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**Contested Technologies: the global justice movement and emerging constraints on activists'
use of information and communications technologies**

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Abstract:

Non-state actors (NSAs) are increasingly coming under consideration within the field of international relations, and transnational social movements (TSMs), particularly the global justice movement (GJM), are seen as having a role in pushing for progressive change. The emergence of the GJM has relied in large part on the growth and accessibility of various information and communication technologies (ICTs). Various attempts are now being made to place limitations on the uses to which ICTs can be put by NSAs. These attempts, intentionally or unintentionally, will affect the work of the GJM. In order to fully understand these developments, scholars of international relations need take a critical perspective on science and technology and understand these areas as contested spaces.

Introduction

Non-state actors are increasingly coming under consideration within the field of international relations (IR), and transnational social movements (TSMs) are seen as having a role in pushing for social and political changes at the local, national, and international level. The explosion of transnational activism since the 1990s, and in particular the emergence of the Global Justice Movement (GJM), has led some to argue that TSMs may not only prove to be influential actors on the world stage, but are beginning to provide an alternative vision to neoliberalism. The growth of TSMs has been due in large part on the development and increasing accessibility of various information and communication technologies (ICTs). Social movements rely on the Internet and affordable telecommunications to build and maintain inter- and intra-movement connections, to mobilise movement participants at short notice, and to bypass government controls and resource constraints that may prevent the flow of information through traditional media.

In developing an analysis of TSMs few scholars have taken a critical perspective on science and technology. There is little recognition of the interaction between particular technologies and scientific theories and other social, political, and economic structures. Those working in the fields of political science and international relations therefore do not have an adequate framework for understanding threats to the work of TSMs emerging in the form of limitations on the uses of ICTs. Seemingly disconnected measures taken by groups as diverse as governments, the recording industry, and software companies may cripple social movements and TSMs by severely reducing their ability to communicate and organise, and to gather and disseminate information effectively. These efforts are spurred on by different motivations, primarily expressed as concerns for national security, law and order, and as part of efforts to prevent piracy of copyrighted material. Social scientists need to take a critical perspective on science and technology if they are to effectively analyse the emerging threats to TSMs' potential.

The emergence of the Global Justice Movement

Compared to the growing concern in both policy and academic circles over the rise of terrorist organisations and the inability of states to monitor or guard against their activities, the response to TSMs has been muted within IR. In 1999, the Ministerial Conference of the World Trade Organisation (WTO) in Seattle was met with massive protests by a range of social movements, non-governmental organisations (NGOs), and individuals. Unions, church groups, environmentalists, human rights groups, and many others came together to raise concerns about the actions of multinational corporations, the handover of decision-making powers to international financial institutions, and the collusion of states in these processes. The size of these protests and the chaos that ensued as protesters attempted to lock down parts of the city ensured that they received significant coverage at the time, but it is their symbolic positioning as the 'coming out party' for the GJM that has ensured their place in the history of NSAs in world politics. For many scholars of social movements, the protests at Seattle marked a turning point in the history of social movements.

There have been numerous attempts to theorise the GJM, each of which understands it in slightly different terms. There are several reasons why I have chosen to use the phrase 'global justice movement' rather than 'anti-globalisation movement', or one of the other labels that abound. This term avoids typecasting the movement as purely reactionary, and defines the GJM through its aim – justice on a global scale – while leaving room for the many ambiguities of the movement. Even a passing glance at the GJM makes it clear that it is multiplicitous, centreless, and fluid. It is anti-capitalist, and anti-corporate, and anti-neoliberal. It is also about building a better relationship with nature, about rethinking the way we produce and consume the necessities and luxuries in life. It is about how we work, where we live, and who owns what. It is made up of a wide variety of actors who drift in and out of involvement, including individuals, smaller movements, and organisations of

various sorts. Few of these actors are pursuing the simple goal of 'global justice', or even opposition to neoliberal globalisation. Rather, they are involved in a variety of struggles over issues which feed into the end goal of a more just world, including environmental issues, human rights, and debt relief.

The borders of the GJM are drawn expansively here, and enclose a wide range of actors with a variety of perspectives. However, the goal of all participants within the GJM is, roughly, a system in which resources, opportunities, and decision-making powers are more equitably spread throughout the globe rather than being concentrated in the hands of the few, and in which environmental considerations take precedence over the drive for profits. It is essential to acknowledge that there are multiple versions of even this rough sketch of what 'justice' might mean on a global scale, and it is useful to bear in mind the call by movement participants for 'one world with room for many worlds' (Marcos 1997), or for the emergence of new *stories* rather than a single dominating ideology (Notes from Nowhere 2003a, 23). Actors within the movement may be pursuing highly localised and specific goals but they are tied to the broader movement by communication with other activists, an analysis that recognises the links between their own struggles and others around the world, and shared participation in movement activities such as protests and World Social Fora (WSF). Arguably, one of the most remarkable and significant aspects of the GJM is that it has knit together a range of movements from the North and South to produce a heterogeneous and fluid, but nevertheless interlinked, network of global activism.

Evaluations of the GJM differ wildly, as hinted at by the range of labels that it has accrued since its emergence. The most frequent critiques of the movement by those external to it are that movement participants do not understand the benefits of neoliberalism, or that they are acting out of reactionary and regressive motives (e.g. Norberg 2003, Shipman 2002). Those within the movement often base their critiques on strategic issues, most often the lack of cohesiveness within the movement (e.g. Monbiot 2003). Despite these criticisms, there are a number of signs that the movement is likely to have an ongoing influence on national and international politics. Firstly, neoliberal institutions have begun to address the challenges raised by the GJM, at least superficially. The WTO, World Bank, and International Monetary Fund (IMF) now all engage with NGOs, and have incorporated rhetoric about accountability and participation into their formal documents. While such changes do not affect the workings of these institutions at a deep level, they do indicate the degree to which protests and other movement activities have been taken as a serious challenge. Secondly, the language and analysis of the GJM has begun to have an effect on national politics in a number of countries. During the recent Democratic primaries in the United States, issues raised by the GJM have come to the fore with Barack Obama (2008) promoting his opposition to neoliberal policies such as the North American Free Trade Agreement (NAFTA), as has Hillary Clinton (Stein 2008). Thirdly, there seems to be a rising consonance between the analysis put forward by the GJM and the views held by the general public in many nations. For example, a recent poll in the United States showed that only 28 percent of respondents endorsed (economic) globalisation, while 58 percent opposed it (Mankiw 2008). None of these developments is entirely due to the work of the GJM, nor are they the only effects of the movement. They do, however, give us cause to take the movement seriously and consider the alternatives that it presents.

The Global Justice Movement and Information and Communication Technologies

This movement has been built from the intersections between many others – it is an extension of TSMs that have existed for decades, and builds particularly on the new social movements of the 1960s and 1970s and Southern social movements that grew from independence movements and, more recently, opposition to Structural Adjustment Programs. The *Ejército Zapatista de Liberación Nacional* (EZLN), more commonly known as the Zapatistas, played a key role in the formation of the GJM through the online and offline meeting spaces they created, and networks such as Via

Campešina and People's Global Action have helped to provide bridges between pre-existing movements. This broadening and deepening of connections between movements has relied in large part on the availability of new ICTs.

As Clay Shirky (2008) argues in *Here Comes Everybody: the power of organizing with organizations*, this is in large part because contemporary ICTs decrease the cost of organising. Shirky refers to a classic 1937 paper on 'The Nature of the Firm', in which Ronald Coase argues that firms (and hierarchical organisations more generally) serve a necessary function by decreasing the transaction costs of interactions between workers, particularly 'the costs of discovering the options and making and enforcing agreements among the participating parties' (Shirky 2008, 30). Today, Shirky argues, the transaction costs of many of these interactions have collapsed to the point where 'serious, complex work' can be undertaken without institutional direction (47). Shirky gives a number of examples of this, such as the effective aggregation of photographic reporting of the London bombings on *Flickr* (34 – 35), or the successful extension of the Voice of the Faithful's campaign against the Catholic church's failure to handle priests' abuse of children (143 – 160). The same phenomena allow social movement participants to more easily contact each other and to organise meetings, events and campaigns in a relatively decentralised way.

It would be a mistake, however, to see the ICT revolution of the 1970s as creating a purely quantitative shift in the ability of activists (and others) to organise. Technological changes and the accompanying shift towards a 'networked society' have also contributed to qualitative changes in a number of fields, including activism. Activists and scholars note that many of the most fundamental characteristics of the GJM rely on participants' access to ICTs, and particularly to the Internet. An influential RAND study on *Networks and Netwars* (Arquilla and Ronfeldt 2001) argues that there are fundamental links between the use of networked forms of organisation, doctrine, strategy, and technology. The use of particular technologies, strategies, and organisational forms is not merely a pragmatic choice, but is also fundamentally tied to the movement's ideology. In fact, we can take this one step further and argue that the movement does not have an ideology in the traditional sense; the movement's ideology is written in the practices of the movement itself (Croeser 2006, Graeber 2004). As with the new social movements that preceded it, participants within the GJM attempt 'to use activism itself, rooted in the actual experience of ordinary people, as a form of governance' (Wapner 1995, 336), as a way to express and experiment with ways of bringing their vision of 'one world with room for many worlds' into being. The movement's project is therefore inextricably linked to its actions and structures, and in turn to the ICTs upon which these are built.

A key aspect of the movement's organisational structure is its networked form. While there are innumerable gatherings, manifestos, and organisations associated with the movement, it remains a network of networks, in which sub-networks are simultaneously overlapped and overlapping, not the tree-like hierarchy of the traditional organisation but rather what the Zapatistas call a *desmadre*: a big mess (Froehling 1999, 174). While earlier movements, particularly new social movements, were composed of horizontal networks rather than hierarchical structures, this has arguably been taken to a new level with the GJM. As well as leading on from previous social movements, the mix of autonomy and connection expressed in this 'loosely connected global network', composed in part by smaller sub-networks, in which different actors mobilise together and interact while at times seeming to remain quite separate (Venter and Swart 2002b, 197) also has echoes of the way in which websites are linked by hypertext. Just as sites on the Internet are connected by key 'hub' websites (Barabasi 2002), the movement is connected by a network of 'nodal organisations [that] are typically in touch, on a horizontal and spreadeagled basis, with many other initiatives and groups, which are themselves in touch with other initiatives, groups, and individuals' (Keane 2003, 61). The similarity is more than incidental, as the World Wide Web provides a space and a template for the global web of activism.

These networks are built on ICTs, not just the Internet but a host of other media, as well as on face-to-face communications facilitated by online communications and enabled by relatively cheap national and international travel. Numerous accounts of the early days of the GJM, for example, emphasise the importance of the Zapatistas' 1996 *Intergalactic Encounter for Humanity and Against Neoliberalism* (Graeber 2004, 204; Milburn 2004, 473; Burbach 2001, 145). This Encuentro was itself an outcome and a validation of the importance of networks. The Zapatistas had been significantly strengthened by the emergence of a web of international supporters who were able to act swiftly on their behalf, which would not have been possible without the Internet (Froehling 1999). The Internet also played a major role in the rapid organisation of the first Encuentro, which attracted about three thousand participants from 42 countries (Froehling 1999, 169). At the Encuentro, the leader of the Zapatistas read out a vision for an 'intercontinental network of resistance' which emphasised the decentralised and transnational nature of the movement (Graeber 2004, 204-205), a vision which must have owed much to the Zapatistas' own experience of the possibilities of networks. Elsewhere, other sections of the movement communicate and organise through websites, mailing lists, mobile phone communication, and at gatherings like the Encuentros and the WSF, forming networks that cross not only borders, but also the hazy boundary between online and offline space.

Finally, it must be emphasised that if we are indeed entering a new phase of capitalism in which production 'has come to mean controlling complex systems of information, symbols, and social relations' (Melucci 1996, 100), the ability to use information effectively will be key to the future success or failure of the movement. In fact, 'through their creation of conditions that allow information to act in viral-like ways, the complex communication systems of advanced capitalism create lacunae or dark spots where institutional control becomes increasingly difficult', opening up new areas for resistance (Jordan and Taylor 2004, 20). Given this, '[a]ccess to alternate forms of information and, most important, the power to reach others with your own alternatives to the official view of events, are, by their nature, political phenomena' (Rheingold 1994, 268). This makes the bi-direction nature of information flow on the Internet doubly important, which was made clear in statements from media consultant Doug Miller in the wake of anti-Nike activism, in which he declared that board members are becoming increasingly scared that their corporate reputations could be blown away in a few months by the Internet (Bennett 2002, 28). While the activism against Nike may have emphasised the role of the Internet in the swift disseminating of information, it also demonstrates the importance of creativity, symbolism and novelty.

GJM participants do not rely solely on the dissemination of information, but rather make frequent use of emotive, novel, or amusing vehicles for that information. While we increasingly have access to huge amounts of information, it seems probable that 'the capacity of individuals [particularly in the developed world] to process, sort, select and use appropriate information may have been diminished', in part because of the sheer volume we receive each day (Schultz 1994, 113). Facts about sweatshop wages are easily submerged among pictures of famine in Africa, local news, ever-present advertisements and the barrage of popular culture. Gaining attention, then, not only relies on the construction of 'causal stories' to explain facts and prompt action (Keck and Sikkink 1998, 17), but also the ability to entertain and provide emotional handholds.

In this respect the GJM's burgeoning media arm is playing an increasing role, spurred on in part by the incorporation of the culture jamming movement. Culture jamming is 'the practice of parodying advertisements and hijacking billboards in order to drastically alter their messages' (Klein 2001, 310), and has crept from the world of billboards onto the Internet with parody sites such as those set up by the 'Yes Men'. Klein argues that although culture jamming and related forms of activism never dry up entirely, in recent years they have been in the midst of a revival, 'focused more on politics than on pranksterism' (2001, 314). The ability of the GJM to engage in culture jamming and related activities relies increasingly on access to ICTs, as well as to cultural content and the tools

with which to manipulate it. With the advent of the Internet and the shift to digital content the cost of accessing and sharing many cultural reference points such as images, music, films, and television programs has become trivial. The more important shift, as the League of Noble Peers argue in *Steal This Film II*, is that low-cost tools are now widely available for people to remix this content in order to express themselves creatively or gain an audience for their messages (2007). While *Steal This Film II* and related work by Lawrence Lessig (2001, 2004), Yochai Benkler (2006) and Siva Vaidhyanathan (2004) focuses on Western 'consumers' ability to become producers (and distributors) of media, neither the access to nor the practical application of the ability to produce and remix content is limited to the privileged few in the West. Access to privately-owned computers remains low in much of the Global South, but there are a wealth of community media projects underway that use free or low-cost software and NGO- or community-owned equipment, or even Internet cafés. For example, in Kerala disadvantaged communities have been running their own radio stations and producing documentaries using open source software (SPACE Website), while the Centre for Civil Society at the University of KwaZulu Natal makes facilities available for young people staying in the nearby township and surrounding areas to produce and distribute documentaries about their experiences and concerns (CCS Website). All of these projects give social movement participants an opportunity to bypass the constraints of mainstream media and communicate with supporters and new audiences.

While the importance of ICTs to activism today has been acknowledged by many of those analysing the GJM and related TSMs, remarkably little of this analysis recognises the contested nature of ICTs, and of science and technology more generally. Most of the social sciences have a 'taken-for-granted approach to technology', seeing it as exogenous (external to social processes or dynamics), given, and instrumental (Youngs 2007, 3), and analyses of TSMs are no exception. Work in a variety of disciplines has repeatedly shown that social, political, and economic forces all shape the path of scientific and technological development. At the most fundamental level, Kuhn argued in the *The Structure of Scientific Revolutions* (1962) that shifts in scientific paradigms are social as much as scientific, revolutions rather than part of 'a continuous or cumulative pursuit of truth,' as previous philosophers had characterised science (Hård and Jamison 2005, 258). Scholars such as Latour and Woolgar (1979), Haraway (1997), Feenberg (1999, 2000) and Sclove (1995) have provided important critiques of the mainstream perspective on science and technology, as have feminist, environmentalist, and postcolonial movements.

There is a wealth of research that documents the various forces that influence the development of particular technologies and scientific theories. Emily Martin's (1991) work on *The Egg and the Sperm* is a classic example of the way in which social structures, in this case gender, influence scientific research. Martin argued that the conventional understanding of human conception as a matter of active sperm and passive ova were shaped and perpetuated by gender stereotypes. Even when researchers uncovered evidence that challenged this understanding their model of conception remained bound by a gendered understanding of the role ova and sperm played in fertilisation. The idea that matrices of power such as race, wealth, political structures or gender can influence the path of scientific development is therefore neither novel nor particularly controversial in many disciplines. However, it is important to emphasise this point because the argument put forward here relies on an understanding of science and technology as sites of power and contestation, shaped by other power structures rather than purely by their own internal logic.

The malleability of technology is concretely illustrated by the various ways in which users have reshaped particular technologies systems once they become generally accessible. The French government's Teletel network, for example, was initially meant to be a medium for disseminating official information effectively. Users then hacked the system to expand from a information-access system to one that had capabilities for person-to-person communication. Subsequently the network became known as a medium for sex chat, and those running it began promoting it with highly

sexual advertisements (Rheingold 1994, 229-234). Very quickly, users significantly reshaped not only the content carried on the network, but the very way in which it worked. There are countless other examples of the creative rethinking of technological systems by their users, from the many case studies in Hård and Jamison's (2005) *Hubris and Hybrids* through to skateboarders' use of urban architecture as a space for play rather than shopping or work. Technological systems are shaped by outside forces and interests during and after their implementation, as well as their development; the path of technological development and use is not inevitable.

The contestability and multiplicity of science and technology is further illustrated by the existence of alternative paths of development that are either aborted or follow a parallel but subordinate path alongside dominant modes. Indigenous knowledge systems relating to agriculture or medicine are a prime example of this; traditional Indian agriculture continues to be practised and developed by the vast majority of farmers at the same time as Green Revolution agriculture dominates institutional and commercial thinking in India (Croeser 2006). The continued existence of subordinated scientific and technological systems such as these highlight the contingent nature of dominant systems by offering models of alternatives that could have been. They also offer starting-points for imagining change to existing systems.

The need to take a critical perspective on scientific and technological structures has arguably acquired a new urgency in the wake of the ICT revolution and the restructuring of capitalism. Manuel Castells, one of the key theorists of the Information Age/Network Society, argues that during the 1970s, a '*converging set of technologies in micro-electronics, computing (machines and software), telecommunications/broadcasting, and opto-electronics*' [emphasis in original] came together and reinforced each others' effects (2000, 29), drastically changing our ability to communicate and manage information. Castells includes biotechnologies in this set of technologies, 'not only because genetic engineering is focused on the decoding, manipulation, and eventual reprogramming of the information codes of living matter, but also because biology, electronics, and informatics seem to be converging and interacting in their applications, in their materials and, more fundamentally, in their conceptual approach' (2000, 29). He argues that this has led to a 'new, informational mode of development [in which] the source of productivity lies in the technology of knowledge generation, information processing, and symbol communication' (2000, 16-17). These changes are ubiquitous, and extend to touch all aspects of our lives, reaching even to the building blocks of life.

The closing down of information and communications technologies as a space for activism

Critical perspectives on science and technology make it clear that recent developments are neither inevitable nor apolitical. The structure of the Internet and the focus on personal computing devices ranging from laptops to mobile phones have been influenced by the particular social, political, and economic conditions in which they have emerged (Castells 2000). Even as activist and other anti-establishment actors explore the possibilities that new technologies offer, governments, corporations, and other elites seek to maintain their dominance over these systems. It should be emphasised here that the motivations behind government and corporate attempts to regain or strengthen their control over these spaces and systems are multiplicitous. In some cases, the shutting-down of these spaces of dissent is part of a campaign waged by authoritarian states against internal actors working directly or indirectly against the government, as in China, Burma and Iran. In democratic states, the same process is at least overtly motivated by a desire to protect vulnerable sections of the population, as with censorship of child pornography sites in European states. The ongoing 'War on Terror' of the last few years has also played a large role, with increasing government surveillance of citizens and non-citizens. The use of surveillance technologies has also been justified by references to more traditional law and order concerns, as is the case with London's extensive program of closed circuit television cameras (McCahill and Norris 2002, 6).

Campaigns waged by governments to bring the technological systems of the information age under their control have not been waged purely to secure 'the national interests' in a security sense, but have also been closely linked to corporate interests. Corporations have a variety of motivations for attempting to develop the way in which information age technologies are used and develop, primarily their desire to prevent 'theft' of 'intellectual property'¹ in order to secure or increase their profits from commercialisation of particular technologies or cultural content. While there have been some signs that elites are directly concerned with the GJM's use of these systems, such as the inclusion of 'anti-globalisation hackers' in a US military training scenario, on the whole the movement is not the direct target for these measures.

One of the clearest threats to the democratic potential of modern technologies is their capacity to vastly increase governments' ability to watch their own citizens, for example through the use of cheap cameras and computational analysis of digital communications, license plates, and facial recognition systems. Additionally, spaces of digital communication are themselves coming under increasing surveillance. In various authoritarian states, online communications and publications have been monitored and activists and journalists have been jailed or otherwise punished for their work. One of the most frequently discussed examples of this is China's extensive content control system, in which large teams of paid government officials monitor blogs and other websites, and all Chinese Internet users must sign in with their real names whenever they go online, even in Internet cafés (Fallows 2008). These measures and others like them are repeated in states throughout the world where autocratic governments have an interest in maintaining a close watch on their citizens, including Cuba, Iran, and Egypt.

This surveillance is by no means absent from democratic states – it is frequently noted that London has more CCTVs per capita than any other place in the world. In the United States, a number of whistle-blowers have brought attention to widespread surveillance of digital communications, including mobile phone communication, by government agencies, particularly the National Security Agency. In 2006 Mark Klein, a former AT&T technician, brought to light evidence that AT&T had built 'spy rooms' that had the capacity for surveillance and analysis of Internet content on a massive scale (Singel 2007). Subsequently, the United States Senate voted to legalise such operations, and granted amnesty to telecommunications companies that had been involved, although the implementation of this Bill will depend upon the House of Representatives (Singel 2008). The scale of this surveillance, as well as United States government responses when it was brought to light, gives reason to suppose that it is likely to continue, and even to escalate. Elsewhere, 'anti-terror' laws justify similar surveillance, with various caveats and limits.

As well as government surveillance of citizens, various companies are accumulating masses of highly personal information about those who use their services. Google, Amazon, and Yahoo, for example, all hold extensive databases on users for months, if not years. For companies which have control over a broad swathe of email services, photo management accounts, social networking sites, and blog hosts, this information can provide a detailed picture of users' lives and activities. At its face, there are several issues with this for those who value their privacy: as well as tools for targeted advertising, such databases have occasionally been accidentally breached, as in the case of America Online's release of identifiable search strings in 2006 (Kawamoto and Mils 2006). For activists and social movements more generally, the consequences may be more dire than a simple loss of privacy, and loss of anonymity may lead to prosecutions, arrests, or other forms of intimidation.

As well as surveillance, censorship of the Internet has been undertaken to varying degrees in most

¹ These remain disputed terms, and many activists would argue that the notion of cultural content as 'property' is profoundly problematic.

countries, including democratic states. Censorship can take place through the blocking of particular IP addresses, Domain Name System (DNS) blacklisting (which prevents access to any site at a particular domain, such as news.bbc.co.uk or blogspot.com), URL keyword blocks and through programs which search the contents of each page you visit, all of which are used to varying degrees as part of the 'Great Firewall of China', which limits the ability of Chinese citizens to access information considered damaging by the Chinese government (Fallows 2008). Similar censorship occurs in other nations with largely undemocratic governments, including the United Arab Emirates.

In several democratic states, including Australia, the United Kingdom, Canada, and Denmark, censorship is primarily aimed at preventing accidental access to child pornography websites, and is mostly undertaken on a voluntary basis by Internet Service Providers (ISPs). However, both the target of this censorship and its voluntary nature (where it is nominally voluntary) have been brought into question. Several nominally voluntary systems have been implemented after police or government pressure on ISPs. In Denmark, in November 2005, Minister Helge Sander said that he would have to consider whether to continue the voluntary scheme. By September 2006, 99% of Danish ISPs had installed the filter (Graham 2008). There are also concerns that filtering systems may be, by design or through poor filtering mechanisms, blocking more than child pornography: the list on which the United Kingdom's Cleanfeed system is completely opaque, and in March 2006, the Danish filter was found to be blocking a legal sex site (Graham 2008). Additionally, several governments have either implemented or considered implementing extended filters. In the United Kingdom, Home Secretary Jacqui Smith has proposed extending the child pornography filters to cover 'extremist' websites (Fisher 2008), while The Pirate Bay, a filesharing site has been temporarily blocked in Sweden and Denmark. Censorship of online spaces can therefore be considered alive and well even in democratic states.

Governments, and the United States government in particular, also have a decisive role to play in the struggle over the structures of the Internet itself, as has been made clear in the case of 'Net Neutrality', the debate over whether all traffic on the Internet will be treated equally. Those in favour of net neutrality argue that ISPs should not be allowed to prioritise some traffic over others. Currently, the Internet has been designed so that most of the processing involved in the network is done by computers accessing and (re)transmitting information, rather than by the infrastructure at the heart of the network, and all 'packets' of information are treated equally. Edward Felten argues that the 'Net neutrality debate can be seen as battle between this model and a more centralised model of control over the network (2006, 2). While a large part of the impetus towards a deregulated Internet which would allow network discrimination comes from ISPs, governments are ultimately the decisive actors in creating the regulatory environment.

Each attempt to bring information age technologies under elite control mentioned here has focused on very particular technologies or methods, but there are also more far-reaching and fundamental attempts being made to control the democratising possibilities being explored by the GJM. Firstly, there is an ongoing struggle over the production and legitimation of knowledge and information. Benkler argues that today, 'proprietary, market-based models of information production compete with those that are individual, social, and peer produced' (2006, 382); for example, Microsoft's Windows and Encyclopaedia Britannica compete with Linux and Wikipedia. Is accepted knowledge – be it a line of software code or an encyclopaedia entry – going to be decided by companies, by small groups of experts, or by peer review? Lessig (2004) provides another way of thinking about this: as a struggle between a mode in which the ability to produce and distribute cultural content (such as films, music, software and novels) is controlled by an oligopoly, and one in which everyone has the right to do so. As Lessig argues, national and international intellectual property regimes currently restrict people's ability to produce their own cultural content. In many parts of the world, and particularly in the United States, there have been moves to extend the scope of

intellectual property laws and to more strictly enforce them.

Secondly, there are significant efforts underway to limit not just democratic control of knowledge production, but also control over access to knowledge and information. As noted in *Steal This Film II* (The League of Noble Peers 2007), knowledge and information has always been controlled – before the time of the Gutenberg Press, books were not only produced in limited numbers but also sometimes guarded and chained. Until even a few decades ago, transferring information mostly involved making actual physical copies of books or papers or audio recordings, and then physically transferring them from person to person. To control others' access to this information, you only had to control their access to the actual physical artefacts that contained it. With the advent of ubiquitous digital content, it is increasingly easier to transfer information between devices. The measures discussed above limit people's ability to transfer information in an uncontrolled way, but on a more fundamental level the concept of 'intellectual property', as well as specific national and international intellectual property regimes, shape the extent to which people are considered to have a *right* – ethically and legally – to access and share information.

Attempts to limit the democratising potential of particular technological artefacts and systems, and modes of knowledge production and information sharing (which are built on and through technological systems) matter very much to the GJM. At the most fundamental level, the movement simply cannot compete with the centralised and hierarchical model of knowledge production that is currently ascendant – movement participants cannot, on the whole, contest the claims of their opponents with expensive studies. They also do not, on the whole, have access to the institutional structures by which knowledge is legitimised – for a variety of reasons, they cannot publish in academic journals, create well-funded think-tanks, and so on. Acceptance of grassroots, peer-produced and peer-reviewed knowledge is therefore vital to the move towards 'one world with room for many worlds'.

At a more pragmatic level, the movement's everyday activities will be severely hampered if the technologies of the Information Age come under tighter control. Censorship poses a threat to the participants' attempts to communicate with each other and with those outside the movement, even when it is not explicitly designed to do so. Software that blocks sites on the basis of keyword searches, for example, may block legitimate sites as well as designated targets, such as sites that offer support to young queer people. There is also a continual risk that limited censorship will be expanded, as in the recent case of Finnish Internet Matti Nikki, whose site criticising the Finnish blocking system was added to the 'child porn' blacklist, although the site does not contain child pornography (Graham 2008). Further, although many of the actions of movement participants are legal in the countries in which they are based, some of them contravene national laws. This means that moves to block access to sites involved in illegal activities, such as filesharing, should be of concern to all activists. Further, because much of the backbone of the Internet is based in and controlled by the United States, sites based outside the United States may also be subject to censorship. This should be particularly concerning in light of the expansive nature of the 'War on Terror', which has occasionally included social movement activists in its scope.

The indirect censorship that might arise from changes to the structure of the Internet is also worthy of consideration. If ISPs began to exercise control over digital traffic, they would have the ability to censor movement messages by slowing activist websites. If this seems unrealistic, it should be noted that some ISPs have already demonstrated their willingness to directly silence certain messages: in 2005 Telus, Canada's second largest telecommunications company, blocked access to the Telecommunications Workers Union's website. This block affected all of its own clients, and all people whose ISPs relied on its backbone network (Benkler 2006, 398). To indirectly silence

activists by 'deprioritising' their traffic would not be a far cry from this, particularly when we consider that many ISPs may be part of larger commercial entities being challenged on various fronts by the GJM, and that movement participants are unlikely to have the resources to pay for a higher priority service.

An end to net neutrality also has the potential to make it harder for movement participants to communicate with each other. As noted above, over the last couple of decades, activists have grown to increasingly rely on online mailing lists, email, and websites to contact each other, to organise events, and to conduct discussion and debates. In recent years, Voice Over Internet Protocol (VOIP) services like Skype and Ekiga have further extended the ability of activists to communicate with each other by allowing even cheaper national and international communication. If ISPs are allowed to prioritise some Internet traffic, the effectiveness of this communication may be diminished. VOIP is particularly vulnerable, as unlike email and websites it works in real time rather than asynchronously (Anderson 2003). Attempts to effectively coordinate actions on the ground using online communications, as happened at the 1999 Seattle protests, may also be disrupted.

The GJM has grown to depend heavily on the freedom to imagine and share creative and entertaining visions of other futures. Lessig (2004) argues that grassroots media production is increasingly being stymied by copyright regimes which limit the legal rights of artists to use the vast amount of digital cultural content that is technically accessible. Lessig also cites numerous cases of artists' work being removed from online spaces after requests from copyright holders, limiting their ability to distribute their work. Digital Rights Management (DRM), which acts as a technological barrier to copyright infringement, reinforces legal barriers to grassroots media production by increasing the difficulty of accessing digital content in a manipulable form. The legal and technological enforcement of intellectual property regimes makes it harder for artists, including movement participants, to create and distribute works that build on popular culture, that inspire and inform others.

Conclusion

Activists and scholars alike have an interest in watching these developments carefully, and in building an understanding of the various forces that act upon technological and scientific systems. The imbrication of technological, social, and political change is radically rewriting the landscape which social scientists seek to analyse, and a failure to explore the relationship between these areas will lead to a much impoverished field. Developments in the legal structures surrounding intellectual property, the ongoing 'War on Terror', and a rapidly shifting hardware and software environment will all have radical implications for TSMs and other NSAs.

The changes described here should not be underestimated. While many of the measures underway by governments and corporate actors seem largely technical, in combination they have the potential to create serious and long-lasting changes to the communications and information infrastructure which has become so vital to the work of the GJM. The GJM is still in its infancy, and the alternatives it presents are yet to be fully explored. Activists and scholars alike have shown a tendency to ignore the processes that shape scientific and technological developments, presumably under the assumption that they are unimportant, irrelevant to political structures, or inevitable and hence not worth analysing or engaging with. If the GJM and other TSMs are to get the chance to develop and grow these issues need to receive more attention.

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