor time-rich citizens of cities out of the way of cash-rich/time-poor ones (an idea that was then abandoned).

As a result of these processes of change, the clear risk is that the previously largely integrated public domains, infrastructures and spaces of cities will become progressively ‘splintered’ in socio-technical terms (Graham and Marvin 2001). Rapidly emerging are separated socio-technical realms of premium and marginalized citizens that are structured so that citizens experience totally different life chances, access rights, and service qualities based on the continuous and automated judgements of vast arrays of (often unknowable) software orchestrating and enacting myriad boundaries through differentiated mobilities.

While sometimes these splintering domains are clearly visible, more often they are totally invisible. Their agency can even be missed by the people who are sifted by them – either the winners or the losers. Increasingly, then, the politics of the right to the city amounts to the hidden politics of code as the agency of software structures urban access and exclusion in subtle but powerful ways (Thrift and French 2002).

Notes

- 1 Stephen Graham would like to thank the British Academy for the support of a Research Readership (2003–2005) without which his contribution to this research would not have been possible.
- 2 There have of course been many other attempts to create integrated process-based social theory, most notably Giddens's Structuration Theory (Giddens 1984), the revival of dialectics, attempts to integrate complexity theory into social science, and the 'new institutionalism' (particularly historical institutionalism) in politics and organization theory.
- 3 The work of Barth (1969, 2000) and Cohen (2000) on boundaries has been vital.
- 4 Lianos, of course, does not use this term.
- 5 This, however, does not mean that such databases are uncrackable. Van Eck phreaking, the ability to capture and read the radio emanations from CRT computer screens and other electromagnetic devices, has been known for some time; and it has recently been proposed that covert optical surveillance of light-emitting computer devices may be possible. Thus databases in use can be read remotely from the screens of the user.

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