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Postnormal network futures: A rejoinder to Ziauddin Sardar

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ABSTRACT

Sardar's "Welcome to Postnormal Times" describes the chaotic, contradictory and uncertain climate today, and analyses the failure of progress, modernisation or efficiency to provide ethical, political or even trustworthy economic solutions to the instability of the present. Missing in his analysis is the role of knowledge, especially as it is migrating from individuals to technical networks. This paper argues that recent developments in the networking of knowledge point towards a new constellation in which networks are emerging as major powers alongside the nation and the market, the two pillars of global political economy in the 20th and early 21st century. It responds to Sardar's challenge to imagine the future by imagining the political consequences of recognising non-human agencies as political actors.

1. Postnormal network futures

Analysing postnormal times, Sardar [1] asks us to reflect on the collapse of older technological, sociological and managerial paradigms (progress, modernisation and efficiency) under conditions where we no longer expect stability. The language of sustainability masks a chaotic, contradictory and uncertain reality. We have no criteria left, and no firm empirical basis, from which we might plan a future which is just, equitable and sustainable. Instead, Sardar suggests, we need to turn to the synthesising power of imagination. The challenge is made more demanding by the possibility that we are already moving towards a major synthesis of humanity in the form of organised communications and storage networks, the 'world brain' described in these pages by Marien [2]. The problem in any such global homogenisation or unification is that the closer we come to making it a possibility, the more urgent the struggles to shape its final outcome. Struggle over the meaning and foundation of knowledge is a critical element of contemporary conflict, especially that between secular and religious traditions. As the grand unification of network knowledge comes closer to realisation, the struggle for control over what constitutes knowledge and which knowledge is impious, dangerous, corrupting or wrong intensifies. Religions great and small, national claims to sovereignty over what their populations should know, market claims to regulate access through pricing and intellectual property regulation, all are increasingly fiercely contested [3]. It is a truism to argue that network communications are the fundamental infrastructure of globalisation, and almost equally to argue that networks are the foundation of any future democracy. The postnormal condition may thus be seen as both a symptom of the network condition, and its cause. It is in this context that we take up Sardar's challenge of imagining the future.

The word imagination is out of fashion. A more typical view of the benefits of futurology is floated by Phaal et al. in an influential essay on technology roadmapping, which sees the key goals as 'identifying disruptive technologies and surviving in disruptive markets' [4]. Such orientations serve to minimise risk, but in the same moment to lose the opportunities for change which, as Sardar points out, are sorely needed in the postnormal world of disproportions. Imagination is

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unfashionable because it is by nature risk-taking. Two hundred years ago, German Romantic philosophers could not get enough of it: perhaps that is why it now has such negative connotations. In Lacan's psychoanalytic schema, the imaginary is a fictive relation that misunderstands the self [5]. For Benedict Anderson's political history of nationhood, Imagined Communities are those which, even though they have immense power, are entirely mental constructs [6]. And for critics of celebrity like Schickel [7], the triumph of the image comes at the cost of the loss of substance. The word *imagination* lives out a sorry afterlife as brand name and advertising copy, and among the last educationists struggling to maintain some kind of human value in an increasingly instrumental education system. Perhaps we have become cynical. The Romantics of the 19th century talked up the imagination, but in our hard-bitten times we talk it down. What has made us so cynical is a peculiar quality of contemporary information capitalism: its own loss of imagination, and consequent recruitment of the imaginations of the multitudes to provide the innovations it so desperately needs, but which it no longer has the capacity to produce. On the one hand, this is evidence of a new crisis in the nature of work, one that will all too easily bring all human creativity into the ambit of corporate ownership and control. On the other, it may indicate that a new paradigm is emerging, a new social and economic formation which capital gives birth to and would love to control, but which is rapidly growing up and about to leave home. A recent news event, unusual in itself but in some respects typical, opens up the terrain for this discussion.

2. Google vs China

On January the 12th 2010, Google posted on its corporate blog a statement by its chief legal officer David Drummond disclosing serious breaches of the company's security and intellectual property, and concluding that Google had determined

> we should review the feasibility of our business operations in China. We have decided we are no longer willing to continue censoring our results on Google.cn, and so over the next few weeks we will be discussing with the Chinese government the basis on which we could operate an unfiltered search engine within the law, if at all. We recognize that this may well mean having to shut down Google.cn, and potentially our offices in China [8].

The post revealed that Google and up to 20 other companies (later reports made it 34) had been hacked in sophisticated cyberattacks originating in China, and that investigations revealed that the hackers had also targeted Chinese human rights activists. Drummond also recalled the company's doubts about censoring search results at the time of the January 2006 launch of their Chinese operation. The global media, focused at the time on the Haitian earthquake, ran with the story for several days, bolstered by rebuttals from Xinhua, the Chinese national press agency, and speeches supporting Google's stand by President Obama and Secretary of State Hillary Clinton. In almost all cases, with the exception of some of the financial and technical trade press, the focus was on human rights and free access to information.

This framing of the story was a triumph for Google, who also managed to get some coverage for the likelihood that a flaw on Microsoft's Internet Explorer browser was the narrow gate through which the hackers had conducted their exploit. But the big story was rarely covered. As Drummond put it in his post, 'sharing information about these attacks with a broad audience is a very unusual step'. Most corporations involved in the mid-December attacks have not come forward, probably because they include a number of defense contractors (Northrop Grumman is named by several sources), the chemicals industry (Dow Chemical) and most embarrassing, security firms (including Symantec in software and Juniper Systems in hardware). Also named are Adobe (whose ubiquitous Reader and Flash software may also have provided a gateway for the hackers), Rackspace (a data storage company whose servers were used to transport the data out of the USA) and Microsoft, again probably for the use of their flawed browser. Of course, any large corporation in the USA is a potential defence contractor: it is unlikely that any of the non-military companies will expose which of their operations were compromised in the exploit. But it seems likely that there was a strategic targeting of a group of companies by a malicious hack, routed through Taiwan and, according to some analysts, originating in the People's Republic, and that it netted some very significant intellectual property.

The Internet is no respecter of geopolitical borders. But the Chinese government have been operating the highly sophisticated Golden Shield protecting its Internet users from undesirable content and from hackers for some years. The celebrated Great firewall of China is, from the Chinese perspective, a prophylactic against pornography, child abuse, race-hatred, terrorism and malware (worms, viruses and spam), and a legitimate exercise of the law in a public communications medium. After all, European Union law forbids Nazi sites: Google has conformed to that legal straitjacket without rebuking the EU, even though such searches are legal and possible in the USA. The Chinese Communist Party, moreover, have seen the results of savage deregulation of state communism in Russia and Eastern Europe, seen the chaos and misery and criminality it brought in the wake of 1989, and have opted for a policy of gradualism, using the planned economy as a medium for sharing the wealth of the Special Economic Regions with the rural poor for example, in an effort to stem mass flows of population to the cities. Hu Jintao and his allies may be motivated by the desire for power, or to maintain the status quo, like politicians everywhere, but they also acknowledge in their policies the massive changes occurring in China, and a sense of responsibility for moderating the damage they may cause.

It is however the very sophistication of the Golden Shield which makes it possible that one arm or another of the massively complex Chinese government system may have had a hand in what the US Internet security industry is referring to as the Aurora exploit. The system does not simply block search results in Google (or the biggest search engine in China, Baidu, with over 60% of the market). Search results may be matched against a list of registered IP (numerical) addresses of websites,

or in some cases the (verbal) URLs. A third method involves filtering DNS (domain name system), the backbone of Internet communication. DNS filtering redirects to another site, or returns incorrect IP addresses, effectively blocking the search. Search engines are typically censored using a fourth method, TCP filtering, which applies to the basic protocol for transmitting network materials, including e-mail and file transfers, in packets: when sufficient packets with trigger keywords have been sent, the connection is automatically terminated. A fifth technique uses the 'connection reset' capability of browsers to send them into closed loops of instructions designed to reconnect to a missing address, but open to infinite loops when the contact is carefully masked. It is also alleged that Golden Shield sets up mirror sites of unwanted online activities, redirecting users to a censored version [9]. Many businesses and professionals circumvent the firewall, either with a cheap but tricky use of proxies, or more expensive but reliable (and condoned) virtual private networks, subscriber services which effectively bypass the hardware gateways through which China's Internet passes on the way to the wider world. Many, and perhaps a majority, of China's 386 million Internet users seem happy with the system as is. Media have been regulated as a matter of national sovereignty from the days of the nascent newspaper all the way through broadcasting. China believes it has a legitimate claim to regulate, and has applied a lot of skill to delivering that regulation.

Much of the intellectual property targeted is of interest in maintaining and strengthening the Golden Shield, in particular in the massively growing field of cloud computing. The principle of cloud computing is storage and manipulation of data not on your own computer but on remote server farms, vast banks of computers and associated software. This is the principle of Google's Gmail service, where users do not have to store anything on their computers, not even the software to run the program: only a browser. Google Docs are another example: write, edit, store and share with others your spreadsheets and texts, using nothing more complex than a browser and an Internet connection. Corporate and governmental data storage has been using remote cloud computing resources like Rackspace to store records for a decade or more. Intriguingly, Google has a prime position in cloud computing, and was launching a major marketing offensive against Microsoft's attempts to join the bandwagon with its 2009 Windows 7 release at the time of the Aurora attack. Drummond's statement mentions Gmail and blog accounts run on Google software: the hack is very likely to have targeted Docs, Apps, and other information services offered by the corporation. This is all the more significant as netbook computers, which are dependent on the cloud, were the only sector to show growth during the global financial crisis, and are set to receive a boost with the January 2010 launch of Apple's new iPad. Perhaps even more significant for China, Google has a growing 21% share of the smartphone mobile Internet market (in which the iPhone and Blackberry are its main competitors), a market which grew 41% in the USA during 2009, and is likely to be taken up strongly in China, where mobile phones are far more prevalent than computers. Extending the Shield to these areas is, in China's eyes, a legitimate extension of national interest. China, in short, is a nation first and foremost, and the market is a device for building the nation.

The problem is that, in the view of the US government, deeply committed not only to the ideal of freedom of speech but to the neo-liberal concept of the free market, the Internet is not a matter of national sovereignty. While on the one hand publicly dressing down China for censorship and human rights abuses, it is extremely likely that back-room diplomacy is expressing outrage at the assault on US intellectual property. The US export economy is driven by intellectual property (IP). Designs, trademarks, patents and copyright are central to the knowledge economy of the most advanced economies, but especially in the US where sales of arms, entertainment and software, and profits from brands and franchises, are major drivers. The USA dominates software markets, and has a major share of global computer and semiconductor patents. That these innovative lines have a long history of involvement with defense contracting makes attacks on them even more significant to the US government. What is most important, however, is that commentators as apparently different as Senator Clinton and the US branch of Amnesty have begun to evince support for the Global Online Freedom Act (GOFA: see http://thomas.loc.gov/home/gpoxmlc110/h275_ih.xml). Initially presented to the House of representatives in 2007 and defeated in 2009, this is a proposal "To promote freedom of expression on the Internet, to protect United States businesses from coercion to participate in repression by authoritarian foreign governments, and for other purposes'. Citing both the UN Universal Declaration of Human Rights and the major status of the information export industry, the Act proposes 'to deter any United States business from cooperating with officials of Internet-restricting countries in effecting the political censorship of online content', using 'diplomacy, trade policy, and export controls' to enforce the intentions of the Act. As many commentators in the financial press have argued, this is a risky enterprise. If, as appears from the preamble, China is to be a major target of this legislation, then major corporations like Google will be debarred from what is generally perceived as the largest, fastest growing, and most important market of the coming century. Under the banner of 'global Internet freedom', the Act can be analysed as arguing that freedom is more important than profits, certainly in the short term, and that establishing a free market in information is critical.

Such freedom might at first appear to be at odds with the principles of ownership enshrined in intellectual property, subject of major negotiations over a decade in the World Trade organisation, and central both to the World Intellectual Property Organisation treaty and to the terms laid out for China's accession to the WTO. Here the critical distinction is voiced by the Free Software Foundation's slogan 'Free as in speech not free as in beer' (http://www.gnu.org/philosophy/free-sw.html). The freedom of information does not preclude its sale. Indeed, the principles of neo-liberal economics demand an ideally well-informed consumer in possession of all the facts about products and their prices in order for a free market to operate. The US government has, since Reagan's adoption of neo-liberalism as state doctrine in the 1980s, pursued this theme with virulence, including such measures as extending the term of copyright to 70 years (the 'Disney amendment', so-called because it is widely believed to have been enacted to preserve the Disney Corporation's rights to Mickey Mouse long after the normal term of copyright). In this instance we see how the nation acts not in the interests of nationhood in the first

place, but in order to provide the legal infrastructure for the operations of the free market. The market itself is the dominant agency: the state operates to serve it. In this the position of the USA is the opposite of that of China.

From Google's point of view, allowing for a certain patriotism, and for extraordinary profitability of its online advertising revenues (reporting revenues of US6.7 billion for the last quarter of 2009 and profits of US2 billion), things look rather different again. While the engines of profit are its AdSense, Adwords and DoubleClick advertising arms, the company's mission is 'to organise the world's information and make it universally accessible and useful' (http://www.google.com/intl/en/corporate/). Since it is advertisers who pay for advertising, only passing on the cost in hidden form in the price of their goods and services, Google's own services appear as free to their users. Even the ads are, for the most part, unobtrusive. In return we get an increasingly sophisticated search engine, applications like Google Earth, StreetView and Maps—now available for smartphones and challenging for the in-car GPS market. We get free use of Gmail, Google Docs, News, Scholar, Finance, the Chrome browser and operating system, and a vast array of information and social networking services. Many of the key properties, like the Android operating system for mobile phones, is open source, meaning the code is freely available, and allows users to change or add to them at will. What then does Google get in return?

The answer is somewhat unexpected. Google gets information. Take the controversial issue of Google Books. In conjunction with a number of University and public libraries, Google has embarked on an ambitious project to scan the holdings of the world's major libraries and make the results available online. To date the project has been extremely costly, and no revenue stream returns from it to the corporation: it runs at a significant loss, even for a company as wealthy as this. The same is true of its YouTube division, like Books also open to charges of copyright infringement. Why then do it? To gain information. Information comes in several forms. First, Books provides the company with a massive database of linguistic materials for analysis. Even though much of the content is unavailable to common users, the company has access, and spends significant energy deriving knowledge of grammar, vocabulary and cultural formations from the books they scan. Secondly, they observe the ways users interact with the books, especially those which, for a variety of reasons, have been scanned photographically but cannot be searched by keyword. Since keywords are the stock in trade of Google, images (the image of a page rather than the letters of which it is formed) are hugely difficult to include in data searches. Photographs and videos share the same problem: how can you reference them, without going through every image and adding keywords (author, date, subject, medium and so on) by hand? Users add value by connecting images together, adding tags or bookmarks, moving from one image to another, or deciding that a certain image matches the search terms they placed in the search engine. Even the suggestions for corrected spelling mistakes ('Did you mean Hillary Clinton?') help Google engineers develop refined searches, predictive text filling in your search before you type it, providing answers to questions in the search page so you do not have to visit the link and so on. Google's operation is then distinct from the national interest: it is the archetypally transnational corporation, and its interest is 'the world's information'. Nor can it be identified with the market-orientation characterising policy statements from the US government. Google is part of an emergent new type of economic and to some extent political organisation. Google is indistinguishable from the network which gives it life.

3. Peer-to-peer

The beauty of the exchange between free services and the gift of information on the part of users is that it forms a recognisable kind of economy. That it is an exchange is clear: if I donate some of my time to using Google services (Blogspot, for example), I not only get the software and server space for free: I get access to the input that everyone else has donated. This is the principle of network organisations that distinguishes them from the market-driven corporation. They exist simultaneously in the market economy and in what has been called variously the high-tech gift economy [10] or the peer-to-peer economy [11,12]. In the days before the Internet, television existed to sell audiences to advertisers. Of course, what was actually sold was not the people but their attention, leading Canadian media theorist Dallas Smythe to formulate his attention theory of value [13]. Audiences provided their attention free of charge and TV stations sold that attention on to their clients. Audience generosity extended to paying for their own equipment, a practice that still dominates the online era of the early 21st century. What has changed is that today we provide not only the attention but also the content. This is what the industry calls user-generated content [14,15].

Take, for example, Linux, the operating system and software suite which has been produced voluntarily by programmers and hackers around the world, and which now accounts for up to 20% of computer, and 60% of mobile phone operating systems. Certainly, some companies make their living supplying and maintaining Linux systems, but the system itself is free, and more than that it has rejected intellectual property rights, the legal lynchpin of the information economy. The free libre open source software (FLOSS) movement is a beacon for a post-capitalist economy based on mutual giving: I donate an hour of my time to hacking code, and in return I get thousands of hours of other people's labour. This peer-to-peer gift economy is largely restricted to 'immaterial' goods like software, but recent experiments include the OScar (http://www.theoscar-project.org/), a project to design and build an open source automobile, conceptually linked to projects designed to encourage micro-loans to enable capital-intensive networked projects like it.

Or take the difficult problem of image searches. The problem arises because people search for images of all kinds of reasons, but images contain so much detail that matching searches to images is incredibly difficult. Games With a Purpose (gwap.com) provides visitors with a game where two people type in words to describe an image ('tags'), and get points when the tags match. The game is attached to a computer which uses the tags to build a vocabulary for recognising the contents of images. The GWAP ESP game is run out of Carnegie Mellon University, which also runs a related project called reCAPTCHA,

which uses the captcha tags now widely used as security features (where visitors have to type out distorted letters, so proving they are human rather than automated bots trawling the web for vicious purposes). reCAPTCHA uses scans from old print sources too deformed for automated optical character recognition (OCR) software to read, invites users to place it on their websites, and uses the retyped data to teach OCR software to read from old print sources (currently old editions of the New York Times). In September 2009, Google acquired reCAPTCHA.

The donation of labour can be used for common, shared purposes from which everyone benefits. But where reCAPTCHA or a similar 'game' is hosted by Google, for example its image labeller (http://images.google.com/imagelabeler/), it is not the general pool of knowledge that is being improved but Google's proprietary search algorithm. Tagging images under the form of a game (image labeller times the action, giving it an edge of racing with an unknown partner to describe each image) creates a kind of reward for a generation raised on computer games. It does have one oddity, which is that it rewards players for using the same tag as their partner, that is for being normal. Unusual vocabulary or inventive analyses are not rewarded. Google's algorithms run the curious risk of becoming normative: that in organising the world's information, they prepare it in the form that the majority seems to want, so risking the very thing network organisations have on their side compared to the free market: innovation.

In some respects this normativity is a property of the free market, brought over into the hybrid organisation of Google. Mass production required mass consumption; the tailored, individualised manufacturing of the 21st century relies on assembling through just-in-time techniques a commodity or service designed by the consumer from a lost of standard options. The cross-over between production-centred and consumer-centred manufacture has been one of the hallmarks of contemporary capitalism, and is intrinsic to the user-generated content model of information and communication. Google sits astride a new faultline, however, in that it provides services through which users are no longer simply prosumers – engaged in choosing the elements from a menu they want on their plate, or the pieces they want assembled for their kitchens – but freely interacting agents providing creative content. In many instances, this might be turned into commodities. But in the case of Google, it is turned into new information and new services which are returned to the community of users who generate them.

Contrast this business model with the one implicit in Apple's launch of the iPad, the other big news item of January 2010 in the technology press. Apple's new tablet computer is of special interest to the publishing industry. Newspapers in particular have suffered a collapse in advertising revenues over the last 20 years due to competition with multi-channel television, the surging consumer magazine market of the 1990s, and the Internet. Cover price and subscriptions, once a marginal revenue stream, have become essential to their survival. Both newspaper and magazine publishers are therefore overjoyed at the prospect of Apple's new electronic reader, and even more so with the translation of their successful model for recapturing music from piracy, the iTunes store, to the realm of publishing. Apple is very clearly still a corporation based on the capitalist economy. It sells goods (computers, phones and so on), and services (software). It has however learned from a previous revolution in the media industry that production is not the key to profit, but distribution. As a distributor of online music and a retailer of other producers' applications for iPhones, it uses its strategic place in the distribution chain to generate profits. Google, on the other hand, do not charge for the news and other data they provide. While they earn strongly from advertising, they provide free use of their software and servers to their users as a reward for the information and creativity they donate. The contrast between these business models reinforces the thesis that Google is the first of a new kind of organisation in a new kind of economic relationship with users who generate content, rather than consume goods and services.

This may explain the dramatic risk Google seems ready to take in moving out of the world's fastest growing economy. According to JP Morgan, Google stand to lose about 600 million dollars in 2010 if they leave the Chinese market, a figure that might be increased if they decide against the planned 2010 launch of a Google phone in China. Though only 2.5% of its projected earnings for the year, that is a substantial sum. However, Google's major interest is less the revenue stream, or even the market share which it has built up against Baidu, but access to the immense creative potential of the as yet untapped Chinese Internet. An estimated 386 million Chinese use the Internet, leaving extraordinary room for growth. Moreover, the plurality of languages, the likely development of new network slangs and interactions, the cultural and scientific ferment of the country all can be expected to generate vast amounts of what Google craves most: information. The design flaw of the Golden Shield, in this perspective, is that it is intended to keep users inside from getting out. While protecting against cyberattacks, it does not operate in the opposite direction: Google can easily access the millions of pages of network materials produced in China, and organise it and make it accessible and useful, as its mission statement demands. This transaction is not entirely financial: it is about the sharing of information, not as commodity but as infrastructure. It is in this sense that we can speak of Google as a hybrid organisation, one foot in the corporate world of the neo-liberal free market, and one in an emerging form of network organisation.

On the positive side this represents a new form of sociality, and quite possibly a new economic mode of exchange. On the negative, it represents an enormous, unpaid, collective labour to produce the content with which we entertain ourselves. On the positive side, we are no longer passive recipients but active participants in the mediascape. On the negative side, we are providing this content through portals like Google which draw their profits from our unpaid labours. The peculiarity of Linux and other related projects is that it is not profit-driven. This is not the case with Web 2.0 portals. If Linux were profit-driven, would people still want to give away their programming skills and time for free? Oddly, the answer would appear to be, yes, they would. Based on the evidence of the social networks, we are quite happy to give away our labour in return for a few free gifts. One question then is, how valuable are the gifts we get in return from other users, and is that a gift we could have gotten

without the mediation of Google? Does the company, in other words, earn its keep by providing a platform through which we can give things to each other? This is something of a matter of opinion.

But the function of social networking is not only to provide entertainment, or a new vehicle for friendship and community. Leaving aside the question of whether such communities and friendships replace the old place-based friendships and communities of the (possibly imaginary) past, the business of social networks is to produce novelty. Computing arose from the necessity to handle vast quantities of rapidly changing data; network computing to provide access and input across geographically dispersed areas. The introduction of the World Wide Web, and with it the conversion of professional networks into a mass medium, occurred however not in Bell Labs but at CERN, the European Centre for Nuclear Research, devoted to subatomic physics and the arcana of quantum mechanics. This unforeseeable irruption of innovation not only enabled the new network formation: it is a symptom of it. A capitalism which was increasingly automated, driven by the falling rate of profit to expand into new markets (the industrialisation of agriculture, privatisation of state services and so on), seized on the opportunity to commodify the creativity of mass populations. Initially failing because they imported old business models to the new environment, after the dot.com crash of 2001, new net-native businesses emerged, led by Google, which made the Internet commercially viable. At the same time, innovation from below in many respects outstripped the capacity of capital to organise it to its own advantage: especially during the period 1993–2001, between the release of the first web browser and the dot.com crash. Today, while the Internet has been thoroughly commercialised, innovation still leaps forward faster than can be assimilated into regimes of commerce and regulation. Thus for example the rich media of video and photography are still to be organised, while major areas like blogs and increasingly prevalent database-driven websites have proved deeply resistant to searching. The question is whether this innovation is ultimately recuperable into the existing political economy, or whether it is the first sign of something new.

4. Network and beyond

As Walter Truett Anderson notes, 'Today, we have reached a virtual global consensus that economic development specifically and the future evolution of the human species generally, are inseparably interwoven with the generation, distribution, application, use, and misuse of knowledge' [16]. In this field, information capital [17], communicative capitalism [18] is triumphant. The market rules, even when, as in 2008–2009, it fails spectacularly. Of course, it has been failing spectacularly since Bretton Woods: failing to solve the problems of poverty, pandemic, permanent war and environmental collapse. Yet even in the depths of the global financial crisis, there was a failure of political activists to produce a viable alternative. Sardar might say, a failure of imagination. The problem is that neo-liberalism, posing as an economic doctrine, is in effect the most successful political ideology of our age, especially its central tenet: there is no alternative. Elections today are won on fear: fear of migrants, of terrorists, of even worse economic conditions. Politics is based on clinging to what we have, not on debating what we need, let alone what we want or should want. This triumph has been a long time coming. Adam Smith wrote at a time when the nation was still the central fact of politics. Wealth was a necessary tool in aggrandising the nation, an unfortunate slightly tawdry business required in order to preserve empire, or to gain respect. In the 1870s, as Marx struggled to complete his master-work, that was still the case.

While writing recent history is a notoriously risky business, we might say that in Shannon and Weaver's mathematical theory of information and Manuel Castells' sociology of the Network Society we have a generation who have effectively acted as the Adam Smiths of the network future. One particularly startling example is in the ethnography conducted by Karen Knorr Cetina with future traders, which found that they conceive of the market as a living entity, one they dialogue with, and which they recognise as an active agency, not just a set of screens or a network of wires. The passionate involvement they expressed to Knorr Cetina recalls the passionate belief in the nation which we find, for example in Kipling, in an era when the nation was such a living, breathing entity, capable of action and eliciting passionate involvement [19]. In China, it appears that the Nation remains that superordinate agency, a subject of social, cultural, political and economic life; where in the economic centres of the USA, to overgeneralise, it is the market which has risen to the status of subject. What appears to be occurring in Knorr Cetina's work is the first inkling of what many of us feel as we engage with the Internet: that the network is itself a subject of that same order, an agency capable of eliciting our passionate loyalty, whose existence is more important than our own, or than nation or profit. This is the network of Linux, of net-native participants in peer-to-peer and gift economies, and it is emerging rapidly as the new configuration standing alongside nation and market as subjects of history and political life.

Political theorist Jacques Rancière defines politics as what comes to life when a way of organising social life is confronted by an outside which it cannot ignore [20]. Such for example was the condition of the free artisans of Athens under the rule of aristocracy. At a certain point, these people had to be governed, yet they were not recognised as citizens, that is as subjects of politics with the ability to speak for themselves. The contradiction between governing effectively non-human creatures and the obvious fact that they were human (could speak for themselves) was, he says, the moment at which politics was born. Political life renews itself periodically by confronting these ostensibly non-human, non-citizens: women, the propertyless, slaves. In our time, the obvious non-citizens, deprived of human rights because they have no citizen's rights, are migrants, and the great challenge to our polities is to recognise that exclusion. This is perhaps the last great step in the history of the nation as the central political fact of the last few hundred years. It is likely to have the same impact on political life as the emancipation of the slaves or the extension of the franchise have had: the movement towards republican rule and democratic organisation occurred, Rancière argues, *because* it became necessary to admit these new populations as citizens, as subjects of politics [21].

Historian of science Bruno Latour and his colleagues propose a model for understanding relations with a different kind of non-human other: networks. The actor-network theory he has developed suggests, on the model of scientific laboratories, that organisation cannot be thought through without understanding that it is not only human beings who are organised into functioning institutions like labs or corporations like Google. He argues that the technologies employed must be understood as agents, just as the humans involved are. The network of a lab or a corporation is composed of people and objects, each of which is constrained by the network they find themselves in, but each of which, human and non-human alike, is instrumental in the running of the network. The kinds of objects we have and the types of connections we put them into make possible new ways of organising humans and objects, new networks, and new kinds of knowledge or goods or services [22]. Knorr Cetina's work is one of many which indicate that socially we are already in a position where we recognise networks as entities capable of interacting, of acting, of having agency, making change. If we place this finding together with Rancière's we can begin to make out a new kind of political agent: the network itself.

The hundreds of thousands who devote themselves to maintaining and developing the Internet, and the millions who spend their hours creating content for it, are motivated by more than the desire to earn a living: they recognise the agency of the network as other generations recognised the agency of the nation. The people that matter to them are the people they network with, known and unknown, just as patriots share their national identification with known and unknown others. The network, like the nation, is bigger than me or my circle of acquaintance, and consequently more significant. It merits my loyalty, and pays me back, as the nation does, emotionally and in physical and intellectual if not always necessarily financial ways. The confrontation between Google and China, and the third corner of the triangle in the US government, is then a clash between an older formation, a dominant one, and one which is just coming to birth. It is likely that, just as monarchs and aristocracies live on today, so will the nation. It is not a question of either/or but of both/and. The market will not disappear either. But this new configuration of technological networks held together by gifts and loyalties presents if anything an even more radical challenge to markets than migrants do to the nation state.

It is here that we face a radical challenge. What would it mean – politically – to admit a technical network into the polity? Such a question must have run through the minds of those striving for the emancipation of African Americans: indeed, Angela Davis argues that freedom was unthinkable, even for the slaves themselves [23]. A future in which machines have some kind of representation among us is strictly unimaginable: but with Sardar's demand that we imagine the future anyway, it should be attempted. Firstly, it is clear enough that this non-human order already calls to us for recognition: it is the everyday experience we have of dealing with our online communications. Second, the condition of the unimaginable is exactly the condition of the future: that which is not the present, and so cannot be thought in the terms the present gives us to think with. To imagine robots with votes is to use the categories of the present—humanist individualism in representative democracy. This is the slippage which in MacNally and Inayatullah's remarkable prescient essay on robot rights: when first published, there was scarcely a network with which to compare, imaginatively, the dominant individualistic subjectivity [24]. Imagine instead a network comprising both devices and humans connected together into a single entity: indeed, imagine the Internet. If it is correct to argue that the network is the coming form of social and technical life, then we can begin to imagine a political life which is more like a network, less like a nation or a market.

Sardar concludes his analysis with a resounding challenge:

> A new normality cannot look for simplistic universals. It has to negotiate through and with the multiple and diverse formulations of all the universalist outlooks that exist. It has to engage with the complexity of humanity as much as it considers the complexity of the global environment we share in such different ways.

This is the challenge which the network already seeks to respond to, even though it comes in the hybrid form of a corporation which not only seeks to organise the world's information – the essential first step in engaging with this complexity – but also to profit from it, even indirectly. Profit, or the cash-relation, is the kind of simplistic universal which, Sardar tells us, can no longer provide answers for global futures. In the medium-term future, we will face the claim of a new network mode of organisation in economics and politics, just as we have it already in culture and society.

As Jan Nederveen Pieterse argued recently in this journal, 'Of the two big stories of 21st century globalisation, the gradual East–South turn is widely recognised, but the other, deepening rural and urban poverty in the emerging societies, is not ... The task of global emancipation is to rebalance state, market and society – the big three – and introduce social cohesion and sustainability into the growth equation' [25]. In this paper, we have argued that the third of the big three is no longer society. Sardar's analysis demonstrates that there is no coherent centre to the social life of postnormal times. Instead, we argue, it is the network which begins now to function in the play for control over the future. Thus it will be vital to ensure that information and communications technology for development (ICT4D) extend to rural populations and the urban poor, but also to insist that the relationships they have with the network are equitable and that the gifts they bring of culture and knowledge, of know-how and know-who, are not simply taken from them. At present in ICT4D discourse, the network is presented as a self-evident good. Few voices are raised to criticise the potential observed at the opening of this paper for both normalisation and homogenisation through a global unified network, nor the intensity of struggles for a place in the final agreement on regulation and profit-taking, gift economy and open democracy, ideological and spiritual protections. It is not only the benefits but the nature of the network which enters into social, cultural, political and economic life in the 21st century that will be the object of these struggles. What is undoubtedly the case about network futures is that the network will be of central importance to any future polity, any future economy. It will have a voice, whether we wish it or not.

The question is then, what kind of a voice? We offer here an opinion: the potential benefits of radical change to the political life of the planet outweigh the potential risk. Imagining a network future, we should not go the route of change-averse risk management. We should embrace the deeper uncertainty arising from freeing technology from its subservience to the merely instrumental goals of human profit. Network thinking is historically deeply influenced by ecological science. If networks are to be our partners in the future, we need to recognise their stake, just as we are dimly beginning to discern the stake that the green world has in our future. If the first challenge for the medium-term future is to integrate networks into the system of state and market, the next, longer-term, is to recognise and incorporate Gaia as an active partner in our species' future. We may then begin to make out a politics beyond the network where human and non-human, living and non-living are connected to mutual benefit.

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