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### Contemporary contexts for new media theory

Nonetheless, this somewhat artificial perspective can sometimes highlight the nature of change and assist us to understand some of its substantive qualities. Such is the case, we believe, with the development of what are called new media and the theories that have evolved to explain them. It is this approach we take in this introduction to historically situate the developments in computer technologies that underlie new media and the context of economic, social and cultural transformation in which they operate.

The second half of the 20th century, essentially from the end of World War Two until the millennium's closing years, was a period of immense social, political, economic and technological change. This post-war dynamic of change grew rapidly and spread comprehensively, so much so that it was eventually experienced in every register of life and continues to be today. However, within this five-decade phase we can periodise yet more: the world of the 1950s was very different from that of the 1960s, which was, in its turn, markedly different from the crisis-prone 1970s, which itself became something of a shadow of the enterprising and even more change-filled decades that followed. Stephen Toulmin has argued similarly: 'Experience in the last quarter of a century has

convinced people that the twenty-first century will resemble the twentieth even less than the twentieth century has resembled the nineteenth' (1992:2).

If change is always with us what then is so different about this 50 year span? Were not the previous 50 years just as transformative of every aspect of life? Well, yes, but in different ways and at a slower rate. War and political strife and economic depression seared the collective and individual consciousness of those who lived through the first half of the 20th century in ways and with an intensity that those born after 1950 would not experience. These were cataclysms made possible by technological transformation, to be sure, but were of a different order and substance. It was change envisioned through an essentially late 19th-century mode of industrialisation that rested on the central pillars of classic modernity. And change was actualised through the power of coal, oil, electricity and the combustion engine. Modernisation and industrialisation were spread through communication and distribution networks that were of similar vintage: through the spatial sinews of railways and macadam roads, and through the 'old media' of telegraphs, telephones and newspapers. Such transformation was, in its own way, revolutionary and signalled that we were living in a globalised (or globalising) world of interdependencies and contiguous effects that inserted themselves into more and more parts of everyday life.

But this was change with a distinct political and economic context. It was a context that served to shape the technological development of the period and made it very different from that which would dominate the latter half of the century. For example, the late-19th-century imperialist order contributed to an almost perpetual state of political crises. Territorial rivalries between the major nation states would eventually provoke two world wars. In terms of the rate and spread of technological development across the world, these were held back by a shift toward an economic and political autarky that emerged especially after the 1914-18 war. A traditionally 'isolationist' USA and the determination by certain European states to protect their own imperial systems through tariffs and protectionism meant that technological change was incremental as opposed to radical and comprehensive. Indeed, many areas of everyday life and culture could be left almost untouched. It was a kind of 'local global' form of development where the political 'local' still had preponderance over the natural 'global' tendencies of capitalism.

The end of the hot war of 1945 saw a transition into a Cold War between the new superpowers, the USA and the USSR. Military conflict continued, of course, but these were localised and conducted mainly in undeveloped countries under the auspices of Washington-Moscow strategic rivalry. Enmity was ideological in the first instance: between the worldviews of liberal capitalism and totalitarian communism, but it had immensely important spin-offs. Primary among these, in terms of their effects upon economy and society, was the rapid developments in computer technology. The Cold War put the immediate exigencies of large-scale military conflict into deep freeze. This released much of the ideological and inventive energies of politicians and scientists. These were channelled in no small part into research and development in computer science (Edwards, 1996). In the USA, politicians and military analysts thought strategically about how to best confront the challenges of the new times. The perceived level of threat was such that they were prepared to do whatever it took to ensure that they could stay ahead of the USSR in terms of technological and scientific development.

Much government largesse was thus conferred on the best and the brightest minds in the universities and the industrial laboratories. Accordingly, in the 1950s, among the many beneficiaries of this intense focus on technological development were men such as Norbert Wiener and J.C.R. Licklider. These were influential scientists who pushed the boundaries of thinking about what humans in conjunction with computers were capable of.

'Conjunction' – meaning 'the state of being joined' – is a key term that characterises how these leading theorists thought about the science of computing. Wiener, a professor of logic and scientist at the Massachusetts Institute of Technology (MIT) pioneered the school of thought he called 'cybernetics'. This was a theory of both control and communication through flows of information in which 'feedback mechanisms' play an essential part. Fundamental to cybernetics was the claim that it applied equally to humans and machines. Information feedback, Wiener argued, would generate automatic processes between the human and the machine (Wiener, 1950). Automatic doors work on this principle. A person approaching such a door alerts a sensor which 'understands' this human action and triggers a mechanism causing it to open. Human and machine create this 'automatic' action through mutual interface – through feedback. Cybernetics was, then, at its very inception, a mode of thought, a form of 'mediation', which was linked to the military concepts of 'command and control'. Its overall purpose was to discover ways in which environments could be engineered and manipulated through human and computer interaction. Wiener saw computers as machines that mirrored what humans were in their essence. In his 1950 book *The Human Use of Human Being: Cybernetics and Society* he was unequivocal about this link:

[T]he [human] nervous system corresponds to the theory of those machines that consist in a sequence of switching devices in which the opening of a later switch depends on the action of precise combinations of earlier switches leading into it, which open at the same time. This all-or-none machine is called a *digital machine*. It has great advantages for the most varied problems of communication and control.

Equating humans with computers through a system of cybernetics was a powerful hypothesis in the development of computer networking and the systems of communication that would eventually become the internet, the network society and the new media applications that make it possible. For example, J.C.R. Licklider, an intellectual father of the internet, wrote a highly influential paper in 1960 called 'Man-computer symbiosis'. In the introduction to this he wrote:

Man-computer symbiosis is an expected development in cooperative interaction between men and electronic computers. It will involve very close coupling between the human and the electronic members of the partnership. [...] In the symbiotic partnership, men will set the goals, formulate the hypotheses, determine the criteria and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking. Preliminary analyses indicate that the symbiotic partnership

will perform intellectual operations much more effectively than man alone can perform them.

In both Wiener and Licklider we see two significant and mutually compatible theses on the nature of computing and humans' relations to it. Wiener argues that to be fully modern is to depend on computing power, and Licklider suggests that computing may also reflect our human essence. These perspectives are at the core of post-war computer science; and the work of these towering intellectuals in information systems and cybernetics contain basic assumptions regarding people and computer systems that flow directly into the creation of our networked society. Both theorists view humans as fundamentally processors of information in a world whose reality becomes apparent only through the interface with numbers. As Theodor Roszak wrote in his book *The Cult of Information*: 'In perfecting feedback and the means of rapid data manipulation, the science of cybernetics was gaining a deeper understanding of life itself as being, at its core, the processing of information' (p. 39). The central challenge for humans aspiring to full modernity, so the logic runs, is to develop information-processing machines that increase in their sophistication, speed and capacity. The more powerful computers become, the more we realise our inner essence, and the more we are able to understand the world around us.

The computer-automated vistas of Wiener and Licklider were becoming a reality in the 1950s and 1960s. The powerful number-crunching capabilities made possible by developments in computing allowed advances in not only atomic weaponry, but also solved some of the mathematical problems of trajectory plotting that had beset engineers of rocketry. Projectiles could now be launched with unprecedented levels of accuracy and power. In the USSR, similar developments in computer science were taking place. So much so that the Soviets stole the march on the Americans in 1957 by launching into space the *Sputnik* satellite. This was the first time that humans had achieved the 'escape velocity' necessary to reach beyond the Earth's atmosphere – and computing power made it possible. The US response to this was to enter into what would become the 'space race' with a commitment by President Kennedy in 1960 to land a man on the moon by the end of the decade. And so yet more funds poured into the universities and the commercial labs to give the USA and the 'free West' the decisive technological edge through computer-based 'solutions' that were shown to have applications across many industries as well as the military.

Away from the worries and concerns of superpower conflict, this confidence in technologically assisted human capabilities gave something of a fresh impetus to the project of modernity. After the destruction of two global wars and the chaos of economic depression, the post-war period opened up into what David Harvey (1989) called the phase of 'high modernity' – at least in the liberal-capitalist west. In the 1960s the rate of innovation in science and technology grew rapidly and the complexity and buoyancy of the globalising economy reflected this. Full employment became the norm in the developed economies of the west, and the growing affluence of society boosted yet further the demand for technologically based solutions. In communications, jet travel became increasingly commonplace, as did use of the telephone for local, national and international networking. A global media was emerging through the mass diffusion of television and transistor radios, allowing people to 'experience' live events such as

soccer world cups or the Olympics; or the emergent mediascape brought political/military events such as the Vietnam War much closer to our everyday consciousness. Indeed, much of the planet watched part of this global mediascape as President Kennedy's pledge was kept when astronaut Neil Armstrong stepped onto the Moon in July 1969.

This 'high modernity' was organised and articulated through what might be equally termed a 'high' Fordism. In 1914 in the USA Henry Ford had pioneered his eponymous system of automated production lines using low-skilled labour to mass manufacture the Model T car. His techniques were revolutionary and soon multiplied far beyond the production of cars. Mass production was predicated on mass consumption, which was in turn reliant on mass communication. The technical rationality of micro-planned and micro-managed Fordist principles spread across the emerging 'mass society' to evolve into what Harvey termed 'a whole way of life' (1989:135). As the method grew and became more dominant in the 1950s and 1960s, Fordism evolved into a tightly macro-managed economic system through the top-level cooperation between business, organised labour and corporate capitalism. The effect of this in culture, in economy, and in society was to regulate and make fairly predictable the pace of change and the trajectory of change. And so British Prime Minister Harold Wilson's characterisation of the 1960s as being shaped by the 'white heat of the technological revolution' notwithstanding, the reality was one of control and of management. Computer systems experts of the time knew, for example, that the automation of much more of industry would enable it to be more efficient and productive. However, in the context of full employment and high profits, the economic impetus to take such a step (which would be politically sensitive and involve the destruction of many jobs) was simply not strong enough. The concept of the national economy was still operating; and the political will to subsidise industries and businesses in the national interest was still dominant. Local-global, then, was still the dominant metaphor to describe the phase of 'high modernity' and 'high Fordism'.

This began to change in the 1970s. High Fordism and the high modernity it helped produce as a 'whole way of life' full of certainties in employment, in modes of consumption and so on, had been maturing and was growing rigid and sclerotic (Kolko, 1988). The system, as it grew in scope and complexity, developed its own internal contradictions. The need for capitalism to 'naturally' expand spatially, and accelerate temporally, was 'artificially' constrained by nation state politics. In Europe and North America, this led directly to pressures of competition from the emerging economies of East Asia and Japan, which were aggressively export oriented. Moreover, falling productivity and falling profits increased the scale of economic crises in the west. These were exacerbated by growing inflationary pressures and, in 1973, the 'oil shock' when the Arab members of OPEC placed an embargo against the USA in particular, which sent world oil prices to unprecedented levels.

The economic and social system of Fordism was in trouble by the mid-1970s. Indeed it was beginning to unravel though growing unemployment, growing uncertainty about the future, and a growing call for wide-ranging 'solutions' from representatives of big business and economic radicals in governments. Ideologues with 'solutions' had, in fact, been growing in influence over the previous decade. These were the 'neoliberals' who argued, after Adam Smith the 18th-century political

economist, that markets must be free from 'rigidities' such as tariffs and subsidies. A central demand to be heard from business at the time was that it should be business alone that should decide how and where capital is invested, free from either the sectional interests of organised labour or the narrow political interests of government. In the climate of deep crises, neoliberalism swept like a gale through the 'whole way of life' that had been the system of post-war social, political and economic consensus. Led by political ideologues such as Margaret Thatcher and Ronald Reagan, government began to abnegate its consensus-building role between business and labour, as well as its role as protector and nurturer of the national economy. Economics was to take the leading role and neoliberals identified major increases in productivity and efficiency, across the whole of the economy, as the prime factors in the restructuring of capitalism. The application of computer-based information and communication technologies (ICTs) had long been developing in the commercial sector as spin-offs from military R&D. However during the 1950s, as we saw, the take-up was slow and accumulative because of the political considerations of the consensus approach. By the early 1980s, however, ICTs were seen, as Neil Postman put it, as a 'solution in search of a problem' (1993:17). Automation was thus to be the panacea for the issues of low productivity and efficiency in just about every industry. It was at this time that the mutually reinforcing dynamics of neoliberal globalisation and the revolution in ICTs really got under way.

The 1980s saw a phase of the entrenchment of neoliberal ideas, especially in the politics and economies of the Anglo-American countries. This had a direct flow-on effect into less developed countries through multilateral organisations such as the World Bank and the International Monetary Fund. The restructuring of the world's economies to make them more 'flexible' and productive and efficient was made possible only through the unrestrained application of ICTs across industries and across entire economies. The flow-on to culture and society of rapid computerisation was swift. In something of a homage to Wiener and Licklider's dreams of human-computer 'symbiosis', the middle of the 1980s saw the beginnings of the quaintly termed 'personal computer' (PC) revolution at home and at the workplace. Growing and increasingly flexible 'post-Fordist' economies were now changing rapidly through the introduction of new media technologies that seem to be getting faster and more powerful by the month. Fuelled by the growth of the NSDAQ bubble, the 1990s saw the popularisation of the internet, the growth to behemoth status of corporations such as Microsoft, Intel and Apple, and the realisation of the global 'information economy'. And into our collective consciousness would be inserted, in the form of a verb, the spirit of the information age through neologisms such as Ebay, Amazon, Yahoo! and Google.

It was during this frenetic activity that Manuel Castells observed that: 'The information technology revolution, and the restructuring of capitalism, has induced a new form of society, the network society' (1996:xv). New media technologies were and are central to this process. These are the technologies of 'mediation': connectable technologies that make networking and the network society possible. Castells further describes the social and economic effects of networks:

Networks are open structures, able to expand without limits, integrating new nodes as long as they are able to communicate within the network, namely as

long as they share the same communication codes [. . .] Networks are appropriate instruments for a capitalist economy based on innovation, globalization, and decentralised concentration; for work, workers, and firms based upon flexibility, and adaptability; for a culture of endless deconstruction and reconstruction; for a polity geared towards the instant processing of new values and public moods; and for a social organization aimed at the suppression of space and the annihilation of time.

(1996:470–471)

The notion of what Castells calls 'polity geared toward the instant processing of new values and public moods' is for us a fascinating consideration. How do we make sense of constant, rapid, and often comprehensive new media-driven change? It is a concern that was similarly expressed more recently by Thomas de Zengotita in his book, *Mediated*. In it he claims that: 'The real world is reconstituting itself on a plane that transcends ancient solidarities of nature and custom, craft and industry. The whole process has been accelerated since the invention of modern communication technologies (telegraph, photograph, telephone), and it crossed a qualitative threshold in the past couple of decades, with the rise of new media' (2005:17–18).

The works selected for this reader go to the heart of these qualitative changes – if that, indeed, is what they are. The subtitle of de Zengotita's book is 'how the media shape your world'. Theorising effects of 'new media' is not the same as theorising the effects of a particular media technology such as a DVD player or mobile phone. 'New media' in the context of this book are plural and encompassing in their scope. It takes in a *media or mediated environment* in which any application or process that is networkable or digitisable has its place. This can range from the latest and fastest wireless laptop and digital camera, to the act of shopping with a plastic card – and even this book, which may be bought online, or easily scanned or converted to PDF and made available online. New media technologies are above all connectable, compatible with others, creating in their plurality a highly mediated context which connects to numberless other mediated contexts that users create in their day-to-day life.

It is this evanescent media landscape that the authors in this collection attempt to describe and explain. The extracts give the taste of larger works that look at the nature of technological change. The challenge for us as editors was to try to capture, as much as is possible, the kind of role new media has played in the undoubted change that has taken place over the last couple of decades. This has meant taking a range of views on new media theory that do not fall into a 'gee whiz' technophilia or, at the other pole, a sombre technophobia that sees only doom and gloom. Many perspectives are unavoidably situated at some point along this continuum, although they never fall into egregious or unconsidered writing that would place them at either extreme. Importantly, we have chosen to compile this collection in a more subtle and we think more intellectually fruitful way. Several of the works do not, in fact, deal with new media at all, but are perspectives on our relationship (cultural, economic, politic and psychological) with technology. What these do is to provoke other modes of thought that allow us to consider, say, the introduction of the telegraph in Canada in the 19th century, as Jeremy Stein does in Part 5, and compare this with the writings – or our experience – of a

hyper-mediated world. We can then ask: is there really any qualitative difference? If so, what, and if not, why not? We do not provide 'answers' to this or other questions; only pathways to more questions.