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The Global Network Society: Territorialization and Deterritorialization

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Introduction

File-sharing operates across the Internet. This chapter explores the character of this global network, in particular the structuring and enabling character of global computer networks. The chapter also examines Manuel Castells' work, that of his critics and that of others who have developed distinct and often divergent accounts of 'network society'. At issue is the question of how technical networks impact upon the social networks from which they emerge. Castells claims powerful effects, while critics dispute this. Castells does not claim that technology compels social change, rather that new technologies change the scope for action of individuals, organizations and groups. It is possible to accept insights from his work without rejecting those of his critics. Digital compression, peer-to-peer file-sharing software and the Internet itself emerged out of particular sets of social relationships, were reapplied and modified by different parties to such relationships, rendering certain courses of action more or less effective and affordable, and enabled various cultural, economic, legal and technical strategies and alliances. This chapter is organized around three key claims made by Castells regarding the character of the network society: that the informational mode

of development is relatively autonomous from the capitalist mode of production; that the informational mode of development is driving the development of 'capitalist perestroika' in the form of globalization and the 'networked enterprise'; and that computer networks constitute a 'morphogenetic structure' conditioning the actions of individuals within it. All three suggestions require significant questioning and qualification, yet all three remain productive provocations in the exploration of the present. Each claim is discussed in relation to the counterclaims made by Castells' critics. The concept of 'affordances' is offered as a way to overcome unhelpful binary reductionisms, two examples of 'post-structuralist' approaches are discussed as illustrative of problems already identified in Castells' approach, while the chapter concludes with a discussion of the work of Gilles Deleuze and Felix Guattari as well as Michael Hardt and Antonio Negri, whose writing continues to draw attention to the possibility of radical social change within network societies, something that Castells and his critics are united in placing at the margins of their accounts of social reproduction in one form or another.

The relative autonomy of the informational mode of development?

Manuel Castells combines structural Marxist categories with elements drawn from Max Weber. His 'critical realism' focuses upon relations between the mode of production (otherwise called the social relations of production) and the forces of production (what he calls the 'mode of development'). In distinguishing between ongoing capitalist relations of production and what he calls the 'informational mode of development' he gives technological development a relative autonomy and causal efficacy that can appear 'technologically deterministic'.

Castells seeks to avoid the accusation of technological determinism or sociological determinism of technology, yet his account suggests developments in networked computing had significant implications for social development, even while the opposite is also true. He makes the analytical distinction between mode of production and mode of development (1996: 14). This parallels Marx's distinction between the relations of production (ownership and control over productive resources), and the forces of production (that which is available to be owned and controlled). Castells thus distinguishes capitalism and industrialism. While capitalist development promoted industrial production, industrialization was also achieved within statist modes of production. As industrial society can have different modes of production, so capitalism can have different modes of development. The move from industrialism to informationalism is such a shift. If the dominant logic of industrialism was the increase in physical production enabled by increased availability of cheap raw materials, in particular energy, the dominant logic of informationalism is the increase in informational production through the increased availability and integration of cheap information

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capacities. Castells suggests a five-dimensional account of the shift from industrialism to informationalism (1996: 61–2). First there is the growth of technologies that act on information (computers); secondly, the increased pervasiveness of such technologies in every aspect of life; thirdly, the increased capacity to integrate such technologies within networks; fourthly, the increased capacity to foster flexibility within integrated production systems through coordinating information transfer and machine reprogramming. Finally, there is the increasing convergence of different technologies to generate integrated systems. For Castells these forces of production (i.e. the mode of development) are generating new conditions of possibility within the capitalist mode of production.

Castells recognizes role of the capitalist profit motive in developing information technologies and in applying them in particular ways. However, he is resistant to the view that capitalism determines the logic of technological development or its use. While the Internet may have been developed by the United States military, themselves driven by the desire of US capitalism to fend off the perceived threat of communism, the Internet is now used by radicals the world over to coordinate political protest (1996: 6–7). The combination of military and economic investment in developing information storage, processing and transmission capabilities is certainly central to the rise of the information age, yet neither determines development. Castells suggests that vast amounts of investment fuelled ‘the autonomous dynamics of technological discovery and diffusion, including synergistic effects between various key technologies’ (1996: 51).

In other words, the first Informational Technology Revolution clustered in America, and to some extent in California, in the 1970s, building on developments of the two preceding decades, and under the influence of various institutional, economic and cultural factors. But it did not come out of any pre-established necessity: it was technologically induced rather than socially determined. However, once it came into existence as a system, on the basis of the clustering I have described, its development and applications, and ultimately its content, were decisively shaped by the historical context where it expanded. (Castells 1996: 52)

While the myth that Silicon Valley was the product of geeks in garages, rather than the massive investment of states and corporations in a period of military and economic globalization, is dismissed (1996: 60), Castells’ account seeks to retain a relationship between technology and capitalism that is semi-autonomous. This ‘critical realist’ stance is questioned by critical theorists, who highlight the structuring of technology within ‘hegemonic’ relations of hierarchy, ideology and control.

Critical theoretical challenges

Early critical theory combined Marx with German interpretivism and its suspicion of modern techno-science (Kirkpatrick 2004, 2008). While

defending the Enlightenment, Theodor Adorno and Max Horkheimer (1979) suggest: 'the deductive form of science reflects hierarchy and coercion' (cited in Kirkpatrick 2008: 51). Despite Adorno's (2002) critique of Heidegger's 'jargon of authenticity', the world revealing consciousness that precedes the 'enframing' of modern thought by instrumentalism, Adorno and Horkheimer (1979) and Marcuse (1986, 2002) retain a suspicion of instrumental reason. The 'original violence' by which nature is appropriated for purposes other than its own, a violence that – if unrestrained – forms the basis for instrumentalized relations between people, remains a concern for early critical theory.

Jurgen Habermas' reformulated critical theory abandons anxiety over instrumentalized nature. Instrumental/objective knowledge interests (1972) over nature are seen as unproblematic. Only misapplication of objectifying instrumentalism to purposive human actors violates Kant's categorical imperative. Where such instrumentalism is applied as social engineering and in the name of efficiency, Habermas calls this the 'scientization of politics' (1971), the post-ideological ideology of 'practical management' and 'modernization' typical of late capitalism. Habermas distinguishes instrumental system logic oriented towards control from communicative action oriented towards understanding. Political and economic systems seek to colonize the communicative realm, ordering people by rules of efficiency and control, but such systems remain parasitically dependent upon life-world communication, oriented towards understanding, as social rules require inter-subjectively achieved interpretations in practice (1984, 1987). Habermas shows the limits of technocratic governance and the foundations of resistance to it.

However, Graeme Kirkpatrick (2008: 56) suggests:

Habermas' concern is not with technology as a mode of human action per se, which he understands as quasi-natural, but with the inappropriate use of instrumental reasoning to solve problems that involve meaning and value. However, the system/lifeworld distinction abstracts technology from society ... he acknowledges that in practice the two spheres interpenetrate. However, the separation of system and lifeworld conjoins technology, in its pragmatic function, so to speak, to a permanent association with coercive authority and makes it inherently opposed to reason and communication.

Elsewhere Kirkpatrick suggests Habermas sees 'technology as innocent, perhaps even benign when seen in social evolutionary perspective' (2008: 74). Essentially Habermas equates particular technologies with neutral and efficient technology as such (rather as Castells does). Habermas neglects the politics embodied in tools, focusing only on misapplication. Following Andrew Feenberg (1991, 1999, 2002), Kirkpatrick suggests such 'process critique', addressing how technology is applied, misses 'product critique' of tools built for unethical purposes and 'design critique', attention to the social interests built into tools and passed off as simply efficient. In Feenberg's 'dual aspect theory' tools straddle the interface between physical and social

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functionality. They must 'work' on nature but must also 'work' in social contexts. Equating technical reason and 'hegemonic technological rationality' is to accept partial constructions of efficiency as natural and to limit technology to truncated ends.

Kirkpatrick's work focuses on 'design critique'. To bolster this shift he rather exaggerates Habermas' limits. Suggesting that with increased telecommunications Habermas' separation of instrumental and communicative action is outmoded (2008: 35) rather misses the point of Habermas' distinction between action oriented towards control and action orientated towards understanding, and overlooks the fact that Habermas' definitive study of the rise and fall of the Enlightenment public sphere was itself a study of mediated communication (1989). Contemporary conflicts over commercial and communicative action through new-media highlight the continuing relevance of Habermas' theorization of early European print media, though highlighting significant differences in the structure of new-media architecture, i.e. the absence of an editorial centre. In this way the architecture of the medium's design is significant, as Kirkpatrick's 'design critique' focus suggests, even if it is not the whole story. It is premature to dismiss Habermas' focus and insights just to make space for Kirkpatrick's, valuable as they are.

Kirkpatrick's 'design critique' applies Feenberg's dual aspect theory to search engines, PC interfaces, and computer games. '[C]reeping standardization' of Internet search engine algorithms, converging around Google's 'spider bot' method of locating and ranking websites according to the number of web-links to them (2008: 140–52) may at first appear merely the most efficient means of finding a site. However, this standardization reinforces what is already most visible and marginalizes non-corporate and alternative sites further. Standardization also enables those with the means to pay consultants to 'position' sites, constructing them in such a way as to move up search engines' ranking systems. Standardization increases the consequences of 'position', jumping all the generically structured queues. Challenging the suggestion that 'this works' equals 'neutrality' disrupts technocratic claims that one version of efficiency equals progress as such. Kirkpatrick highlights a range of alternative search engine designs.

The rise of the 'user friendly' interface appears to help the non-expert user, but inhibits their understanding and so keeps them under control (Kirkpatrick 2004: 22 and 26–68, and 2008: 73 and 122–5). Sherry Turkle's (1995) suggestion that the Windows interface seduces the user into a 'life on the screen', a postmodern freedom to explore multiple identities and positions, is rejected by Kirkpatrick as a manipulated illusion. He proposes a Brechtian modernist aesthetic critique of false and misleading interface designs, in favour of direct engagement with the machine through writing syntax commands. Learning and writing commands would give users greater control and freedom to configure the machine. 'User friendly' interfaces are said to configure the user to limited menu/icon options.

'The mechanical, austere and challenging interfaces on older operating systems were in a sense, consistent with a more realist aesthetic of technology

design' (Kirkpatrick 2004: 23). At times Kirkpatrick's 'design critique' is realist, challenging designs which obscure real world power relations and domination – such as in the case of search engine algorithm standardization or where covert surveillance and adware are used to manipulate users. More often Kirkpatrick's critique is strictly modernist, rejecting artifice and metaphor in form in favour of explicit presentation of the medium's own workings. Modernist attention to the medium's truth in relation to the mechanics of its functionality gives less significance to true representation of the world beyond the medium. The primacy of 'design critique' in Kirkpatrick's critical theory lends itself to such attendance to the character of the medium over the practices of users as such. The primary agents are designers. Users are seen in large part as passive, having been configured by the designs said to contain them.

The power of 'hegemonic technological rationality', despite Kirkpatrick's questioning of it (2008: 152), is most definitely assumed in his account of potential resistance. Critical theory's account of technocracy's pacification of class struggle itself struggles with questions of change and/or resistance. Critical theory came to substitute itself for 'imminent critique', the self-contradiction and self-confrontation claimed in classical Marxist accounts of class-based societies. This can be seen in Kirkpatrick's 'design critique', itself seeking to effect 'progressive rationalization' in the face of dominant constructions of efficiency. But who would adopt such alternative and more challenging designs? Kirkpatrick finds some hope in computer gamers, who he sees poised on the knife-edge of seduction by the interface/screen and a desire to explore the algorithms that structure the game/system. Drawing on Sloterdijk (1984) Kirkpatrick (2004: 69–88) identifies a tension between the cynicism of suspended disbelief in the virtual game on the screen, and the cynical questioner who wants to probe beneath and perhaps question 'the rules'. Instilling knowledge of computers (to some extent), the dialectic of gaming is offered as a proto public sphere for a new modernity.

Kirkpatrick suggests computer simulated war games fostered a realization that the cold war was irrational, thereby encouraging its end. This is hard to verify and designers/gamers offer only modest hope for redeeming technology. However, when Kirkpatrick's focus on design is allied with product and process critiques imminent in the development and conduct of file-sharing, technologies of sharing may offer a greater hope for democratic and progressive rationalization. Having distanced his critical theory from earlier suspicions of technical reason per se and from accounts that render technology as neutral tools (2004 and 2008), as well as in his distancing from constructivist and positivist accounts of technology (2008), Kirkpatrick's 'minimal technical attitude' of critical engagement with technology and technical reason as a progressive force 'meshes better with a realist stance on the technical object' (2004: 7). This does not mean critical theory can be simply fused with Castells' critical realism, as Christopher May's empirical objections outlined in the next section attest. Nevertheless,

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the scope to draw insights from both traditions is increased, even while enabling a more subtle engagement over their still significant differences.

Feminist critiques

Feminist Internet research tends to parallel critical theory. While Sadie Plant (1998) suggests the Internet's network character has a particular elective affinity with feminine weaving over masculine hierarchy, this is more ironic subversion of masculine assumptions and designed to highlight the non-reducibility of social life and/or technology to existing relations of power. Alternatives exist, and can be fostered. Dale Spender (2003) similarly highlights the potential for network communication to disembody and eliminate gender distinctions online, even while she goes on to show how, in practice, men use sexist language and images to colonize cyberspace. Sherry Turkle (1995, 2005) suggests the disembodied character of computer 'geek' culture excludes women. Flis Henwood (1994) shows how the gendered assumptions of teachers and boys reproduce female exclusion and self-deselection from computing. Nevertheless, the rise of the computer and the revaluation of 'typing' over more 'physical' forms of engagement with 'technology' have shifted gendered relations. Masculine forms of dominance in framing skill and power remain (Wajcman 1991), but women's paid employment has been entrenched not weakened with the shift from manual to non-manual engagement with machines (Webster, J. 1996). Donna Haraway (1991, 1997), through her work on cyborgs, hybrids and the post-nature fusions of humans, machines and other organisms touches on the Internet only tangentially. Technology is bound to patriarchy and capitalism, but for her there is no recourse to a natural order. It is technology itself that both undermines older repressive ideologies and fosters new ones. Like Habermas, Haraway suggests instrumental rationalizations in the interests of control can foster critical challenges.

Informationalism and 'capitalist perestroika'?

The central argument of Castells' *The Information Age* (1996, 1997 and 1998) is that we are becoming a global network capitalist society. In line with Marx, Castells argues that social development is driven by economic conflict. Capitalism has become global, over-running both pre-capitalist and statist alternatives. Network capitalism is characterized by increasingly distributed enterprises, trade systems and financial markets. Traditional forms of geographical and class-based community are fragmenting. The network society is, therefore, characterized by increasing individualization and increasingly global connectivity. The tension between self and net – in economic, political and cultural terms – is coming to form the dominant site of identity crisis and reformation (1996: 3) in economic production, political power and personal experience (1996: 14–15).

The context out of which the informational technology revolution emerged and into which it developed was that of the United States' rise to global dominance, economically and militarily. Castells' critical realism holds that technology develops by producing increasingly powerful objective tools for the control of nature; and such an objective yardstick, for all the potential for social manipulation and direction, gives technology a level of autonomy from simple social determinism, and technical artefacts impact upon social relations as though from outside. Increasingly powerful tools enable increased economic productivity. Increased productivity is one of the key drivers of social change, but it is not the only one. The other three castells suggests (1996: 103–5) are: gaining access to larger, more integrated and affluent markets; increasing the gap between cost and price (which may be achieved by a number of means other than efficiency); and effecting macroeconomic management at national and international levels. The network society emerges as technical shifts in the mode of development (the shift from industrialism to informationalism) enable shifts in the other three dimensions. These other shifts are within the mode of production (capitalism), and can be summarized as the shift towards global network capitalism, what Castells (1996: 18–22) calls 'capitalist perestroika'.

The rise of global corporations requires greater information storage, processing and communication capacity, and their provision has enabled the combination of greater centralization of ownership, more rapid flows of capital through stock markets, and the development of integrated and lean forms of production and distribution (flexible production and global trade). Network capitalism is founded upon what Castells (1996: 172) calls the network enterprise: 'the network enterprise makes material the culture of the informational/global economy: it transforms signals into commodities by processing knowledge.' The 'culture of the informational/global economy' is what Castells calls 'the spirit of informationalism'. '[t]he "spirit of informationalism" is the culture of "creative destruction" accelerated to the speed of the optoelectronic circuits that process its signals. Schumpeter meets Weber in the cyberspace of the network enterprise.' (Castells 1996: 199).

The consequences of this creative destruction are multidimensional. In the realm of work the new network enterprise in the global market promotes flexibility, leading to new forms of economic insecurity for many and greater wealth for elites. According to Castells we are now experiencing 'the individualization of work and the fragmentation of societies' (1996: 201). Established collective identities of class and nation are being undermined by the new global informational capitalism, a new world of experience characterized by what Castells (2000) calls 'real virtuality' (the increasingly significant amount of dis-embedded/mediated experience), 'the space of flows' (the increasing mediation of place by mobility – whether of things, people or information) and 'timeless time' (the abolition of distance and the increased scope for coordinated action at a distance). For Castells, the gap between haves and have nots lies in relative access to informational

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resources and can be mapped in terms of virtual, spatial and temporal integration within the net.

Volume II of *The Information Age* (1997) describes the fragmentation of national and class identities and the rise of new social movements (regionalism, environmentalism and feminism in particular), and the transformation of the state from nation state to network state (with its consequent dislocation between government and democratic accountability).

Critical theoretical challenges

From within the Marxist tradition Christopher May (2002) questions the radical nature of change in Castells' 'network society'. Identifying four dimensions of supposed radical change in Castells' work, May concludes that continuity in each is far greater than change. First, the idea that society has been fundamentally changed by information technology is questioned. For May, relations between owners of the means of production and waged workers is not fundamentally changed. Secondly, May suggests Castells' separation of the mode of production from the mode of development is unjustified. The nature of work and class relations is not radically altered and talk of individualization of work is much exaggerated. Trade unionism and workplace politics is certainly fluid, but the rise of flexible production – with core and periphery employment, increasing part-time/temporary contracts – cannot be explained by a shift in technology. Additionally, it is still the case that the majority of employees in advanced economies work full-time. The rise of industrial production in developing countries and the increased paid employment of women across the world suggest the rise of industrialism, not its demise. The very separation of industrialism and informationalism is hard to justify. May suggests the same logic of increasing productivity and profitability underpins capitalism in physical and informational production. Thirdly, May (2002: 81–113) questions whether new social movements are either the result of the network society or a sign of the death of class politics. Old and new movements use new technologies to achieve action and communication. Finally, the belief that the state is fundamentally transformed is questionable, both in terms of its demise in the face of global markets and in terms of its centrality in democratic political conflict. May is concerned by Castells' structuralist language, and his claims for the semi-autonomous and radical effects of new technologies.

There is nothing natural, nothing inevitable about the information society: while we can only make our own history in the circumstances we find ourselves in, we should recognise that these circumstances are not as fixed or narrow as many commentators on the information society tell us. (May 2002: 161)

This view is not fundamentally at odds with Castells' own view, but May offers a valuable corrective to technological determinist readings of Castells.

The network as morphogenetic structure?

Volume III of *The Information Age* (1998) charts the relative position of different regions in the information age (the former Soviet Union, Africa and Latin America, Asia/Pacific and Europe). The United States is very much the epicentre of the new global transformation and the focus of attention in Volume I. Such a grand accounting exercise tends to present a process far above the heads of all those living through such changes. While networks are commonly used in sociology to emphasize human agency, this is not Castells' intention.

Presence or absence in the network and the dynamics of each network vis-à-vis others are critical sources of domination and change in our society: a society that, therefore, we may properly call the network society, characterized by the predominance of social morphology over social action. (Castells 1996: 469)

Social morphology refers to structural characteristics in social systems (see Archer, 1995). Castells asserts that the network society is a social structure, something that is not reducible to or controlled by conscious actors. It is an environment in which humans act, and which constrains and enables such action. In this sense Castells is an anti-reductionist. Society cannot be reduced to the actions of individuals. Castells' structuralism is in diametric opposition to ethnographic research.

Ethnographic, ethnomethodological, conversation analytical and discourse analytical studies have addressed the design process, the interaction between design and use by 'non-experts', the discourses that surround computer surveillance and simulation models, as well as the relationships between networks in the formation of communities and technologies. Particular attention has been paid to the question of whether technology has effects. In addition, the question of how to conceptualize the social in relation to the computer will also be examined. This theme flows from the ethnographic and discursive focus upon action and language, largely in opposition to attention and belief in social 'structures'. If technology is not independent of the social and social structure does not mould technology, what is going on? Ethnographic and discursive researchers highlight the ways computers are imagined and used, challenging both technological and sociological reductionism.

Ethnographic alternatives

Christine Hine's (2000) ethnographic study of Internet use involved observation of, interaction with and interviewing users of both the World Wide Web and a range of Internet newsgroups. The focus of the research was Internet coverage and discussion of the English nanny Louise Woodward's court battle against charges of murdering the child she was looking after in the USA. Hine's interest lay in the anthropological themes of community and identity formation. Would interaction in non-physical and often non-temporal

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proximity lead to weaker normative expectations and regulations? Would the characteristics of the medium affect the way people interacted? Hine suggests the space created for interaction on the Internet is both performative and a performance (2000: 116). In one sense the Internet creates a new environment where people can interact without being co-present. In this sense the Internet has effects. Interactions that would not otherwise occur, do occur. Yet the medium itself does not determine how people will interact. The way that the Internet is used is itself a performance, the medium is interpreted and applied in ways determined by social negotiation between the parties to the interaction. This process of performance has two dimensions for Hine. The first sense of performance lies in creating contexts and rules of behaviour. Groups create routines and places on the net where they meet. Groups also establish patterns of expectation, inclusion and exclusion. These regulate anti-social behaviour (2000: 115). Hine rejects the idea that loss of face-to-face proximity will have necessary consequences. People using the Internet are not denuded of normative context. While the medium does not provide normative context, participants do. In the second sense of performance Hine (2000: 144) highlights that participants in online interactions often continue interactions from non-Internet life and interactions online always play upon materials drawn from outside the Internet to create cultural context. Of particular interest in the case of Louise Woodward were national identity and television coverage, two sets of cultural resources that enabled online participants to identify themselves as a 'community' – one that the Internet encouraged but did not create.

Daniel Miller and Don Slater researched Internet use in Trinidad and found: 'Trinidadians have a natural affinity for the Internet' (2000: 2). The expectation that the poor have less access and interest in information technology (hereafter IT) was confounded in this study. In what is by most indicators an economically poor island, the researchers found that one in three households had direct access to the Internet, and there was little negativity and technophobia even among those without. Miller and Slater conclude that far from being a detached and dis-embedding technology, the Internet is deeply embedded in Trinidadian life. As a mobile population, with high levels of migration across the world, the Internet fits. A libertarian ideal of free movement also resonates with a cultural emphasis upon freedom, born of a history of slavery and resistance. Structural accounts fail to capture the creativity by which communities engage and remake technologies. For Miller and Slater, the ethnographic approach avoids both the sociological determinism of Castells' 'network society' and its technological determinism.

David Mason et al. (2001, 2002a and 2002b) use ethnography to examine workplace surveillance. Fieldwork in diverse workplace situations examined use of 'surveillance-capable' (2002b: 558) technologies, technologies that collect data on the activities of employees, whether or not this is either intentional or applied. Use was studied in detail. Rather than assuming how or by whom capabilities would be used the research team observed what

happened. It was not simply the case that capabilities were used by management to spy on staff, to increase work pressure, or to individualize work evaluation. This presumption is referred to as 'apriorism'. Mason et al. suggest the value of ethnography lies in its more inductive approach to finding out what is really going on. Capabilities were negotiated to a variety of ends and in a variety of ways. Technology requires active involvement of staff in its use and the data such systems generate is the result of negotiation, interaction and interpretation. Use that does not increase management control cannot automatically be assumed to be resistance. Using systems to monitor work in order to keep a record of your actions could be resistance against management pressure, or conformity. Sometimes staff felt monitoring impinged privacy; sometimes they did not. The meaning of the technology and what it meant for the technology to be working properly was negotiated in context rather than being a top-down imposition. Technologies afford possibilities, as do workplace situations, but neither determines outcomes.

From ethnography to discourse

Steve Woolgar (2002: 14–21) summarizes a range of 'virtual society' ethnographic and discursive research projects. He proposes 'five rules of virtuality'. First: 'The uptake and use of the new technologies depend crucially on local social context'. Information and communication technologies (ICTs) are embedded in social life, not vice versa, and they certainly do not abolish social context. Secondly: 'The fears and risks associated with new technologies are unevenly socially distributed', again reflecting local contexts. Thirdly: 'Virtual technologies supplement rather than substitute for real activities'. Fourthly, it is suggested: 'The more virtual, the more real'. New ICTs drive and extend existing mobility, communication and interaction. Finally: 'The more global, the more local'. ICTs do not abolish locality.

"To talk of the impact of technology, then, seems to require us artificially to separate the technology from some "social group" in the service of assessing "the effects" of one upon the other' (Grint and Woolgar, 1997: 93). Better to say: 'The "technology" is the machine's relations with its users', rather than to imagine the machine as something outside society. This seems strange. The machine still sits there when we leave. Grint and Woolgar (1997: 80–2) cleverly highlight the discursive construction of the computer as a freestanding thing in their account of the labelling placed on computer casings to discourage the user from lifting the lid and transgressing the boundary between thing and user. However, while the boundary is enforced by rhetoric the machine still has a physical reality, with limits and possibilities. Grint and Woolgar critique the view that information technology has its properties and capacities 'hard-wired' into it by its designers. They point out that in reaction to technological determinists, a generation of social researchers emphasized the social shaping of technology. This social shaping approach implied that technology was driven by macro social structures, with

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no intrinsic consequences of its own (MacKenzie and Wajcman 1985, 1999). A reaction to this tradition was to emphasize the way that technological design built in certain features that had political consequences (see Winner 1985). Grint and Woolgar reject technological determinism, social determinism and technological neutrality, the latter because it seems to imply that the technology exists independently of its uses, waiting to be used one way or another. In abolishing the distinction between technology and its uses, they suggest that any artefact in use is a unique configuration. From their ethnomethodological perspective, using technology differently remakes the technology. Such rhetorical hair splitting makes a particular point and does not dispute the existence of physical objects with particular properties.

We have no wish to insist that machines actually are texts. Rather the point is to play against this metaphor, to see how far we can go with it. What happens to the structure of our discourse when we introduce the notion of machine as text? What, if anything, is special about machines by comparison with other texts? What are the limits of talking in this bizarre way? (1997: 70)

Challenging discourse analysis from within

Ian Hutchby (2001) responds to the apparent abolition of artefacts in the language, if not the intention of Grint and Woolgar, using conversation analysis of the way humans interact with and through computers, and the expectations displayed in interactions with computers – expectations drawn from human conversation. Conversation analytical attention to the orderly yet spontaneous character of human talk highlights difference between humans and machines. Computers are not oriented towards understanding, performing programmed responses not human ‘conversation’. Humans interacting through the Internet generate their own normative contexts to regulate performance (Hine 2000). However, the videophone did not ‘take off’ because it fails to provide the kinds of ‘taken for granted cues’ available in face-to-face communication (Heath and Luff 1993). The conventional telephone does not afford such ‘cues’ either but, as the videophone was promoted precisely in order to do so, its failure reduced its appeal. In reviewing Lucy Suchman’s (1987) ethnography of work within a hi-tech company, Hutchby notes the way designers imported a range of metaphors and assumptions from the field of computing into their designs for human–computer interfaces. Assuming human thinking mirrors the computational character of a machine encouraged designers to provide interfaces based on incorrect assumptions. Human conversation displays intentionality and an orientation to understanding not present in machines. Hutchby concludes by saying (2001: 140): ‘The difficulties experienced by users in both cases emerge from a lack of fit between the expectations associated with the normative structures of ordinary interaction and the artefacts practical communicative affordances.’ Hutchby outlines a range of such affordances as well as the interactional work and communication

breakdowns that ensue when humans interact with and through machines. Similar research explores libraries (Zeitlyn, David and Bex 1999), medical expert systems (Collins 1990) and McDonald's (Kusch and Collins 1998).

Hutchby's 'affordances' avoid seeing computers as carrying in built logics of use, programmed either by technicians or society, or seeing machine as texts only meaningful in the way they are read by users. Affordances are the limits and possibilities of physical artefacts. While limits do not determine uses, to ignore limits is to ignore a fundamentally important difference between humans and machines. Recognition of this difference underpins ethnography, ethnomethodology, conversation analysis (CA), social interest theory, Marxism and most feminist scholarship (David 2005), even if each needs reminding for different reasons.

Affordances bridge Castells' suggestion of technological 'impact' and his critics' attention to the social shaping of technology at different levels. Affordances highlight that without use there is no technology, but also that usage has limits. Different objects offer different possibilities. Critical realists' and critical theorists' attention has been on the cutting edge organizations and designs within the network society, neglecting hidden users who clarify and illuminate their insights. Where May is correct to suggest that corporations remain corporate and in that sense hierarchical for all their distributed infrastructure, that networks now enable every computer to offer new affordances which challenge corporations does present scope for radical change. Where Hine, Miller and Slater show that technologies can only be understood in relation to the communities that use them, it is also true that the performative scope to act is changed (as is Castells' suggestion also). Hostilities towards the music industry for its pricing of recordings existed long before network technologies enabled relatively easy circumvention of payment. Piracy and home taping suggest that file-sharing is not just a technical possibility that created a cultural desire.

The 'post-structuralists' Alexander Galloway and Frederick Kittler – in radically different ways – highlight the value and limitations of attempts to study technical networks as relatively autonomous, socially determining, morphogenetic systems rather than as social practices.

Post-structuralist approaches

Alexander Galloway (2004) suggests early study of the 'information society' neglected the material reality of information technology, while later discussions of the 'network society' tend to treat the term 'network' as a metaphor for new forms of social interaction rather than as a physical infrastructure and a command language built to distribute (regulate the flow of) data across an electronic grid. Galloway suggests such 'vapour theory' of networks allows projection of polarized visions of social change onto technical systems, first wave liberation technologists (Reingold 2000, Gates 1995, 1999 and Zuboff 1988) and second wave dystopian theorists (Bogard 1996 and Lyon 2001) fail to understand the technical contradiction at the heart of

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the machines themselves. While Galloway overstates technical contradictions within the Internet, his detailed discussion of software and infrastructure are useful both in qualifying the theoretical projections he seeks to make and in challenging either/or constructions of network potential.

Though critical of Castells, Galloway replicates his focus upon the technical realities of networks even while coming to different conclusions. Critical theorists, such as May (2002), observe in Castells a reified technical infrastructure too close to a 'historical materialist' form of Marxism, where technical forces of production drive out 'dated' social relations of production and ferment social transformation. Critical theorists suggest technology is not an autonomous force for social change.

Like May, Galloway's 'political economy' sets itself against Castells' account of the Internet as a transformative social force, framing his discussion of Internet protocol within Deleuze's (1992) account of the 'control society' (discussed below). For Galloway, the architecture of the Internet, the management style embodied in its protocols, along with the concealment operating at every level of its interfacing, reproduce the society of which it is a part. However, unlike May, who sees the continuities within 'capitalist society' manifested online, Galloway suggests Internet protocol materially mirrors the reordering of the mode of regulation from a 'disciplinary' society (based on a Foucauldian decentralized power) to a 'control' society (based on Deleuze's conception of distributed power). Domain names are allocated by a hierarchical set of designated agents (once totally centralized but now partially decentralized), while distributed interaction requires a set of universal standards (protocols). The fact that peer-to-peer interaction via distributed networks requires such a universal set of agreed programming standards leads to what Galloway calls the 'protocological society'.

Increasingly individualized communication requires increasingly standardized media. Galloway exaggerates the difference between the centralised (thought increasingly de-centralised) power over domain name allocation and the distributed nature of data-transfer within the Internet. Removing China's domain name from the domain name system (DNS) would be more akin to removing the word China from the English dictionary than removing it from the English language. Galloway's observation that China's '.ch' domain name could be removed within 24 hours is correct at one level, but the actual numerical Internet address would remain. What would disappear would be the ability of search engines using the most updated versions of the protocols to locate Chinese Internet sites. As such, the relationship between the dictionary and the language has changed. We are more reliant on looking things up (through search engines) when using the Internet than we are in our everyday language. Internet users rely on the centralized 'ad hoc' of the Internet Engineering Task Force (IETF) to give them a system that links up. The extent to which such reliance has consequences needs to be investigated at the level of actual usage. Galloway seeks such power relations in the very material character of the Internet's language, its semantic naming system and its syntactic protocols. Galloway

locates contradictory but substantial power relations within the material realm of the machine and the functional constraints and constitutions said to emerge from its command language. Attention to the protocols is largely separate from the discussion of his case studies of power and resistance, viruses, cyberfeminism and tactical media (2004) as well as of terrorist networks (2004, 2005).

These cases are only tenuously linked to his overarching 'protocological society' theory, and relatively marginal to his attempt to theorize the Internet as a language indifferent to the meaning communicated through it. Such a structuralist/post-structuralist attention to the semantics and syntax of the Internet as a material language discourages any serious attempt to theorize the substantive content – and thereby actual use of the Internet – because syntax is said to condition the parameters of semantic content in advance, rather than semantic content driving divergent uses of syntactic systems. This explains Galloway's strenuous, and at times contorted, attempts to explain protocol in its own terms (as a system, even if a self-contradictory – post-structuralism compliant – system). It also leaves his work open to the accusation of reification, despite his otherwise interesting observations about reification through concealment. While interesting, Galloway's theoretical framework inhibits research into much that is of interest about the Internet and its use. While 'vapour theory' allows for the projections of cyber-optimists and cyber-pessimists, this is no less true of the structuralist/post-structuralist 'materialist theories' of Castells and Galloway.

If much is gained from engagement with Galloway's work, perhaps as much can be gained through a critical distancing from the work of Friedrich Kittler. Kittler's account of three stages in the development of media – 1800 reformulation of storage media, 1900 developments in transmission, and more recently the development of computational media – correspond, as Kittler rightly shows, to popular and intellectual representations of the human subject. Influential constructions of the mind draw still upon the latest media technology. Romanticism, psychoanalysis and structuralism/post-structuralism/systems theory pass off metaphors drawn from the machines of their day as analytical categories. Kittler suggests today's network fusion of 'partially integrated media systems', of storage, transmission and computation, will create (or has created) a fully integrated 'system' – a self-contained information loop, no longer 'media' as it would not need external points of reference to mediate between. This play on Foucault's (1974) 'Death of Man' through an inversion of McLuhan's (1964) 'Extensions of Man' portrays a symmetrical system as unsustainable, in reality, as the systems theoretical framework that seeks to conceptualize it. Systems theory is a 'performative contradiction' (David 2006a: 81–2). Paul Virilio's claim that 'the message is the velocity of the medium' (2000: 141), making human intelligence the extension of artificial intelligence, fails to explain the systematic failure of such high speed info-war to convince. Similarly (contra Kittler 1997), the German military's definition of radio *broad*-casting as a technical weakness didn't stop it catching on, and Intel's

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imprinting of the PC's basic operating system onto the chip's silicon circuits does not programme the PC user as a 'subject or underling' of corporations. Kittler's fascinating histories and counterintuitive accounts of media technology's relationship with war, literature and the human sciences (1990, 1997, 1999) offer myriad insights and intellectual provocations. Nevertheless, his 'attempt to construct sociology from the chip's architecture' (1997: 162) reduces social relations of technology to the codes of media machines and metaphors for the human subject drawn from them. The failure to distinguish the command language of computer syntax and the inter-subjective characteristics of human language, interaction and meaning formation, continues to encourage misrepresentations of humans as computers (David 2002), and continues to ensure their inability to examine human-computer interactions without reifying the former in the mirror of the latter.

Contingency, contradiction and contestation

Marx termed the twofold movement of the tendency to a falling rate of profit, and an increase in the absolute quantity of surplus value, the law of the counteracted tendency. As a corollary of this law, there is the twofold movement of decoding or deterritorializing flows on the one hand, and their violent and artificial reterritorialization on the other. The more the capitalist machine deterritorializes, decoding and axiomatizing flows in order to extract surplus value from them, the more its ancillary apparatuses, such as government bureaucracies and the forces of law and order, do their utmost to reterritorialize, absorbing in the process a larger and larger share of surplus value. (Deleuze and Guattari 1984: 34-5)

The above quotation captures both contradiction and contingency. Two contradictory processes are paralleled and the contingent nature of both is highlighted. What Marx (1995) refers to as the law of the counteracted tendency is the tendency for the rate of profit to fall within competitive market conditions. Goods being sold above their cost attract increased supply. When this exceeds demand prices will be depressed, as is the rate of profit. Various countermeasures can be enacted to reduce cost, expand markets, and integrate horizontally or vertically to reduce competition or to reduce price elasticity (by customer loyalty). One such countermeasure is to prohibit entry with trade barriers, charters, professional or commercial licences and other mechanisms that criminalize market entry by others. Capitalism increases productivity to reduce cost. Rising output raises the prospect of reducing scarcity to the point where supply exceeds demand, thus threatening prices and profitability. As such, market inhibiting mechanisms are as much favoured in restricting competition as are technical and productive innovations designed to reduce cost. The rise of intellectual property monopolies designed to protect profitability are only contemporary manifestations of longstanding counteractions to the tendency for the rate of profit to fall.

As such, for Marx, while crisis tendencies afflict capitalism by its very competitive and profit-oriented nature, such tendencies must be set against equally significant counter-tendencies towards the protection of existing dominant positions by anti-competitive regulations. There are no necessary outcomes in such dynamics and the way groups and individuals seek strategically to ally and compete cannot be predicted fully in advance. Actors must make choices as to how their best interests might be served, even as their interpretations of what such interests might be are also subject to competing claims and demands.

For Deleuze and Guattari a similar contradiction lies in the pressure within capitalism both to exceed state and regulatory boundaries (to evade restrictions), and yet to seek regulation and protection from attempts to challenge regulations that protect them (to re-restrict at a higher level). While information technologies for storage, processing and transmitting data have emerged as part of existing economic, political and military strategies, these strategies are themselves open to many alternative possibilities. It is useful to explore how such new affordances may make certain things more or less possible. Where once bootleg tapes and home taping tweaked the margins of the record industry's monopoly over recorded music, digital compression and network distribution (both technologies developed by the entertainment industry in the first instance) significantly alter the relative costs and benefits of such appropriations.

The way artefacts act to stabilize and/or destabilize the relative position and composition of social groups is something highlighted by the now defunct Actor Network Theory. Latour's (2005) attempt to fend off any over-rapid movement towards sociological determinism, wherein established social categories are wheeled in to explain the use of artefacts, is legitimate – even if he rather labours the point. Like Castells, Latour can be questioned for placing too much emphasis upon the potential for artefacts to reconfigure the balance of power and composition within and between social groups, yet the point remains true that negotiations over the formation and application of artefacts always involves some renegotiation over the composition and relative dominance of humans. Such renegotiations will not always be significant; however, they will not always be insignificant.

File-sharing offers an interesting case study. Expanding market reach and reducing cost by deterritorializing production of informational goods, in particular by means of digitalization of storage (digital compression) and transmission (file-sharing protocols), evaded local regulations, but the same artefacts were appropriated by competitors and non-market actors circulating freely by the same mechanisms to an even wider global network. Those that once sought to escape regulation demand re-regulation at a higher level. Whether this will be successful is an open question.

While Deleuze and Guattari (1984) highlight the open and contingent nature of ongoing developments in struggles over power, culture and profit in global information flows, Deleuze's (1992) diagnosis of the shift from territorialized discipline (in the form of Foucauldian institutional spaces

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and disciplinary fields) towards deterritorialized control through networks of information and money (surveillance and debt) is more concerned to outline the 'coils of the serpent' within 'societies of control'. Deleuze's final suggestion to the next generation that 'it's up to them to discover what they're being made to serve' (1992: 7) gives no answers, only the insight to keep looking. This book takes the hint.

Michael Hardt and Antonio Negri (2000) refer to the deterritorializing action of networked multitudes within and yet beyond the control of global empire. The actions of hundreds of millions of peer-to-peer file-sharers, in taking information technologies and using them in ways that challenge dominant logics of application and development represents just such a networked multitude – an illustration of deterritorializing leapfrogging beyond control by its own tools, and just such a challenge to existing social relations by means of the affordances made by artefacts that could well have been used otherwise. Yet, while such deterritorialization 'from below' may challenge dominant practices, it can also be linked to new forms of reterritorialization, either through legal enforcement or new forms of trust. The discussion of alternative business models in Chapter 9 highlights how diverse configurations of proximity and trust play out the possibilities of de/reterritorialization and de/relegitimation.

Conclusions

Where Castells grants relative autonomy to technology only to suggest such new forces of production are driving the emergence of a new capitalism, his critics tend to suggest established social relations continue to call the shots. Similarly, while his critics suggest Castells is a technological determinist, these critics are themselves more often than not guilty of reductionisms to their own preferred levels of causal explanation (language, interaction, hegemonic regime or mode of production). This chapter has sought to highlight these symmetrical counter-reductionisms and to resist them. Valuable insights have been highlighted at many levels. It is valuable to take insights from researchers working at all levels of analysis precisely as in so doing it is possible to identify the failure of any one level of explanation to effect closure. Social change is neither determined nor discounted in advance. This chapter draws upon the concept of 'affordances' as a bridging term that allows for analysis across levels of explanation, from language and interaction, to institutional and systemic social relationships and practices, without recourse to reductionism of various kinds. Castells' critics suggest he goes too far in claiming technical affordances transform social relationships. In some senses they are correct. In others Castells does not go far enough. File-sharing technologies afford perestroika from below not simply the reinvention of capitalism through new tools, though this is an alternative affordance.