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Article (Accepted version)
(Refereed)

Original citation:
Mansell, Robin (2017) *Inequality and digitally mediated communication: divides, contradictions and consequences.* Javnost - the Public. ISSN 1318-3222

DOI: 10.1080/13183222.2017.1287966

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Available in LSE Research Online: February 2017

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INEQUALITY AND DIGITALLY MEDIATED COMMUNICATION: DIVIDES, CONTRADICTIONS AND CONSEQUENCES

Robin Mansell

Introduction

This article examines some of the relationships between economic and social inequality and digitally mediated communication.[1] Researchers generally agree that there is a reciprocal relationship between expressions of inequality and changes in the digitally mediated world, but there are large differences in their views about how these relationships work and whether inequality is likely to persist into the future. In the digital divide research tradition, there are instrumental and critical approaches and some of the limitations of the instrumental approach are highlighted. The implications of asymmetries of control and authority between human beings and their machines and the consequences for economic and social inequality are addressed with the aim of assessing the opportunities for evaluating them and for encouraging a shift in the contemporary direction of digital technology innovation.

The article begins with a brief historical reflection on what we know about the relationship between technological innovation and society. This is followed by a summary of several instrumental and critical approaches to digital divides and a consideration of how research in this area treats issues of economic and social inequality. The way in which the results of some of this scholarly work becomes embedded in policy in the European context is then discussed to prepare the basis for a discussion of the emerging contradictory relationships between humans and their machines. In the conclusion, I reflect on what might be done to address risks associated with the dominance of corporate control and with a potential loss of human control over the digitally mediated communication environment.

Relations Between Technological Innovation and Society

In the social sciences, technological systems are acknowledged as being instruments of power. The literature on the history of technological innovation, for example, demonstrates that power relations are hidden within these systems. Hecht and Allen (2001, 1) begin their

essay honouring the work of historian of technology, Thomas Hughes, with the statement that "we have understood for centuries that technology is an instrument of power … statements about the nature of technology were thus themselves political or cultural strategies." Winner (1980/1999) insisted that all technology artefacts have a politics, writing within the political science discipline, and, with an understanding of technology located within the sociology discipline, Foucault argued that technologies of power "… determine the conduct of individuals and submit them to certain ends or domination" *(*as quoted in Martin et al. 1988, 18). Castells (2009, 4), especially, in *Communication Power*, highlights that "the communication process decisively mediates the way in which power relationships are constructed and challenged in every domain of social practice, including political practice."

The fact that society is becoming ever more dependent upon digital systems means that there is arguably a special need for the investigation of how mediation operates in the media and communications field. Silverstone's (2007, 26) claim in *Media and Morality* was that "mediated connection and interconnection define the dominant infrastructure for the conduct of social, political and economic life across the globe." With the fragmentation of academic fields of research and the continuous creation of new fields, information systems scholars and many scholars working in the socio-technical tradition are emphasising the "materiality" of the digital environment in what has come to be known as information infrastructure and platform studies (Gillespie et al. 2014, Plantin et al. 2016). In many traditions in the social sciences, it is being acknowledged that an understanding of the way power relations are mediated by digital technologies is essential for the analysis of the cultural, social, political and economic features of society. The interpenetration of technology mediated structures and processes is not something encountered only in the digital era, however, and there has been a continuous struggle between those who regard the trajectory of technological change as inevitable, progressive and good for society and those who regard it as a process that requires careful evaluation.

In the history of deliberation on the consequences of technological change for society, policy makers have also, on occasion, noticed that the direction of technological innovation is implicated in rising social and economic inequality, especially in the context of development. The Dag Hammarskjöld Foundation's influential report in the 1970s, for example, emphasised that attention needed to be given, not just to the rate of the production of new technologies, but

also to the direction or pathway of innovation. This report said that:

> producing technology … means producing instruments of control and influence over other individuals, firms and nations. The capacity of technology to transform the nature, orientation and purpose of development is such that the question of who controls technology is central to who controls development (Dag Hammarskjöld Foundation 1975, 93).

The Foundation's report called for "another development," informed by a needs-based approach that could contribute to self-reliance. This was regarded as a counter to the then prevailing growth-oriented development strategies that sought to lock less wealthy countries into trajectories of technological, social and economic change which were being experienced in the wealthy countries.

Researchers engaged in critical scholarship – those concerned with power asymmetries and their consequences – have long been aware that inequality and social injustice abound in the world and that digitally mediated communication is a contributing factor. However, instrumental traditions of research – those offering solutions to narrowly defined questions about how social and economic inequality is generated rather than why it occurs – have also examined the role of digital technologies. It is therefore important to consider the implications of the way these different traditions tackle the development of digitally mediated communication and its economic and social consequences. The digital divide literature is located in both the critical and instrumental traditions and the next section considers how the determinants and outcomes of digitally mediated communication are treated in these research traditions.

Digital Divides: Determinants and Outcomes

Digital divides are examined in several generations of research which seek an understanding of relationships between the spread of digital technologies and the factors contributing to the inclusion or exclusion of countries, regions and people in the digitally mediated world. The first digital divide tradition investigates the access divide. It is very prominent and is primarily an instrumental research tradition. The main goal in this tradition

is to connect the unconnected to digital networks, typically using broadband technology (Katz and Berry 2014). Numerous reports of this kind are generated by consultancy firms, academics, United Nations agencies and The World Bank. These document the rate of diffusion and take up of digital technologies, networks and services, usually with the aim of ranking performance and assessing whether access gaps are being closed. These kinds of studies frequently mention that connection entails risks such as challenges to individual and corporate privacy and the growth of surveillance. They highlight the need for improved security and for addressing a growing skills deficits, as well as problems associated with rising energy consumption, and, often, the need to devise better means of child protection (The Earth Institute 2016). The assumption which informs this tradition is that greater connectivity is beneficial for all populations. It is assumed that connecting the unconnected progressively improves people's lives and that any risks resulting from improved access are manageable.

Research in this instrumental digital divide tradition confirms that a rapid rate of investment in digital technologies and services is strongly associated with declining economic inequality, at least on a global scale. Absolute poverty - defined as a USD 1.25/day income at purchasing power parity - declines as the rate of penetration of digital technology (mobile subscriptions) and internet users increases (Pepper and Garrity 2015). As the chapter on digital technologies and income inequality prepared for the World Economic Forum says, "the impact of ICTs [information and communication technologies] on economic growth, along with targeted interventions to increase their impact on poverty alleviation, will help to relieve the plight of those in absolute poverty and improve the well-being of citizens everywhere" (Pepper and Garrity 2015, 36). Within countries, research in this tradition reveals a different picture. The consensus is that improved access or connectivity is associated with rising income inequality, although there are arguments about the direction of causality and the other variables that explain this relationship. An OECD (2015) report acknowledges this consensus in its recognition that the gap between the rich and the poor is widening within countries, that economic growth is disproportionally benefitting higher income groups, and that digital technologies play a significant role.

A second or deepening digital divide tradition focuses on the skills, literacies, and competencies required to make use of digital technologies once access is achieved. van Dijk (2013), for instance, theorises digital divides as being created by relational and resource

factors including personal and positional inequalities, the asymmetrical distribution of resources, the differences in kinds of access and the differences in the nature of participation in society. He highlights the social, economic, political and cultural consequences of digital exclusion. In the Netherlands, for instance, empirical research in this tradition shows that only 15 per cent of the population can be counted among the information or digital elite, despite the relatively high levels of connectivity in the country (van Deursen and van Dijk 2014). This tradition is not confined to the media and communication field. In the field of science, technology and innovation policy field, Mendonça et al. (2015) focus on access (to ICT devices and connectivity), basic skills (individual know-how for basic uses) and complex capabilities (higher-level ability for creative engagement) in their examination of what gives rise to digital divides and social and economic inequality.

A third tradition in the digital divide literature gives greater attention to the outcomes of connectivity. van Deursen and Helsper (2015), for instance, are interested in measuring the differential economic, social, cultural and individual outcomes of internet use. They examine the tangible differences that users associate with their use of the internet and what they can achieve in their lives. Castells and Himanen (2014) also focus on outcomes. They link indicators of digital access with differences in economic development, human development, ecological sustainability and cultural development to assess the extent to which human dignity is enhanced as a result of internet access and use. They aim to assess "how the potential of creativity and wellbeing unleashed by the informational revolution can be harnessed for the progress of humanity instead of becoming a factor in reinforcing the unsustainable, destructive process of development that characterizes much of our interdependent world" (2014, 3). Human dignity is understood to refer to the freedoms, justice and well-being which may be achieved through greater economic and social equality.

Sometimes other digital divides are discussed in the literature, referring to gaps in internet use between the old and the young, to gender differences, to the exclusion of the disabled or to gaps in access between urban and rural areas. The labels of these traditions and the categories vary and much of the research in the digital divide tradition focuses on quantitative indicators and is undertaken at a relatively high level of aggregation. However, this work is complemented by numerous case studies, many of which employ qualitative methods to examine access and technology use barriers. For example, exclusionary business

practices may be revealed such as the levying of service fees of as much as 16 per cent of the value of transactions on mobile money transactions in some African countries which serves as a barrier to use and reinforces economic divides (Kalba 2016).

The main message from several waves of digital divide research, in summary, is that socio-cultural, political and economic factors are associated with the way people experience the digital environment. Bauer (2016) highlights the complexity of the relationship between digital technology and economic, political and social factors, a relationship that is further complicated when studies focus on the local or national level. Historical differentiations shape the way digitally mediated communication is experienced in different societies and it is generally agreed that experience is influenced by the "general circumstance of an individual's life" (Wessels 2013, 26). Yet, it is the first and second digital divide traditions that seem to have the most influence in policy making, despite the fact that these traditions give the least attention to questions about why digital technology innovation yields persistent unequal outcomes in society.

Digital Inequality and Policy

The prevailing view is that connecting the unconnected using digital technologies is necessarily a good thing for society as a whole, for the economy and for the individual. Although the relationship between infrastructure and digital platform development and inequality is complicated, policy makers tend to assume that their interventions will have a direct and positive impact on the take up and use of digital technologies and services and a consequential beneficial impact on society. The main focus in policy is to reduce the access and literacy divides and, as a result, attention is given principally to the rate of investment in digital infrastructures and in digital skills acquisition.

In Europe, for example, the policy focus is on three pillars in the European Commission's Digital Single Market strategy: the economy, broadband connectivity and access, and skills and employment (EC 2015a). Regarding the economy, concern in Europe about the very considerable market power of large platform operating companies leads to measures intended to remove barriers to the growth of the single market. Policy interventions include the lengthy Competition Directorate case against Google that may or may not succeed in

altering the company's strategy. They include efforts to remove national market barriers such as geo-blocking practices that result in less than four per cent of all video-on-demand in the European Union being accessible across member state borders (EC 2015a). There are initiatives to boost investment in the broadband infrastructure, especially in rural areas. Other market interventions are designed to support news content creation such as a proposed fees levy on digital platforms operated by Google and others, and efforts to tackle the tax base are under discussion such as the challenge to Ireland's tax concessions for Apple and the introduction of tighter regulations on how platform company revenues are assessed.

European policy in addition requires user consent for the use of the personal data to address the absence of corporate transparency in the way consumer information is used. The European Commission's General Data Protection Regulation introduced new "data protection by design" and "data protection by default" measures with the aim of reducing the risks associated with online interaction (EC 2016b, 2016c). When the US Federal Communications Commission (FCC 2016) introduced its new rules for Internet Service Provider use of personal data and certain kinds of metadata, these were greeted by advertisers as "unprecedented, misguided, counterproductive, and potentially extremely harmful" (Oster 2016, np). In Europe, by contrast, a lengthy set of deliberations on the rules for personal data protection has produced a somewhat more muted response from industry to updated policy measures.

Some of the policy interventions in response to the spread of digital technologies and services are explicitly aimed at achieving fairness in the treatment of citizens and greater transparency with regard to corporate practices. Nevertheless, the dominant theme in policy discussions concerns the prospects for the digital economy and the highest priority is to promote an increase in the rate of investment in both infrastructure and online services and to do so by ensuring that the economic incentives facing infrastructure and platform providers encourage such investment. Even when policy makers succeed in encouraging shifts in business strategy in an effort to ensure that citizen interests are protected, such policy interventions mainly tinker with the direction of innovation in digital technologies. Rarely, if ever, do they lead to substantial changes in the pathway or trajectory of digital innovation which is currently leading to an increasingly more intensely mediated digital environment. As Nieminen (2016, 22) comments, these interventions are aimed at "patching the gaps" left by global regulators which themselves no longer exercise control over the activities of the

providers of digital technologies and services. Each new generation of technology is expected to help to close digital divides; to get more people connected and to boost the use of digital services. This expectation is evident in the enthusiasm in the press and policy circles for 5G wireless services. At a cost in Europe for 5G rollout of some €57 billion by 2020, the benefit is estimated at some €113 billion for the European single market by 2025 (Standeford 2016). The emphasis is on the economic drivers with an assumption that the deployment of this technology will bring a new chance to close the digital divides.

With regard to digital skills, the policy focus is increasingly on up-skilling. Concern is growing in Europe (and in the United States) that a low levels of certain skills is preventing major advances in deploying new generations of technology as well as restricting the abilities of citizens to benefit fully from their access to digital networks. Only some 1.7 per cent of European enterprises are reported to make full use of advanced digital technologies and around 41 per cent to not use them at all. Some 47 per cent of the European Union's population does not have appropriate digital skills, but 90 per cent of jobs are forecast to require at least some level of digital skills by 2025 (EC 2015b). The European Commission's 2016 Skills Agenda for Europe emphasises the need for skills in computer science, nanotechnology, artificial intelligence (AI), and robotics (EC 2016a). It also notes the need to strengthen transversal skills such as team work, creative thinking and problem solving, but it is STEM subjects - science, technology, engineering and mathematics – that receive the highest priority, together with occasional references to the arts in relation to creativity. Changes in education provision at the higher education level are deemed to be urgent to reduce barriers to market growth in big data analytics and the Internet of Things. These are expected to contribute some €415 billion to the European Union's future gross domestic product. Should strong growth be achieved, this is assumed to be consistent with greater choice for consumers and with generating new sources of employment. The emphasis in policy initiatives in this context is on investment in research and development to promote faster innovation and to strengthen economic growth in the single European digital market.

Many policy papers addressing these issues embrace a discourse that signals a concern about the disruptive nature of technological change and about the need to ensure that social justice is achieved, together with transparency. However, the main focus is on access and skills and on closing gaps in the relatively short term. Rarely is there a discussion about the

implications of the rate *and* the direction of technological change in the longer term. Yet, Goos et al. (2015, 1) find that it is likely to take "at least 60 years for Europe's lagging regions to close half of their current lack of high-tech employment compared to Europe's high-tech hubs," based on current technologies and expected rates of investment. The longer term implications for inequality are also signalled by Keen (2015) who finds that the growing use of digital tools helps to explain the gaps between rich and poor. He observes that, "the more we use the contemporary digital network, the less economic value it is bringing to us. Rather than promoting economic fairness, it is a central reason for the … the hollowing out of the middle class" (2015, i). Similarly, Atkinson's (2008) assessment is that, even if full employment could be achieved, a structural shift towards higher skilled labour associated with the types of skills required in the digital economy is likely to result in a more unequal distribution of income. This is partly explained by a growing concentration of rents from technology and trade which are accruing to an increasingly smaller number of companies, by steeper pay hierarchies and by a shift from fixed salaries to other forms of pay, such as zero hours contracts.

These are all factors that fall outside the models used to examine digital divides and their consequences. This suggests that policy makers are focusing on a narrow range of issues informed by the instrumental digital divide traditions. This means that there is little acknowledgement of the need for a debate about the consequences of the direction of change in digital technologies and services. It is recognised that the direction of digital technology innovation is affecting the income distribution of populations as a result of the automation of labour and some estimates put the jobs at risk from computerisation in the form of sensors, the Internet of Things, algorithms and machine learning, and robotics at nearly 50 per cent in as little as three decades (Frey and Osborne 2013). Nevertheless, the underlying assumption is that technological change will bring more benefits than losses for individuals and societies, albeit in the long term. The evidence suggests at the same time however, that deep social and economic inequalities are persistent and unlikely to be reduced by tinkering with the rate of technological change or with up-skilling in relatively narrowly defined advanced technology fields. Yet persistent inequality undermines commitments to democracy and the capacity of individuals to generate an income to live a decent life; one that is safe, and one that offers them a possibility for improving their well-being and regard for their self worth and that of others.

Economists such as Stiglitz (2012) and Wilkinson and Pickett (2011) are calling for

progressive income and wealth taxes and a strengthening of the social safety net in the face of threats to people's livelihoods. However, those who propose these kinds of measures also remain oddly committed to the view that there is a natural or inevitable direction to change in digital technologies. In addition, because work in the digital divide tradition and policy is focused on access and on the use of the technologies and services that have been deployed outside the laboratory, there is little discussion about what the consequences of the current direction of technological change will be for how human beings will live and experience their lives in the future when technologies that are still in the laboratory emerge.

This commitment to a particular direction of technological change operates as a monopoly of knowledge or, in Charles Taylor's (2002) terms, as a dominant social imaginary. The prevailing view when discussion focuses on digital divides treats promoting connectivity and up-skilling as the main solutions to economic and social inequality. The logic is that inclusion is likely to be achieved optimally when the competitive market serves as the driver. Social benefits (and costs) are regarded as the derived outcomes of success in the digital marketplace (Mansell 2012). Political economist Harold Innis (1950, 22), warned that "obsession with economic considerations illustrates the dangers of monopolies of knowledge and suggests the necessity of appraising its limitations." This was a trenchant criticism of an obsessive focus on the factors determining economic growth in his time when little attention was being given to distributional issues or to the social and political consequences of unequal wealth accumulation.

In today's context, this monopoly of knowledge is insistent that digital platforms and increasingly sophisticated computerised information processing will bring good things for citizens. Provided through globally competitive markets, these platforms optimise consumer choice and technology suppliers are seen as simply responding to consumer demand. Ultimately – in the long run - there will be no power asymmetries. The main focus is on the *rate* of investment in technological innovation and on the introduction of more sophisticated digital products and services. In this context, there are references to the need to moderate market developments to achieve the common good, however it is defined. Such moderation generally means only that it is acknowledged that technology itself is not a solution to social and economic problems. Jeffrey Sachs, Director of the Earth Institute at Columbia University, says, for example, that technology "must be properly deployed—directed towards social purposes—

and extended to the poor and to remote regions that markets alone will not serve, at least not in a timely way. Put simply, technology must be combined with a will towards the common good" (The Earth Institute 2016, 6).

Whatever the imagined consensus as to what the common good may be, it is principally associated with the rate of investment in infrastructure and skills. There is no questioning of the direction of change in digital technologies. The present trajectory is yielding benefits for health care, education, financial services, smart agriculture and many other sectors. Investment in experimental research and in bringing new applications to users is reducing the costs of deploying some services and it may enable enhanced public awareness and citizen engagement or contribute to productivity gains and improved market efficiency. Nevertheless, the longer term consequences of the direction of technological change go unquestioned because the present pathway for technological innovation is presumed to be the only one available.

Contradictory Relations Between Humans and Machines

An assessment of the complex relationship between digitally mediated communication and economic and social inequality requires a deeper probing or questioning of the direction of change if the contradictory relations between humans and their machines and their consequences are to be evaluated. The present direction of technical change presents multiple challenges for human control and authority over the digitally mediated world. Dennett (1978, 216) suggests that the designers of the digital technologies which are being experimented with in the laboratory tend to favour a direction of change that aims to create "an all-powerful executive homunculus whose duties require almost Godlike omniscience." Contemporary research on social or intelligent machines suggests that this is an aspiration which continues to inform experimental research in the fields of data science and AI, albeit moderated by a concern with the common good (Miorandi et al. 2014). Research on advanced robotics and machine learning is supporting pattern recognition and augmented computerised problem-solving consistent with this powerful technology vision. These developments are starting to be deployed outside the laboratory although there is controversy about how rapidly this is happening. Once the stuff of science fiction, these developments could bring substantial risks if the view is taken that human beings should retain control of their digital environment.

If the trajectory of change is one that is likely to remove human authority over the technological system, we must ask whether this would destroy the very notion of what it means to be human.

These developments are encouraged by the view that there is a natural course of development of digital technology. This gives rise to the contradiction that the more digitally mediated benefits we have, the fewer opportunities there are for humans to exercise their control and authority. While technologies are always shaped through their use, increasingly, it appears as if there is only one choice and that is to adapt to technological advance. This applies as much to scientists, government representatives and corporate decision makers as it does to citizens. The challenges presented by this contradiction go beyond questions about which technical developments are being promoted by Google, Facebook, Alibaba or Amazon. They go beyond whether commons-based forms of social organisation are likely to become more pervasive, thereby reducing inequality through non-market solutions supported by commons-based peer-to-peer services that foster sharing and bartering. The commons paradigm may embrace virtues that encourage moral legitimacy and a social consensus on the need for greater equity (Benkler and Nissenbaum 2006, Bloemen and Hammerstein 2015), but the outcomes of such activity are not always positive because they can be "positive or negative or somewhere in between" (Hess and Ostrom 2007, 13). As Hepp (2016) notes, even in digital technology maker communities that work collaboratively, the goal is to achieve better designs that will intensify digitally mediated production and consumption. These communities do not problematise the overall direction of technological change or consider the long run consequences for human control and authority over the technologically mediated environment.

An obsession with economic growth is at the centre of the prevailing monopoly of knowledge about the digitally mediated future. This is reinforced by a vision or imaginary that depicts the progress of digital technology as a force of nature. Algorithms, for instance, are often described as self-organising agents in a digital system that "creates itself out of itself" (Arthur 2009, 21). *Wired's* Kevin Kelly (2016, 5) writes that in the wake of the rapid momentum of technological innovation, "we can work with their nature, rather than struggle against it." On the progress of research on AI he says that "its very ubiquity will hide it … Tracked, parsed, and cognified by utilitarian AIs, this vast ocean of informational atoms can be moulded into hundreds of new forms, novel products, and innovative services" (Kelly 2016, 30,

267). Similarly, Woerner and Wixom (2015, 60) argue that "big data is here to stay and every enterprise will have to accommodate the problematic nature of big data as it decides on a course of action." These developments are seen as progressive, notwithstanding their association with short term and long term inequality and the possibility that human control and authority might be eroded. The promise is that the benefits will outweigh the risks even though developments in machine learning suggest that the asymmetry between humans and their machines is being exacerbated. Yet, with the spread of automated systems, as Harvey (2014) says, the consequences of continuing on the current digital trajectory are that many workers could become disposable.

It is not that no-one is aware of the risks that this direction of technological change may entail. Some scholars, activists and policy makers are making efforts to mitigate the risks of underemployment and social and economic exclusion as well as other harms to human beings. Critical scholarship is demonstrating how far the commodity form of online engagement is reaching into citizen's lives and providing increasingly robust evidence of algorithm system biases, whether racial, gendered or income related (Turow 2011). Despite such evidence and claims that the direction of innovation is yielding an infoglut and a black boxed technological system which is not transparent for citizens (Andrejevic 2013, Pasquale 2015), the technological development pathway continues to be one where the operations of the algorithmic system are becoming less transparent and accountable. In the face of this process of transformation and increasing reliance on complex computations as a basis for decisions, Zuboff (2015) asks "what happens when authority fails?" She envisages a situation where contemporary surveillance capitalism is no longer responsive to the authority of institutions or even individuals. On the current pathway of technological change in the digital world, the results of data analytics, often in the form of visualisations of patterned associations, are shaping decisions in society (Yoo 2015). Yet as O'Neil (2016) observes, "it's a rigged system, a system based on surveillance and on asymmetry of information where the people who have the power have much more information about you than you have about them. They use that to score you and then to deny you or offer you opportunities" (O'Neil 2016 as quoted in Pazzanese 2016, np). O'Neil reflects on whether individuals still have some authority to change this, but she insists that fewer and fewer people can understand what computatal operations are underpinning those decisions.

As already emphasised, those who reflect on asymmetries between machines and humans and on the consequent inequalities, refer to digital infrastructure and digital platforms that have already been deployed and are available to users in commercial markets and in the commons. As wealth and authority continue to shift to the platform owners, inequalities may be addressed by mandating transparency, changing tax policies and up-skilling. Politicians may be able to moderate company behaviour to some extent when they call for transparency in personal data processing and there is some evidence of public resistance. However, controls aimed at moderating dystopian outcomes that envisage "a capitalist oligarchic elite supervising the mass genocidal elimination of much of the world's surplus and disposable population while enslaving the rest and building vast artificial gated environments" (McChesney and Nichols 2016, 264), assume that authority will continue to reside with company executives or state actors to decide how new generations of technology will be deployed.

The assumption that human control will remain feasible is at least questionable in the light of McChesney and Nichols' additional observation that "the violence of technology resides in the way it cuts the link between the person and sensory interaction with the world" (2016, 271). Leonhard (2016, iv) echoes this concern in *Technology vs Humanity.* He argues that when "a mass extinction event" for global commerce is triggered, the way people communicate and engage with each other when their lives are mediated by cognitive computing will be radically altered. Scientists also worry about the direction of digital innovation. Stephen Hawking, for instance, warns that:

> in the future, AI could develop a will of its own - a will that is in conflict with ours … the rise of powerful AI will be either the best, or the worst thing, ever to happen to humanity. … We do not know which (Hawking as quoted in Best 2016).

Yet, the response to these developments is to build more intelligent technological systems with behavioural economics and ethical conduct being presented as the solutions to challenges to human control and authority.

Conclusion

Is it realistic to envisage a deeper consideration of the consequences of contemporary digital technology innovation? Policy measures are being introduced to limit the damage

caused by accidents resulting from experimentation in the laboratory and the excesses of practices in the private sector. Legislation and regulation play important roles in addressing the short run consequences of contemporary developments and such interventions do alter the incentives of private, state and, indeed, civil society actors, leading to incremental changes in the direction of innovation. Platform operators and infrastructure providers will continue to seek public legitimacy for their practices in order to ensure the financial sustainability of their business models (Andersson-Schwarz,2016), but these will amount to small shifts in strategy with technological innovation continuing to progress along its current trajectory.

Such tinkering is unlikely to address the principle contradiction identified earlier - that the more digitally mediated benefits we have, the fewer opportunities there are for humans to exercise their control and authority. The risks that augmented machine intelligence presents for human beings are being addressed through risk mitigation strategies that involve further progress towards algorithmic complexity. As calculative practices are internalised by citizens, this limits the capacity of human beings to imagine alternative directions for technological innovation (Introna 2016). While it is recognised that developments in AI and robotics "hold the potential to reshape fundamentally the way we live and work" (House of Commons,2016, 3) and that there is a need for ethical scrutiny of the societal consequences, the prevailing view is that society must adapt to the current pathway of technological change. A dialogue is needed but this raises the issue of what kind of dialogue. Alternative directions for change are themselves mediated by our immersion within the technological system. It is difficult to envisage how citizens without indepth scientific knowledge can be expected to actively participate in such a dialogue. This is especially so because some 71 per cent of Europeans, for example, report that they believe there is no alternative to disclosing their personal information to obtain products or services (Jourova 2016).

Nevertheless, there is no alternative to deliberation. As long as people are still able to exert their authority, then they must be assumed to have the capacity "to take part in crucial decisions regarding public affairs" (Sen 1999, 16, Couldry 2016). Freire argued that "dialogue is a moment where humans meet to reflect on their reality as they make and remake it" (Shor 1987, 98) and McChesney and Nichols propose that "we can through conscious thought and action change both the world we live in and ourselves for the better" (2016, 282). When social and economic inequality persists and digital technologies are implicated, it is crucial to enable

a dialogue that may reveal alternative pathways which challenge the presumed natural direction of digital innovation. The obsession with economic growth at the heart of the prevailing monopoly of knowledge may be diluted through attention to the increasingly visible and extreme consequences of economic and social inequality (Preston 2016). Any such dialogue must focus on what human beings will do in their lives in the future and how they will live together with authority and dignity. This must be a dialogue about what people value in their lives when they are mediated by digital technologies, not simply about the values that come to be embedded in technologies as they emerge from laboratory. It is urgent that such a dialogue is undertaken, that it is inclusive and that choices are acted upon.

NOTES

1. My understanding of mediation is close to the definition of mediatisation as "the interrelation between the change of media and communication, on the one hand, and the change in culture and society on the other" (Hepp and Krotz 2015, 3). My concern is with the institutional or structural as well as the micro-level features of lived experience in environments where digital technologies play a role in enabling or constraining change, making some outcomes and consequences more likely than others. The term 'mediation' is used here because I want this paper to address readers who work outside the media and communication field as well as those who work within it. The former are inclined to use the term mediation to refer, not only to symbolic interaction, but also to structures and processes that operate within the economy. Like those who regard mediatisation as designating complex meta-processes that constrain or enable change (Krotz 2007), I use the term mediation in a similar way (Mansell 2012).

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ABSTRACT

This article examines relationships between economic and social inequality and digitally mediated communication. Differences between instrumental and critical approaches in the digital divide literature are considered to highlight the limitations of the former approaches and the ways these are reflected in European policy. What we know about the relationship between technological innovation and society and its consequences for economic and social inequality is summarised and emerging expressions of inequality between humans and their digital machines are discussed. With computational models, algorithms and machine learning becoming more pervasive, it is argued that human beings are at risk of losing the ability to control the digitally mediated environment. Policy measures create incentives for small shifts in corporate digital platform strategy that amount to tinkering with the overall direction of technological innovation. The article emphasises the need for an inclusive dialogue to reveal potential alternative directions that might take better account of what people value in their digitally mediated lives.

KEYWORDS

inequality, digital divide, mediation, technological innovation, algorithms, dialogue, employment

ACKNOWLEDGEMENTS

This article is an extended version of a keynote presentation at the ECREA Pre-conference "Cleaning the House: Testing Critical Concepts in Communication and Society", Prague, 8-9 November 2016. The author gratefully acknowledges comments received from participants in the conference. Any errors or omissions are the author's responsibility.

DISCLOSURE STATEMENT

No conflict of interest is reported by the author.

FUNDING

The research for this article was not supported by any source of external funding.

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