CHAPTER 5

The Economy of Digitality: Limitless Virtual Space and Network Time

> Algorithmic cognition is central to today's capitalism. From the rationalisation of labor and social relations to the financial sector, algorithms are grounding a new mode of thought and control.
>
> Luciana Parisi, 2016, p.98.[1]

The economy of digitality is a space-time economy. That is to say, the relationship to time and space through technology, and the nature of this time and space as the articulation of the accumulation process, is central to what the post-modern economy is and what it does. This is new and different in that digital technology acting as driver of accumulation has distinctive manifestations that we must recognise and understand.

Here I will look at time and space as digital and networked phenomena that are foregrounded by digitality in the ways that I have described—and use this frame as a way to consider the global economy as a whole. The central point of the discussion here is that the effects and spread of digitality have not been uniform. This is in the nature of capitalism, as much in its classical mode—think Leon Trotsky and his 'uneven and combined' theory of capitalist development—as it is in its mutated digital form that dominates today.[2] Given that accumulation—notwithstanding its mutation in the context of digitality—is *still accumulation*, with the same objective of extracting value from labour, then Trotsky's theory is a useful way to plot and analyse the multifaceted articulations of the digital global economy.

Let us begin with a consideration of some of the ideas around the transformation of perceptions of time and space that has been a central motif within the globalisation debates since the 1980s. To begin with we can put aside many of those theories that emerge from business journals and management books.

How to cite this book chapter:
Hassan, R. 2020. *The Condition of Digitality: A Post-Modern Marxism for the Practice of Digital Life*. Pp. 97–128. London: University of Westminster Press. DOI: https://doi.org/10.16997/book44.e.

Invariably, these are celebratory in the context of an assumed and unreflective technological 'progress' that propels manufacturing, production, consumption, communication, etc. to new levels of 'efficiency' and thus humanity to new levels of prosperity.[3]

One of David Harvey's most important and lasting contributions to Marxist scholarship, and to the political economy analysis of capitalism more generally, has been his 'time-space compression' thesis. His 'spatializing' of the accumulation process serves, still, as a most fruitful way to think about accumulation, about globalisation and, as I will detail shortly, about *culture*. In what has become a much-quoted passage in *Postmodernity*, Harvey writes that with the term 'time-space compression' it was his intention to 'signal … processes that so revolutionise the objective qualities of time and space that we are forced to alter, sometimes in quite radical ways, how we represent the world to ourselves'.[4] The world as a space of communication, transportation and production has become dramatically smaller, he argues, and so the experience of this rapid transformation needs to be understood by the left as it will be 'challenging, exciting, stressful … sometimes deeply troubling, [and] capable of sparking … a diversity of social, cultural, and political responses'.[5] The sociologist Anthony Giddens proposed something similar to Harvey, and did so earlier, a fact Harvey indicates only in passing in *Postmodernity*.[6] Giddens calls his theory 'time-space distanciation'. Here, the growing 'intensification' of the dynamics of modernity serve to order social life and social relations in ways that link 'local happenings' to events 'occurring many miles away and vice versa'.[7] In more philosophical mode, Frederic Jameson, in his essay 'The End of Temporality', evokes a late-capitalist space-time in which subjective experience is reduced to a constant present, a present that is nonetheless still an unfolding telos, though one that never quite terminates, but which would signal the 'death of the subject', and hence the end of the Marxist project of revolution or emancipation, if it ever did.[8] And more recently, Ben Agger looked specifically at digital connectivity, primarily through the pervasive smartphone, to argue that 'smartphoning creates a kind of "iTime" that challenges the pre-Internet boundaries between public and private, day and night, work and leisure, space and time'.[9] Intriguingly and somewhat in tune with the concerns of the present book, Agger goes to on to write that 'iTime is consistent with, and hastens, the expansion and elasticity of the commodity form in late, laptop, fast, post-Fordist, postmodern capitalism.'[10]

These are only a selection from the literature, but they are representative. What characterises them as left-critiques of the transformation of time and space is that they look to some form of classical historical-materialist analysis to understand the phenomenon. But they look to that same analysis as containing, somewhere, the progressive or emancipatory *solution* to its negative effects. To put it another way, the space-time transformation is still set on an established continuum upon which the dialectic unfolds, and if we can identify the specifics of the movement in its new context, then the way forward, or

the solution, be it resistance, organisation, consciousness-raising, or whatever, will reveal itself as a contradiction. To consider the transformation of time and space through the frame of digitality, however, gives a rather different perspective. Such diagnosis offers no immediate prognosis other than the realisation that a new approach, a new political economy, is called for. Digitality, being a new human relation with a new technological category, has deflected the dialectic of postwar/Fordist modernity from its course, and so new explanations for the new sociotechnical context must be found. Two general statements of the problem are put forward here as the basis for an exploration of the transformation of time and space that has constituted the present global economy of digitality. First is that through the aegis of a new technological category, digitality transforms time and space, such that: *digitality alienates, and automation facilitates*. Time and space compression, an abstract concept to begin with, becomes something else through digital networks. It becomes the actualisation of Jacques Ellul's 'exclusion of man' from the primeval relationship with technique and nature.[11] A technologically-specific alienation is the effect: an alienation that maroons us in the post-modern condition of 'relationlessness', alienated not only from technique and nature, but also from our ancient analogue legacies in culture, politics and economy.[12] Second, and following from the first, is that the creation by capital of a digital time and space logic that shapes economy and society according to its own encoded and automated imperatives, leaves people, institutions, societies and cultures with a much-diminished capacity to affect the trajectory in any significant way.

Uneven and Combined Digitality in the Time-Space Global Economy

In his *History of the Russian Revolution* (1930), Leon Trotsky sought to extend the Marxist theory of uneven development.[13] It was a theory first developed in 1910 by Rudolf Hilferding which declared that the early industrialising countries such as Britain, Germany and the US were able to gain competitive advantage over other countries, and were able to increase that lead over time, and so lock in their dominance as industrialisation grew and spread.[14] Trotsky extended this idea into what he termed *uneven and combined* development. Here, those countries being developed through the importation of capital and technology from the advanced countries could 'skip' certain phases of development that the advanced countries had already gone through. Moreover, a developed sector could exist alongside an underdeveloped or 'backward' sector inside the same country. This was a feature of the uneven characteristic. For Trotsky, this was also a contradiction. It could produce negative consequences for the emancipation of the working class, such as the creation of a powerful and indigenous capitalist stratum that could rule an emerging worker class that had had no opportunity to develop the institutions of solidarity and

resistance that had evolved in the advanced capitalisms. This process of unevenness was nonetheless combined across a wider scale through the numerous interconnections between the developed and developing countries by way of the linkages created by capitalist expansion itself. These connections, Trotsky reasoned, could have a more positive effect upon working class consciousness and radicalisation through, for example, awareness of and inspiration from struggles in other parts of the world. This idea also gave substance to his more basic concept of 'permanent revolution'.[15] In his writings over the course of the 1930s Trotsky sought to systematise this idea of uneven and combined capitalist expansion into a more formal economic 'law'. It was Trotsky's ambition to generalise this 'law' as a dialectic determining what he saw to be *the* 'most general law of the [capitalist] historical process' and an ideological counter to the rise of Stalinism and the 'socialism in one country' ideology promoted in that decade.[16]

It is not my intention here to subscribe to any law from within the social sciences, from Trotsky, or from anyone else. I wish only to show how through an adaptation of Trotsky's uneven and combined thesis, we can understand digitality more clearly and see that it generates uneven manifestations across the world—and that these are all combined within a dominant techno-logic.

The mutation of accumulation expresses itself today in a new time-space relationship through a digitality that gives Harvey's 'spatial fix' thesis another dimension. It will be remembered that the 'spatial fix' was Harvey's term to theorise the way capital overcomes its overaccumulation problem by shifting excess capital to new geographic areas, new markets, zones of production, sources of raw materials and so on, to where it may be more profitably deployed. It will be recalled, too, that Harvey, following Marx, saw that this was only a temporary 'fix', one that simply 'transfers the contradictions [of accumulation] to a wider sphere and gives them greater latitude.'[17]

Today, the 'spatial fix' takes on important post-classical and post-modern articulations. This can be understood through an idea I have developed more fully elsewhere, which I term 'outward-inward globalisation'.[18] I will sketch it in outline here. As the term suggests, the 'spatial fix', facilitated by digitality, has given the logic of accumulation two directions of travel—*outwards* into the physical space of the world, much as it has done since the beginnings of capitalism, and *inwards* into the virtual space of society, to create new spaces of accumulation through the new industries and opportunities afforded by an ever-growing networked sphere. Moreover, this 'inwards' logic is also able to colonise, through commodification, pre-existing spaces of society, entering areas of life that were, as Fredric Jameson put it, 'hitherto sheltered from [the market] and indeed for the most part hostile to and inconsistent with its logic.'[19] Let me now outline each direction of travel in its turn, before moving to a consideration of what I see to be the three salient manifestations of the global digital economy, which are *service*, *manufacturing* and *platform* capitalism. From there I will end with a reflection in the context of digitality upon what David Harvey, in his 2005 book

The New Imperialism, termed 'accumulation by dispossession'—which he sees as (still) the major 'feature of what contemporary capitalism is about.'[20]

Outward Globalisation

Much of the process of outward globalisation may be seen as 'conventional' in that it is capital expanding in the way, and for the reasons, that Harvey dissected in his *Postmodernity*. As he puts it, the overaccumulation crises of Western capital:

> ...can to some degree be interpreted, therefore, as a running out of those options to handle the overaccumulation problem. ... As these Fordist production systems came to maturity, they became new ... centres of overaccumulation. Spatial competition intensified between geographically distinct Fordist systems, with the most efficient regimes (such as the Japanese) and the lower labour-cost regimes (such as those found in [the] third world …) driving other centres into paroxysms of devaluation through deindustrialization. Spatial competition intensified, particularly after 1973, as the capacity to resolve the overaccumulation problem through geographical displacement ran out.[21]

Contemporary globalisation began in earnest when the deregulatory effects of the Washington Consensus began to be felt in the mid-to-late 1980s. Harvey's 'geographical displacement' had been going on for at least a decade prior to this time, with the first wave of Newly Industrialising Countries (NICs) such as Hong Kong, South Korea, Singapore and Taiwan attracting much overaccumulated capital from the developed countries in the form of Foreign Direct Investment (FDI).[22] Such expansion is necessarily uneven, with the contingencies of politics, of previous imperial connections, of geo-strategic considerations, and of business opportunity all playing a role in deciding where and when capital gets invested. The inflow of capital to this first wave of NICs, as well as into the second wave that took off in the 1980s in Mexico, Brazil, China, India, Malaysia, the Philippines, Thailand and Turkey, was uneven also in terms of the exportation of Western political values such as democracy. In the 1990s, leaders in countries from Singapore to Malaysia, and from India to China, were clear that the importation of neoliberal markets did not mean the importation of liberal democratic values. Lee Kuan Yew of Singapore, and Mahathir Mohamed of Malaysia, for example, were willing to take Western investment, but insisted on the pre-eminence of 'Asian values' as the guiding form of their modernisation programmes. In 1996 the *Beijing Review* could note with official Chinese Communist Party approval that 'the Western model is not the only way to modernisation'.[23] From the perspective of today it is clear that in China and India, to take the most consequential examples, Western liberal democracy

has gained little traction. China, with its one-party system, is openly hostile to liberalism whilst continuing to seek Western investment;[24] and India, the vaunted 'world's largest democracy', will enthusiastically take Western investment, whilst simultaneously constructing a Hindu-dominated nationalism or 'Hindutva' that is anything but Western or liberal in its political outlook.[25] Third-wave NICs such as Myanmar, Pakistan, Bangladesh, Sri Lanka and Vietnam will also accept investment when they can get it, but they too pay lip service to human rights, anti-corruption strategies, and democratic norms and values, Western or otherwise.[26]

This unevenness in economic and political development is increasingly combined through mutual dependencies that are made possible through the information technology networks that made post-Fordist flexibilisation possible. Asian, European and North American capitalisms, the main sites of capital concentration, are deeply integrated through supply chains in manufacturing that criss-cross land, sea and air. Under construction since the 1970s, these supply chains have formed tightly-organised and complex systems of just-in-time (JIT) scheduling of production and distribution that function around the world, around the clock. They shrink time and space for capital in a digital process that is being more deeply integrated every day through the speed and density of digital connection and interconnection. This networking is largely automatic in its infrastructure-building and maintenance and is propelled and shaped by the logic of the dominant neoliberal imperatives. Conceived initially by Toyota in Japan as an automobile production system that would minimise stock levels, free up warehousing space, and accelerate the speed of the production process overall, JIT has become a metaphor for the economic system as a whole. It is the digitally-driven core of corporate control over global time and space. Businesses, economies and individuals are tied economically, culturally and psychologically to its logic to the extent that we now expect the benefits of its time-space shrinking 'efficiencies' in many aspects of daily life, such as avocadoes jetted in from Fijian farms to French supermarkets in January. But behind the mirage of externality-free efficiency, there is an ideological cost to JIT and the kind of world it makes possible. As Jeffrey Nealon argues in his *Post-Postmodernism, or, the Cultural Logic of Just-in-Time Capitalism*, 'there's no space of pure autonomy outside the dominant form of global economic organisation', which is a neoliberal economic organisation. Nealon goes on to write with just a trace of sarcasm: 'we swim in the same sea as everything else that has been "successful" over the last thirty years—[and so] theory is neoliberal, Microsoft is neoliberal, anti-retroviral drugs are neoliberal, even anti-globalisation protests against neoliberalism are neoliberal in their own way.'[27] Cynicism aside, as a mode of control through a mode of production, this combining of the unevenness of capitalist accumulation strategies through digital networks is unparalleled.

Financialisation is another powerful combiner of uneven economic processes that has ridden on the back of outward globalisation. It is also a comparatively

new phenomenon, and, like JIT, something made possible in the 1970s–80s through the combined affordances of networked computing and neoliberal globalisation. Financialisation is accumulation through the growth of the financial services sector and the exponential array of financial instruments—contracts between parties that may be traded, modified and settled—that now constitute a leading edge of post-industrial capitalism. Today, 'traditional' banking and the financial services sector—which are often one and the same thing—constitute a volatile and precipitous form of accumulation, which is less about creating new wealth through the financing of the creation of new products and services by peopled businesses and industries, and more about what Costas Lapavitsas terms 'profiting without producing'. Financialisation, according to Lapavitsas, has changed the landscape of traditional accumulation and has morphed into a digitalised logic that has 'altered [the] behaviour of the fundamental agents of capitalist accumulation, including non-financial corporations, banks and workers. Finance has reshaped the activities of all three … resulting in new forms of profit.'[28] In particular, financialisation reflects a growing asymmetry between production and the circulation of money. Here, through a sectoral concentration on the latter, Lapavitsas observes an inexorable:

> rise of profits accruing through financial transactions, including new forms of profit that could even be unrelated to surplus value; this process can be summed up as 'financial expropriation'.[29]

This is money made from money: profit from speculation, from leveraging, bonds, shares, stocks, derivatives, interest rate fluctuations, currency exchanges and many other 'instruments'—including accumulation from the indebtedness of workers and the poor across the world. This does not mean, however, that workers and the poor are able to be part of the financial system in ways that would provide stability and a source of income. Financialisation takes place within a closed system made up of a networked global elite with access to financial information and to algorithmic technology that squeezes profit from that information. Proprietary black-boxed automated systems work in closed loop circuits of buying and selling between banks, hedge funds, investment management companies and brokerage firms. The opaqueness of such a lucrative system is a problem not only for regulators around the world but also, ironically, for those with privileged entry to it and who must, on a daily basis, literally gamble through means of a little-understood logic. As Laura Lotti writes, 'these [algorithmic] technologies operate at a temporal scale and degree of complexity inaccessible to the human perceptual system'.[30] Moreover, studies of algorithmic computing at the quantum scale indicate that 'certain things can be described finitely but cannot be decided and are therefore incomputable'. The logic of algorithmic processing at the level of scale and complexity found in the global financial sector, Lotti argues, is therefore essentially detached from material–physical reality, and 'enjoy[s] a mode of

existence proper to [its] own being'.[31] So not only do we lack sufficient understanding of how algorithmic financialisation works, but we fail to fully appreciate that it is an alien logic, an 'ontology of algorithmic objects'[32] that exists as a growingly autonomous source of unpredictable and uncontrollable power that is far removed from the human-scaled analogue world of people and the realities they construct within it.

The objective of extracting profit from the financial money-go-round by means of algorithms that seek to compute and therefore determine the essentially incomputable, ensures that the process will not run without problems. Ellen Ullman, programmer and author of the novel *The Bug*, has described this 'code piled on code' complexity as the basis for our individual and collective disarticulation from the logic of digitality as it acts upon the world. She writes:

> In some ways we've lost agency. When programs pass into code and code passes into algorithms and then algorithms start to create new algorithms, it gets farther and farther from human agency. Software is released into a code universe which no one can fully understand.[33]

The Wall Street 'Flash Crash' of 6th May 2010 occurred when the algorithmic High Frequency Trading (HFT) system inexplicably glitched for around fifteen minutes, causing the Dow Jones Index to drop by 9 per cent, the biggest one-day fall in its history up to that point. The system 'recovered' but the cause of the malfunctioning is still not fully known. What is known, at least by some, is that there is insufficient control over algorithmic capitalism. It is estimated that on average there are a dozen 'mini-flash-crashes' a day in the US part of the system alone.[34] Moreover, in a move set only to increase algorithmic complexity and unpredictability, some trading algorithms are now linked to news sites. And so in 2016 a reported comment by French Prime Minister Francoise Hollande that if the UK wanted a 'hard Brexit' it would get one triggered a selling spiral on the British Pound, which dropped by 6 per cent until automatic trading was halted manually.[35]

Digitality's capacity for 'expropriation through financialisation'[36] is clear—as is its unevenness, with centres of accumulation in New York, London, Tokyo, Shanghai, and a handful of other cities soaking up the great proportion of profit generated. But this unevenness combines too, through planetary networks, causing virtual money to affect material reality. As Nancy Fraser put it, the system-effect ripples out from the virtual to the real and back again:

> Affecting indebted peasants in the global South targeted for dispossession by corporate land grabs, workers in the global North forced to supplement low wages with consumer debt, and citizens everywhere subjected to austerity by states that are compelled in turn to act in the interest of investors by global financial institutions and bond markets...[37]

The Global Financial Crisis (GFC) was triggered in 2008 by a collapse in the sub-prime housing market in the US. Many thousands of risky loans were made in the previous decade to a large stratum of the low-waged working class. These were re-packaged into financial instruments that were sold back into a global finance sector, there to circulate within connected exchanges and banks. These loans defaulted suddenly, and in waves. The financial system only just survived the effects. Less fortunate were the millions of people in the global South and North who lost homes, jobs and communities. They continue to be victims through various government austerity programs and cutbacks since 2008, and in their sufferings are but the latest consequence of outward globalisation. They enter the ranks of de-industrialised workers that began to form in the 1970s and keep growing today wherever new technology is able to automate or outsource their skills and livelihoods to somewhere else. These are the discarded human material of outward globalisation, numbering millions, principally in the Anglosphere, in the migrant communities of France, and in the youth demographics of Mediterranean Europe. They may be superfluous to the needs of classic globalisation, but they have a function within global–local digitality as expressions of networked culture and politics that undermine, or at least make problematic, the organising principles of modernity's (and the West's) traditions of liberal democracy.

Inward Globalisation

Much inward globalisation may be seen as unconventional as it represents a new form of accumulation through a new dimension of space: virtual space. I differentiate this globalisation from the material, physical process just discussed, because the virtual is above all an individuated and subjective space, a psychological space whose new reality we accept as if it were real: a 'magic' space we little understand or interrogate phenomenologically. Its 'existence' as reality tells us something about what Noel Castree called Harvey's 'geographical imagination', and the consequences of what must frankly be described as a failure of imagination in his historical-geographical materialism.

After 1989, the Soviet Union and the ex-Warsaw Pact economies quickly embraced the global market, making it possible for capital to have fresh destinations for investment and accumulation. China opened up shortly after Tiananmen Square, and that country would, by 2018, be the biggest host for Western foreign direct investment (FDI).[38] But China presents a different economic case to other destinations for FDI. It does so in two ways: first, the country is run by the Communist Party, and Western investment—and the terms of that investment—are strictly regulated. Moreover, a widespread culture of corruption makes for an investment climate in China that is fraught, far from straightforward, and always uncertain in terms of the political climate and how investment will fare over the mid- to longer term. This in itself is not unique,

but the central point, and what makes China different, is that as the Chinese economy itself has grown, and grown to become the second largest economy, by GDP, in the world, then *its own* domestic accumulation has been compelled to join global circuits of capital in the relentless search for new opportunities in always decreasing physical space.[39]

In Harvey's logic, and in the context of subsequent post-1989 political and economic developments, it is reasonable to argue that a global and definitive crisis of accumulation should have occurred by now. That is to say, capitalism could have been expected to run critically short of the classical ways to make a profit, and serious cracks in the system would begin to show. The question is destined to remain a counterfactual one because of something that presents a significant problem for a materialist-based geographical imagination: virtual space emerged as an unanticipated space, a potentially unlimited space, not only for overaccumulated capital to enter, but also as the generator of vast new sources of accumulation. This is inward globalisation. This is the expansion of capital into the space of networked communication. Inward globalisation is also a colonisation of the existing spaces of society, into those realms, cognitive, material, cultural, where the cash-nexus of accumulation did not use to dwell but now can enter, impelled by the logic of market neoliberalism and empowered by digital technology. What this development means is that in the context of Harvey's spatialised thesis, there is no longer any notional or actual limit to capital in the way that he imagined it, and neither is there any notional or actual limit to the commodification of that networked space—or of the individuals who spend their lives within it.

The fact that virtual space has become a major, if not dominant, space for accumulation was illustrated by two events in 2018. First is that in early August, Apple became the first corporation to have a stock market valuation of one trillion dollars. Part of its success was that it has sold over one billion iPhones since its launch in 2007, which is approximately three phones every second for eleven years. Second is that in the same month Jeff Bezos, founder of Amazon, became the world's richest man, with a net worth estimated at $156 billion, equivalent to around $20 for every person on Earth. Neither event would have been possible without the internet, and both in their different ways are major expressions of what the internet is and what it does. They create virtual space and monetise it. And they—alongside others such as Google, Facebook, Netflix and so on—are instrumental in the creation of what Mark Andrejevic calls the 'digital enclosure'. This is an 'interactive virtual space' (between user and business) in which user activity becomes 'encompassed by the monitoring embrace' of the business.[40] Andrejevic speaks mainly of the dynamics of surveillance, but it is a surveillance capacity that expresses a power relationship that is oriented around the monetisation of user activity. In this sense, virtual space is another way of seeing how Winseck's concept of 'direct commodification'[41] is actually created and expanded.

Andrejevic's metaphor of 'enclosure' is a useful way to think about virtual space, but it is also misleading in an important sense. He draws his metaphor

from the Enclosure Movement in seventeenth- and eighteenth-century Britain, where large tracts of common land were privatised through the Enclosure Acts and given over to landlord–industrialists. The land of the commons was required for manufacturing capitalism; to transform it into sheep pasturage to provision the textile factories of the industrial revolution. In what became known as the 'Highland Clearances', enclosure not only privatised much of the ancient crofting farmland of the north of Scotland, but also expelled the people from that land.[42] Millions of acres of common fields and common land passed into private holdings and their peoples were evicted and scattered to the new factories of the British industrial cities, or further to North America and Australia.[43] This was what Marx called 'primitive accumulation' and the 'genesis of the industrial capitalist'.[44]

Virtual space may also be seen as a space of 'primitive accumulation' in that it secures and privatises the means of a new kind of production. However, Andrejevic's enclosure metaphor breaks down beyond this point. As just noted, people were expelled through commons enclosures; driven away to become wage-labour in the mills and factories, or to disappear through migration and transportation, never to be seen again. Virtual space, by contrast, was *created* as an enclosure, created as a privatised virtual space whose primary function was to be a space of accumulation. In this case, privatised space *needs people to come to it* and to stay for as long as possible. It's an important distinction. The internet was never a 'commons' with a distinct pre-history and culture. A Creative Commons has existed since 2001 as a non-profit web-based organisation set up to promote a user-collaborative approach to the web through tools and applications that are shareable, able to be built upon, and so forth. Ostensibly this is about collaboration, democracy, software-sharing and internet freedom. But Creative Commons depends upon a substantial capital grant from computer-maker Hewlett-Packard. Tied to this corporate leash, Creative Commons, if not compromised, seems destined to remain at the margins of web life, which is presumably where the tech companies would like it to be. By funding it, Silicon Valley appears to promote diversity. Moreover, Creative Commons is itself a child of digitality and is therefore unlikely to reflect too critically upon digital logic or upon the deeper philosophical meanings of digital technology *per se*. Still, Andrejevic, Creative Commons, and many like them seek, in Andrejevic's words, 'to rehabilitate rather than write off the democratic potential of interactive media'.[45] Note the term 'rehabilitate'. It means to 'restore' or 'bring back to a former state'. But there is nothing in virtual space to apply these terms to. From its inception, the overwhelming space of the web was oriented towards the objective of production for exchange—what Vincent Mosco, as long ago as the momentous year 1989, called 'cybernetic commodities'.[46] Any 'democratic potential' in the web was mainly at the level of rhetoric, with the real potential always being about business.

And note the term 'interactivity'. It is here that we can see the concrete expression of the business imperative at the heart of the web. Around 2004, so-called

'Web 2.0' became a brandable synonym for user-business interactivity. It is no exaggeration to say that the Web 2.0 discourse is what 'saved' the web from what threatened to be a niche/specialist obscurity after the 2000 dot.com crash. In the lead-up to the crash, a decade of hyperbolic promises had fuelled a bubble in NASDAQ stocks. From at least the time of Apple's '1984' ad, computing had entered public consciousness as the epitome of business efficiency and individual productivity. Computers and the emerging internet were proclaimed and often seen as the solution to almost any problem: from education to civil society, and from Bill Gates's 'friction free capitalism' to new forms of democracy and community building.[47] But the 1990s internet failed to deliver on any of these. Partly this was because the user base and technical infrastructure were not developed enough, and partly because the user base was not *interactive enough* with the owners of the internet—the corporations who had been busily creating the digital enclosure for over a decade.[48]

Web 2.0 was Silicon Valley's response to the mortal threat that the dot.com crash represented to digital capitalism. The Valley's Californian Ideology was tested by the loss of so much investment capital and the loss of face for so many of its tech-visionaries. However, now came a talented entrepreneur with an understanding of the power of language, especially metaphor in branding: Tim O'Reilly, a student of, and participant in, the Californian counterculture of the 1970s. O'Reilly is credited with coining and copyrighting the 'Web 2.0' brand. Of the power of metaphor, he wrote: 'A metaphor is just that: a way of framing the issues such that people can see something they might otherwise miss…'[49] Web 2.0 was to point out to people what they had missed in the previous iteration of the web: and that was that the web had to be profitable before any thoughts of making people free. O'Reilly blogged openly about it at the time, advertising a 2004 'Web 2.0 Summit' in San Francisco, proclaiming that: 'Web 2.0 is our first "executive conference"—a conference aimed at business people, with the focus on the big picture.'[50] He put it more bluntly a year later on his website:

> Web 2.0 is the business revolution in the computer industry caused by the move to the Internet as a platform, and an attempt to understand the rules for success on that new platform.[51]

The Silicon Valley big picture and rule for success was interactivity, or in a more democratic-sounding register, the 'participation' of the user with the platform, the browser or the app. And it worked. Through a new ideological offensive and with the collaboration of the more far-sighted tech corporations who survived the crash, the people came and they interacted. This was not primarily with each other as had been the case in the old days of Bulletin Boards and free Hotmail accounts, but with businesses such as Amazon who saw that the user was not just a customer, but also a source of information that could be harvested and aggregated and monetised in new and ever more integrated

ways. Although described by O'Reilly as a 'new architecture for participation', Web 2.0 did not involve any radical technical innovation.[52] As Evgeny Morozov describes it, the rise of Web 2.0 was instead the effect of an 'conceptual imperialism'[53] by Silicon Valley and its free market doctrinaires. It was done largely in order to change ideas around dangerously profit-free concepts such as open source software and 'virtual communities' and the 'digital citizen'. For business, it was an overdue reboot along proper business lines about what software did and what it facilitated vis-à-vis the user and the web.

Web 2.0 interactivity is the instantiation of inward globalisation. It is a step-change in attitude on the part of business, and shortly thereafter on the part of users who would in the main accept the web as efficient and convenient and as a form of progress. At root it was a Silicon Valley-inspired libertarian attitude that would soon spread around the world. We see it contained in the libertarian philosophy of Apple's Steve Jobs, who, in words reminiscent of Tim O'Reilly's quote above, expresses not only the core Valley belief of what constitutes 'interactivity' or 'participation' but also its attitude towards people: 'A lot of times, people don't know what they want until you show it to them. That doesn't mean we don't listen to customers, but it's hard for them to tell you what they want when they've never seen anything remotely like it.'[54] As twenty-first-century digital life began to encompass more than a free Hotmail account and Google browser, it began to change user attitudes. It did so in a way that would permit Facebook, for example, to explode as a means of human communication, and to give the term 'social media' meanings far beyond what anyone thought in 2004 when Mark Zuckerberg launched his application. This kind of interactivity has brought 'social' and digital 'media' into a now almost synchronous communion with the cash-nexus, or monetisation. In other words, the logic of accumulation has been freighted from 'media' into 'social' in ways and to an extent undreamed of prior to the Web 2.0 reboot.

Beyond accumulation through labour and the harvesting of user data, the main vector for digital accumulation is advertising. The statement is almost banal, but it is an underappreciated fact. Digitality's business model is largely dependent upon advertising, and it is fairly well-known that algorithmic tracking by Google, Facebook, Uber, Amazon, etc. is the means through which technology corporations keep 'interactivity' going—on their terms. However, the effects of the 'soaking'[55] of social life with advertising, as the practical application of the algorithmic business model, are much less understood or reflected upon.

Web 2.0-powered digitality has created a new relationship between advertising and the consumer. Through its capacity to make the process of signification infinitely penetrable, flexible and mutable, what Baudrillard termed the 'communicative function' of the 'commodity sign' in capitalism has become a potent force for accumulation. Digitality creates the virtual spaces in which people think, work, relax, produce, consume and communicate with others. It creates an 'atmosphere' of capitalism. The advertising that accompanies the user through much of web life inserts and circulates more than commercial

signifiers among an exposed and largely receptive public. These signifiers are also enmeshed within a whole continuous web of social discourse (narratives) that have embedded the promotion of commodities into the very centre of late capitalist culture. This has the effect of marketising social intercourse generally and making 'promotion' the 'cultural condition' of our time. Drawing from the semiotic works of Baudrillard, Franco Berardi sees this development as the arrival of 'semio-capitalism', a 'capitalism founded on immaterial labor and the explosion of the info-sphere.'[56] Semio-capitalism is perfectly suited to the web. Through it, time and space are digitally infiltrated by the commodity sign of promotion. Berardi again:

> Technological transformations have displaced the focus from the sphere of the production of material goods towards the sphere of semiotic goods: the info-sphere. With this, semio-capital becomes the general form of the economy. The accelerated creation of surplus value depends on the acceleration of the info-sphere. The digitalization of the info-sphere opens the road to this kind of acceleration.[57]

Contrast this with the commodity sign processes of analogue (print media) capitalism. Walter Ong wrote that the word in print media is fixed in time and space—on a page, a billboard, a shop window.[58] We can see it or not, engage with it or not, and it is a matter of chance whether the scattergun release of the print media advertising reaches us or not. Moreover, in print culture, the word is a semi-abstracted and semi-alienated 'thing' that one has to learn and consciously engage with if it is to fulfil its function of knowledge and literacy. Ong also noted that the sign 'releases [the] unheard-of potentials of the word'.[59] This is an important observation. The digitalising of the word and sign, and their insertion and circulation into the web life of the user, means that there is no way of not seeing, no way of not having to engage, if only to delete, and no way to avoid the algorithmic targeting of advertisements through profiles compiled from user history. Literacy with the digital sign, unlike literacy with the printed word, is a form of non-literacy, or illiteracy—in that whereas literacy connotes a form of control over the sign, this is something that digitality does not offer. There is little or no control over the commodity sign within semio-capitalism. It bombards and envelops us. And like the fish in water, we don't know we are wet. There is a learned acceptance of what appears, to unassuming 'digital natives' at least, as the natural state of advertisements at every turn. And this digitally created non-recognition, or non-realisation, is an aspect of our alienation, of our 'relation of relationlessness' with sign and word through digitality. As Berardi puts it, the advertising component of digitality is 'the anthropologically constitutive – and hence insuperable – character of alienation.'[60]

In this context it should be no surprise that we are able to create, and view as relatively unproblematic, a social world where not only are there diminishing spheres that the commodity principle cannot reach, but also that there is

nothing that is not at least in theory vulnerable to commodification. Michael Sandel mused on 'moral limits of the market' in his 2012 book, *What Money Can't Buy*, with a bullet-point list of what it now will. A random selection:

- *A prison cell upgrade: $82 per night*. In Santa Ana, California, and some other cities, nonviolent offenders can pay for better accommodations—a clean, quiet jail cell, away from the cells for nonpaying prisoners …
- *Rent out space on your forehead (or elsewhere on your body) to display commercial advertising: $777*. Air New Zealand hired thirty people to shave their heads and wear temporary tattoos with the slogan "Need a change? Head down to New Zealand."
- *If you are a second grader in an underachieving Dallas school, read a book: $2.* To encourage reading, the schools pay kids for each book they read.[61]

Mutated accumulation has transformed the capitalism of old. It is now a changed organism with an adapted fitness for a new environment. Through digitality, capitalism has the power to colonise the outward and inward physical realms of the world in ways that were impossible under analogue capitalism. And virtual space is an infinite space of accumulation through which capitalism is able to create a space more closely reflecting its logic and needs in ways that a generation ago would have seemed like science fiction. To finish this part, I will consider how the uneven and combined outward–inward–virtual dynamic has re-shaped capitalism's formal and commodity-producing expressions through service, manufacturing and platform capitalism. I will then consider how digital accumulation turns upon its head the logic that David Harvey terms 'accumulation by dispossession'—a classical form of accumulation that we find in the writings of Marx, and also in the metaphor of the 'digital enclosure' put forward by Andrejevic to argue that the classical form had continued into the digital context. What operates now, I suggest, is *dispossession by accumulation*, a far-reaching effect of the mutation of accumulation that renders more problematic than before the exploitative logic of capitalism.

Service, Manufacturing and Platform Capitalism as Regimes of Uneven and Combined Digital Accumulation

Digitality functions and dominates by way of three unevenly-spread articulations of the accumulation logic: service, manufacturing and platform. The first two are digitalised mutations of earlier iterations, and the last is wholly new. However, they all combine through a digital logic that motivates and activates accumulation on an integrating global-networked scale. Service, manufacturing and platform capitalism are networked but are not, of course, completely automated. They are peopled by the workers of the world who function simultaneously as producers and consumers. They more-or-less[62]

suffer the appropriation of their material or immaterial labour *as* producers and consumers—and they experience this appropriation to a greater-or-lesser degree, depending upon the sector they work in and the objective political conditions in the country and economy that is 'their' part of the global digital economy. All, again, more-or-less, inhabit digital–political spaces that are either actively neoliberal or passively market-dependent. This affects how an otherwise generalised and combined process of expropriation occurs in the lives of people where they live. And it produces kaleidoscopic post-modern articulations. So, for example, a manufacturing worker—say, a Foxconn worker making iPhones on a Zhengzhou production line—would have more in common with a platform worker—say a Deliveroo rider in London—by way of levels of exploitation, than each would with a salaried insurance (service) worker with Dai-Ichi Life in Tokyo, or a skilled manufacturing worker in a Boeing hangar in Everett, Washington.

Service capitalism now dominates the Western model of accumulation. Always a large component, it burgeoned to primacy as a restructuring effect of the de-industrialisation process of the 1980s and 1990s. During this period, much manufacturing capacity either vaporised due to exposure to globalised competition or was relocated to zones in Asia or Central or South America. And, like capitalism more broadly, the services sector has become subject to flexibilisation. This has meant adaptation to a more customer-centred environment. There are echoes here of the Web 2.0 strategy discussed earlier, in which the value of 'closeness' with the customer is set at a premium. In the context of the peopled service economy, this evolved into the so-called 'service-product continuum' whereby the consumer *engages* with a service that can be a product, and a product that can also be a service, with either able to be furnished online or offline. It is a business logic that permeates the vast service sector in the advanced economies in health, education, distribution, retail and so on. The establishment (by the business) of a 'relationship' between business and customer is the strategic objective of the service-product continuum, with the chief purpose being the extraction of on-going value from the connection. For example, the purchase of a product such as a holiday, a smartphone, a bunch of flowers, or almost anything, will likely be accompanied by a continuing service connection in the form of loyalty discounts, product upgrades, customer advice services, insurance, warranty options, etc., all designed to bring the customer closer to the business and to insert, as much as possible, a durable and continuing cash-nexus into the relationship. Digitalisation automates and empowers the process and makes more intimate, in a Web 2.0 way, the relationship that the service economy seeks to establish. Moreover, being subject to digitalisation and the forms of expropriation that it brings, the 'relationship' is, by its very nature, instrumental. This is a useful point to consider. From the business perspective, the logic of instrumentalisation would suggest that services should be increasingly digitalised and automated, and spread to wherever possible in order

to save transaction costs and to extract more value. But from the customer perspective, there appear to be limits, at least as far as the service sector goes. The intrinsic value of the person-to-person relationship, be it face-to-face in a physical store or online through a 'customer chat' service, is still considered important by many customers. What this means is that attempts to force through the automation principle through chat bots, through spam mail, or through automated check-outs in stores, check-ins at airports, cashless transactions at point-of-sale, etc., tend to generate customer dissatisfaction and thus far have tended to signal potential lines of resistance to untrammelled automation of the vast service sector.[63] Having said that, the planned implementation of driverless cars and trucks and trains and even aeroplanes, to name just a few of the major service sector industries, indicates that there is no let-up in the automation and roboticisation logic. Nonetheless, service capitalism soaks up the labour of the majority of the working populations of the developed economies and is also a highly digitalised sector that uses the facilitating power of the network to bring worker and customer together within the virtual context of atmospheric or active-direct commodification.

In 2010 China displaced the US as the centre of world manufacturing capacity.[64] This fact is indicative of the classical outward globalisation movement discussed above, but the bigger picture is complex and shifting. Manufacturing evolves and takes differing forms—from electronics to automobiles, and from consumer goods such as fridges to capital goods such as machine and robot manufacture. And the political picture is multifaceted, too. Some countries, such as Germany, are relatively protective of their manufacturing sector.[65] Others, such as the US under the Trump administration, seek a return to a mythical 'golden age' state of strength and vigour based upon that sector. But just-in-time flexibilisation, as with the services sector, has had a generally uniform effect upon manufacturing in terms of the neoliberalisation of its relations of production. Once the leading sector of skilled, secure and rising wages in the developed economies during the post-war 'golden age', manufacturing has undergone a transmutation to become a globalised sector connected by supply chains of pervasive just-in-time processes rationalised through the ideology of 'efficiency' that translates into on-going strategies to automate and/or implement increasing worker flexibility wherever possible. In the space of a couple of decades, manufacturing in the West has become a very different occupation in a very different society. Over roughly the same period, manufacturing arrived in the export processing zones of China, Mexico and elsewhere as a newly-minted neoliberal form, of which its newly-minted manufacturing workers would have had little or no experience. Nor would they have the historically-learned capacity to be able to resist its demands. Using Trotsky's formulation, we can see that such FDI-led manufacturing was able to 'skip' phases of social-political development in many countries that may otherwise have fostered worker class consciousness and the organisations that would reflect it. Moreover, where such organisation tries to emerge, in countries such as China, it was

and continues to be repressed, or else simmers in ongoing conflict between workers and management.[66]

These combined articulations of globalised manufacturing under the neoliberal relations of production were, at least in hindsight, predictable. Once more, this is capitalism doing what capitalism does. Also inevitable in the neoliberalisation and globalisation of the manufacturing sector is a three-decades long stagnancy in working class wages, and not just in the manufacturing sector, but across all economic spheres. The US is seen as the lead indicator here. In 2015 the Economic Policy Institute (EPI) estimated that 'The U.S. middle class had $17,867 less income in 2007 because of the growth of inequality since 1979'.[67] Another EPI Report from 2018 made the same point from a different angle when it noted that : 'A full-time minimum wage worker in 1968 would have earned $20,600 a year (in 2017 dollars) [whereas] a worker paid the federal minimum wage would have only earned $15,080 working full time in 2017.'[68] Moreover, general accumulation for capital is boosted further if it is considered that outsourced and new investment manufacturing capacity in the NICs is predicated upon wage-rates that are even lower. And there is a further business dividend with increases in worker productivity though both labour flexibility and automation—and not just in the US, but wherever manufacturing takes place.[69]

The spectre of automation, as a total solution, looms over manufacturing much more than it does over services. So pervasive and so transformative is the potential effect for capitalism as a whole, that it is difficult to find settled opinion in economic-pundit and investment circles on what it means in terms of jobs lost (and created) due to the excising of the human component in production through automation. This is in the nature of digitality. Moreover, capitalism's transformed relationship with time and space means that predictions of social-economic effects over even five years into the future are fraught. McKinsey Global Institute (MGI), for example, the consultancy firm that advises businesses on investment strategies, published a report in 2017 which found that:

> …half the activities people are paid to do globally could theoretically be automated using currently demonstrated technologies. Very few occupations—less than 5 percent—consist of activities that can be fully automated. However, in about 60 percent of occupations, at least one-third of the constituent activities could be automated, implying substantial workplace transformations and changes for all workers.[70]

The report then goes on to ideologise this fairly neutral phraseology with the kind of confirmation bias that businesses like to hear:

> The relative cost of automation can be modest compared with the value it can create. The types and sizes of investment needed to automate will differ by industry and sector. For example, industries with high capital

> intensity that require substantial hardware solutions to automate and are subject to heavy safety regulation will likely see longer lags between the time of investment and the benefits than sectors where automation will be mostly software based and less capital-intensive. For the former, this will mean a longer journey to breakeven on automation investment. However, our analysis suggests that the business case can be compelling regardless of the degree of capital intensity.[71]

As to effects upon employment, the report adopts a neutral tone again:

> People will need to continue working alongside machines to produce the growth in per capita GDP to which countries around the world aspire. Our productivity estimates assume that people displaced by automation will find other employment.[72]

McKinsey's research is typical of the general trend. Basing their conclusions on little more than recent industrial and economic indicators, and filtering them through a neoliberal discourse that equates new technology, especially automation, with productivity and profitability, economists and consultancies thus prod businesses forward to automate or die. Any secondary externalities, such as job losses, are given short shrift, as in the comment just cited, or are assumed to somehow work themselves out. And so, reading the signals and hearing the discourse, businesses naturally look towards automation as the solution and therefore automate. Aggregated numbers are difficult to find, but the International Federation of Robotics (IFR) estimates that the growth of industrial robots, the kind that are installed in automobile, electronics and white goods assembly lines, has averaged 15% per year over 2006–16, and that 254,000 new machines were installed in 2016. Forward trends suggest that there will be 400,000 installed in 2019—a number not so far short of the current combined US workforce of analogue-age behemoths General Motors (180,000) and General Electric (313,000).[73]

The largest corporation in the world in terms of number of employees is Foxconn, the Chinese-owned maker of electronics, computer chips, and notably the iPhone. Foxconn's 2017 annual report gives the number of its employees as 803,126.[74] Chairman Terry Gou sees his vast workforce as too large for an industry that is the archetype for automation suitability, and was quoted in 2018 as saying, 'If we can't change, we'll be left behind'.[75] However, Foxconn has been at the forefront of automation for some years. In 2016 the BBC reported that it had already 'replaced 60,000 factory workers with robots.'[76] The company is pushing as fast as it can to fulfil its strategic objective to automate as much as of its workforce as possible, with the Chairman seeking to install one million robots in Foxconn factories by 2020, a feat that would make redundant much, if not most, of its current human capital.[77] Whether it will achieve this is a moot point, and earlier targets for automation were not reached. But failure

was not due to lack of will by the company, or to resistance from the Chinese government or worker agitation, but to the simple logistics of finding the right robot for the job. And so Foxconn's quest continues, with the corporation raising four billion dollars in 2018 to fund its next round of automation. We can see that predicting the general direction for the future is a fairly safe bet as far as Foxconn are concerned. And automation will be the future for manufacturing more broadly as the Foxconn's chairman's fear of being 'left behind' asserts itself as the default psychology of the sector.

McKinsey tell us in the quote above that 'in about 60 percent of occupations, at least one-third of [their] constituent activities could be automated'. This indicates that it's not only the low-waged and low-skilled whose working future is under the shadow of the robot, but the high-waged and high-skilled too. The future is here already. Bots now write copy for publications such as Forbes.com and the *Washington Post* (owned by Amazon) where writing, once the task of the journalist in areas such as sports reporting, company earnings statements, weather reports and so on are now routinely generated automatically by an algorithm.[78] And in high schools, universities and in MOOC courses, the automation of many academic tasks such as marking, lectures (through on-demand video) and librarianship (via digital libraries) has been underway for some years. And on YouTube you can watch a robot suturing a grape with all the skill and tenderness of a practiced surgeon.

When they sounded the alarm about the employment dangers of automation, Norbert Wiener and Jacques Ellul could probably have fairly accurately imagined an increasingly automated manufacturing sector such I have just described. Moreover, Wiener was more forthright than the ethics-free McKinsey report. In his 1954 work *Human Use of Human Beings*, he inserted a warning:

> Let us remember that the automatic machine, whatever we think of any feelings it may have or may not have, is the precise economic equivalent of slave labor. Any labor which competes with slave labor must accept the economic conditions of slave labor. It is perfectly clear that this will produce an unemployment situation, in comparison with which the present recession and even the depression of the thirties will seem a pleasant joke.[79]

In the 1950s it would have been difficult for anyone to imagine something like the platform economy. Platform capitalism combines the crudest as well as the most sophisticated forms of human exploitation and accumulation to date. Its app-based logic is able to encompass registers of life that heretofore were outside the scope of where the market could penetrate. Platform capitalism aids new possibilities for exploitation, accumulation and rentierism[80] in wholly new spheres, and so constitutes the leading technological edge of inward globalisation. Platform capitalism is able to draw broad swathes of society into its logic. This includes the unemployed and the under-employed who are transformed

thereby into a precariat dependent upon the app and the contract weighted in favour of the intermediary. I touched on the current manifestations of platform capitalism at the beginning of this book. This was in reference to a report by the Data and Society Institute and its research on the 'algorithmic management' of a highly flexible labour force, and what I referred to as 'automated exploitation'. Here I will look at its cruder, as well as its more sophisticated, aspects in some more detail. In combination, these attributes form the parameters of a new kind of capitalism, a 'new business model'[81] as Nick Srnicek calls it, in that they not only extend the frontiers of accumulation, but also reorient legacy forms of accumulation such as service and manufacturing ever more closely toward the hyper-flexibility and profitability of the platform model. Through platform capitalism, in other words, the mutation of accumulation spreads throughout the whole domain of accumulation in uneven but combined ways.

Platform capitalism is crude in that it disrupts legacy forms of accumulation with rapidly-developed and implemented automaticity that—through the app ecology—leaves existing businesses, legislators and workers little time to reflect on and react to the new facts on the ground. This is the Silicon Valley model, of course, and has its mantra in Mark Zuckerberg's boast that successful businesses such as his have to 'move fast and break things'. We see this in early platform capitalism's ride-sharing company Uber, a company that is claimed to engage in 'regulatory arbitrage', using loopholes in local laws concerning business practices that are ruthlessly exploited through the new capabilities of digital technology.[82] Uber is able to establish a physical–virtual presence by acting as the intermediary between driver and passenger, using its app to dramatically lower the cost of transaction. This is achieved largely through the exploitation of the driver, and by being able to control production inputs, such as vehicle, fuel and maintenance, by loading them on to the driver, and so not having to acquire property rights over those inputs.

The crudity of moving fast to break existing industrial paradigms can perhaps be better illuminated through the use of a metaphor. The platform intermediary may be seen as a hammer shattering a windscreen. The windscreen does not collapse upon impact but turns opaque and is held together by the millions of tiny cracks and fissures themselves. The weak, fragile and fissured windscreen is the platform model, but it stands also for a large part of digital society more broadly. The spaces of its cracks are colonised by networks that insert themselves between the shattered fragments, connecting the fragments yet keeping them apart. Workers are those fragments, isolated from each other yet forming a shattered totality, something whole but broken, something on the brink of collapse, and something unable to be put back together because the impact of the hammer causes an irreversible metamorphosis in the structure as a whole. The social disaster of fragmentation, however, is obscured by the ideology of the hammer-wielder that sees fragmented labour as 'free' labour, individual peer-to-peer actors with 'choice', or as independent contractors who enter freely into an agreement. Indeed, some platform workers even

see themselves as 'entrepreneurs', thereby exhibiting a kind of digital Stockholm syndrome that leads many, no matter how poor and powerless, to identify with a Travis Kalanick, an Elon Musk, or a Peter Thiel.[83]

Platform capitalism is sophisticated in that it is able to draw upon the skills, knowledge and entrepreneurship of a present-day computing culture that is descended from the US military-industrial complex of the 1950s. Today, however, it is a *globalised* culture that has the added ideological advantages of neoliberalism, libertarianism, and a worldwide pool of talent to supercharge this essentially science-based endeavour underpinning accumulation. The US still has many economic and technology-infrastructural advantages: it is the largest economy in the world; it has the deepest concentration of computer R&D in the world; it has some of the largest (and most highly computer-sophisticated) military contractors in the world; and it has some of the biggest, and most largely computer-dependent, financial services in the world with which to fund this activity. However, as the political scientist Daniel Abebe puts it: 'no country's infrastructure is more dependent on computer systems, and thus more vulnerable to attack, than that of the United States'.[84] Accordingly, the US devotes more resources than any other country—more than Russia and China—to R&D to strengthen its cyberwarfare defensive and countermeasure capacities. Digitality thus has the force of a central strategic imperative of the world's most powerful military and economy underpinning it.[85]

Computer R&D evolves in large part through specific political–military considerations—in the US and elsewhere. This has the inevitable effect of ratcheting up the need for ever-more powerful computers and sophisticated applications. And the tech companies are part of this. This may be as a partner in clandestine cyberwarfare in the often-opaque relations[86] that the biggest tech companies preserve with governments; or this may be as victims of hackers stealing their commercial secrets; or as the target of malware attacks for commercial or ideological reasons. Defensive measures, for tech companies and governments, drive the constant need for more sophistication, more computing power. And, as noted, the military–industrial complex is no longer the US-centric culture or discourse that evolved solely to develop computing power to defeat the Cold War enemy. It is now a global culture that sees computing, technical expertise, entrepreneurship, greed, jealousy, fear, paranoia and hubris swirl and interpenetrate between many governmental and private sector entities. This instrumental culture of computation is enhanced by well-established connections in the university system—again not just in the US, but across the major developed economies. For example, university-derived psychological insight into computer-user experience has applications in advertising as much as it does in adopting countermeasures against Islamic jihadists. The lure of government research funding means that many university disciplines will seek to adapt their specialisms to computational 'solutions' to any number of applications. Semiotics, critical thinking, political science, political communication, journalism, media and communications and cultural studies are just some of

the disciplines through which the logic of the digital is now filtered and directed towards economy and society—and then employed in the service of ever more sophisticated means of accumulation.

It is clear that digitality suffuses economy and society from top to bottom: from the traditional sectors of services and manufacturing to the wholly networked sector of the platform. Accumulation is still the original and continuing objective for capitalism. But this is an accumulation logic that has mutated and displays new fitnesses and capacities. This realisation takes us back to the question posed at the beginning of this section: exactly what kind of accumulation is this?

In *The New Imperialism*, David Harvey brought his brand of historical-geographical materialism to bear upon the 'territorial logic' of global capital as it acts in the twenty-first century, with the US being the leading exemplar.[87] Harvey characterises this new logic as 'accumulation by dispossession', and devotes a good deal of his book describing how this unfolds in time and over space. In many ways, as Harvey sees it, accumulation by dispossession is the continuation of the classical process of Marx's 'primitive accumulation' which involves, amongst other things, the removal of peasants from their lands to make way for factories and export processing zones in NICs such as Mexico, China and India; or it involves the destruction of jobs with relative impunity by businesses free to relocate to wherever the highest returns on investment can be made. But for Harvey the new imperialism also incorporates some 'cutting edge' aspects that give the accumulation process 'a wholly new mechanism'.[88] The first is privatisation. This is dispossession by sale of public assets such as water, power, public land, telecoms, government services, and so on. This functioned as the model for significant dispossession in the Anglophone capitalisms. It then grew to become neoliberalism's ideological standard across the world during the 1980s and 1990s.[89] Second was dispossession through the privatisation and marketisation of specific areas of knowledge where it pertains to the commons of bio-heritage, such as through the licensing of genetic materials and the sequencing of the human, animal and plant genomes for commercial purposes.[90] These are certainly 'new mechanisms'; however, they are simply *extensions* of the classical form. What Harvey describes is the *accumulation logic taking the lead*, through what Marx termed the 'antagonistic character of accumulation'.[91] This is capital acting as it has always done, since at least the time of the Industrial Revolution, actively seeking out new spaces for accumulation which have almost always included dispossession of some kind. It is *dispossession through traditional means*, be they ideological or ontological. To his credit, all this is well-documented in *The New Imperialism*, and Harvey accurately reflects the continuing travel of the classical accumulation mode as an aspect of contemporaneous globalisation. And his many readers would have learned much about how accumulation by dispossession, much like the logic underpinning the case of the Enclosure Movement in eighteenth-century Britain, continues today at the human scale and through those remaining material–analogue means.

But Harvey argues that his 'accumulation by dispossession' is the central 'feature of what contemporary capitalism is about'.[92] The use of the term 'contemporary capitalism' in 2005 is suggestive. In a book of political economy and the time–space compression, one would expect that such contemporary analysis would feature a major incorporation of the shaping effects of the networked economy and society.[93] However, it is peculiar that writing over a decade and a half after the publication of *Postmodernity* Harvey still has little or nothing to say about information technologies and their transformative effect upon capitalism and the world more broadly. His use of the term 'imperialism' in the title of the book as its analytical descriptor is also a reminder of his predilection for not going much beyond classical Marx for his theoretical cues. *The New Imperialism* mentions the 'internet' only twice, and in passing; 'communication' is written about in its generic sense; and the term 'digital' does not appear at all. The downgrading of the importance of information technology evidently persists, and so Harvey is able to tell only a part of the story of contemporary capital accumulation. Not only that, he omits the most important—and actually 'contemporary'—part.

Digitality has not only created a form of accumulation that may one day eclipse classical accumulation strategies as the dominant form, but it also *reverses* the classical logic, thus making it truly revolutionary. Under digitality, the accumulation logic does not precede the act of dispossession, but rather *the act of dispossession precedes accumulation*. Dispossession by accumulation functions as a form of dispossession that *has already occurred* through creation of virtual space itself. This is because virtual space is privatised space and was conceived of as such by the owners and controllers of the infrastructural technologies that make networked space possible. It was a commons (or a potential commons) only in the sanguine theories of early techno-utopians such as Howard Rheingold.[94] Dispossession comes first in the networked space, a space born as instrumental and oriented toward accumulation. Such dispossession comes with the potentials of sharing, of commonality, of democracy-building coded out of it, and with the atmospheric or active configurations of commodification coded in.

Coming 'pre-dispossessed' to the space of the network society means that users are already at a disadvantage vis-à-vis the digital sphere. Users come to the space not by 'free' choice, but for a range of more compelling reasons, such as the requirements of work or education, or peer-pressure, a 'fear-of-missing-out' factor that features in many a migration to social media.[95] When users enter the digital sphere, they perforce are dispossessed of the capacities of analogue technique; they are dispossessed through alienation from the analogue world and its analogue essence that they share; are dispossessed by their removal from the analogue human scale of the world; and are dispossessed of the analogue time and space that frames that world. The accumulation logic does not lead, as in the classical model, to the point where capital scours the planet for opportunities for accumulation. Digital accumulation is framed by an *atmosphere*, a logic

that resides inside the virtual space itself, ready and waiting for users who come to it. Consequently, the digital dispossessed will not feel the pangs of dispossession that a peasant farmer would feel as victim of a corporate land-grab, for example. Digital dispossession is of a different order, because digital accumulation represents a new form of capitalism. Digital accumulation is not, therefore, a new 'mechanism'—a telling label employed by Harvey—but a radical coercive force, where its movement and effect, its process and its continuity, to paraphrase Silvia Estévez, are an invisible and magical process of accumulation that we are yet to fully grasp or understand as users.[96]

I have striven to show that the digitalised economy is more than a computer-enhanced process of efficiency for the logic of accumulation, something equivalent to the introduction of the Fordist production line, or the containerisation of the shipping industry. Digitality has given accumulation a capacity and characteristic that is very different from the 'antagonistic' essence, as Marx called it, that was part of its Industrial Age DNA. Accumulation logic has mutated, and through the digital interface has upturned accumulation by dispossession into dispossession by accumulation. This is accumulation almost by stealth through means that obscure the dispossession and disguise the antagonism; accumulation in a context where dispossession has already occurred. Digital technology and digital networks have created an entirely new economic sector, platform capitalism, which represents accumulation at its most exploitative and alienating. Platform capitalism is the model for the future; its techniques are applied wherever possible in service and manufacturing, and digitality has transformed these sectors too. The mutation of accumulation is largely undertheorised and so has evolved largely unnoticed. Partly this is because the influential and Marxism-inspired left, such as Fraser, Harvey and Streeck, fatally weaken what are often penetrating analyses by ignoring the digital. And media theory, a discipline born only relatively recently and with a chip on its shoulder in respect of its intellectual legitimacy, has tended to be inward-looking and legitimacy-seeking, and tends to produce micro-epistemes of theory that achieve little beyond its immediate spheres. Again, much good work is stifled, this time by the lack of an overtly political dimension.

This is a problem, not simply for the left, be it Marxism-inspired or otherwise, but for the project of emancipation itself. An economy that alienates and exploits to the extent that a digitally-powered capitalism does, demands that to be able to resist it, we need first to be able to identify it and theorise it. Digitality is producing a qualitatively different economy, and so we must recognise it as such, and we must prioritise it as such. This means that we must think about political economy in a different way. A mutated form of accumulation that is seemingly non-antagonistic makes for a powerful mode of exploitation. And the double-alienation from analogue technique and the analogue world by digital logic makes recognition of this fact even more difficult. Gramsci's pessimism of the intellect can be a paralysing condition for theorists and for activists, causing them to turn to other fields such as identity politics or media

archaeology. To combat this proclivity we need to remember the ancient powers of reason and of logic when fused with politics. Raymond Williams understood that *more politics* could be the necessary intellectual palliative in the face of seemingly insuperable political problems. In his *Politics and Letters*, he responded to a long question about Dickens's novel *Hard Times* and its context of industrial society with the soul-restoring line:

> however dominant a social system may be, the very meaning of its domination involves a limitation or selection of the activities it covers, so that by definition it cannot exhaust all social experience, which therefore always potentially contains space for alternative acts and alternative intentions which are not yet articulated as a social institution or even project.[97]

The next section on culture and society both illuminates and complicates the problems of digitality. It is necessary to give particular focus to these domains, because the capitalist dynamic involves a relationship between social being and social activity, and consciousness. The current hegemony of digital as vector for globalisation inevitably impinges upon the non-static formations of culture, of politics, and of society more generally. Here there is much darkness, but also light, and so it is to these constituting features of our post-modern time–space that we must turn.

Notes

1 Parisi, Luciana (2016) 'Instrumental Reason, Algorithmic Capitalism, and the Incomputable' in *Alleys of Your Mind: Augmented Intelligence and Its Traumas* edited by Matteo Pasquinelli. University of Lüneburg: meson press, p.125.

2 Leon Trotsky (1930/2008) *The History of the Russian Revolution*. Chicago: Haymarket Books. Vol., p.910.

3 See, for instance, Don Tapscott and Anthony D. Williams's (2013) *Radical Openness* (New York: TED Books). More recent is Klaus Schwab's (2018) *Shaping the Future of the Fourth Industrial Revolution*, (New York: Portfolio).

4 David Harvey (1990) *The Condition of Postmodernity*. Oxford: Blackwell, p.240.

5 Ibid.

6 See p.222.

7 Anthony Giddens (1984) *The Consequences of Modernity*. Stanford: Stanford University Press, p.64.

8 Fredric Jameson (2003) 'The End of Temporality', *Critical Inquiry*, 29(4), 695–718.

[9] Ben Agger (2011) 'iTime: Labor and Life in a Smartphone Era', *Time & Society* 20 (2), 119–136.
[10] Ibid., p.121.
[11] Jacques Ellul (1964*) The Technological Society*. New York: Vintage,, p.135.
[12] Rahel Jaeggi (2014) *Alienation*. New York: Columbia University Press, p.1
[13] Trotsky, *The History of the Russian Revolution*.
[14] See Rudolf Hilferding (1981) *Finance Capital: A Study of the Latest Phase of Capitalist Development*, Morris Watnick and Sam Gordon (trans.), Tom Bottomore (ed.) London: Routledge & Kegan Paul, pp. 322–323.
[15] Leon Trotsky (2007) *The Permanent Revolution*. London: Resistance Books. For Trotsky, socialist revolutions could be successful in countries (such as Russia) that had not undergone a bourgeois revolution, only by the proletariat embarking upon a 'permanent' struggle whereby it carried though the bourgeois phase (of industrialisation) by itself—and also where it would make alliances with worker movements in other countries to avoid the indigenous revolution becoming isolated and deformed (such as happened in Russia in the 1930s).
[16] Leon Trotsky, *The History of the Russian Revolution*, p.5.
[17] David Harvey (1982/2007) *The Limits to Capital*. London: Verso, p.414.
[18] Robert Hassan (2001) Unpublished PhD Thesis, *Globalisation: The Space Economy of Late Capitalism*. University of Melbourne Library.
[19] Fredric Jameson (1996) 'Five Theses on Actually Existing Marxism', *Monthly Review* 47(11), April, p.9.
[20] David Harvey (2005) *The New Imperialism*. New York: Oxford University Press, p.147.
[21] Harvey, *The Condition of Postmodernity*, pp.185–186.
[22] Foreign Direct Investment was globally valued at 54 billion in 1980. Today it is at 1.8 trillion. See World Bank Group website: https://data.worldbank.org/topic/financial-sector
[23] Wang Jisi (1996) 'Civilisations: Clash or Fusion?' *Beijing Review*, January 15–21, pp.8–11.
[24] See Elizabeth Economy (2018) *The Third Revolution: Xi Xinping and the New Chinese State*. New York: Oxford University Press.
[25] Dibesh Anand (2011) *Hindu Nationalism in India and the Politics of Fear*. New York: Palgrave Macmillan.
[26] See Gary Rodan (2018) *Participation Without Democracy: Containing Conflict in Southeast Asia*. Ithaca: Cornell University Press.
[27] Jeffrey Nealon (2012) *Post-Postmodernism, or, the Cultural Logic of Just-in-Time Capitalism*. Stanford: Stanford University Press, p.174.
[28] Costas Lapavitsas (2013) 'The Financialization of Capitalism "Profiting without Producing"' *City*, 17(6), 792–805.
[29] Ibid. p.794.
[30] Laura Lotti (2018) 'Fundamentals of Algorithmic Markets: Liquidity, Contingency and the Incomputability of Exchange', *Philosophy of Technology* 31: 43–58, p.51.

[31] Ibid., p.52.
[32] Ibid.
[33] Ellen Ullman (2018) 'Franken-Algorithms: the deadly consequences of unpredictable code'. Interview in The *Guardian* 30th August. https://www.theguardian.com/technology/2018/aug/29/coding-algorithms-frankenalgos-program-danger
[34] Alexander Munk and Erhan Bayraktar (2017) 'The stock market has about 12 mini flash crashes a day — and we can't prevent them', *Marketwatch*, 31st July. https://www.marketwatch.com/story/the-stock-market-has-about-12-mini-flash-crashes-a-day-and-we-cant-prevent-them-2017-07-31
[35] Jamie Condliffe (2016) 'Algorithms Probably Caused a Flash Crash of the British Pound' *MIT Technology Review*, 7th October. https://www.technologyreview.com/s/602586/algorithms-probably-caused-a-flash-crash-of-the-british-pound/
[36] Nancy Fraser (2017) 'A New Form of Capitalism?' *New Left Review* 106, July-August, p.64.
[37] Ibid., pp. 64–65.
[38] See *World Investment Report* (2018) China is the largest host for FDI (after the United States) see p.4. https://unctad.org/en/PublicationsLibrary/wir2018_en.pdf
[39] Elizabeth Economy makes the point that 'In the third quarter of 2015, China's outbound investment surpassed its inbound investment for the first time'. See her *The Third Revolution*, p.112. Moreover, China's 'Belt and Road Initiative', whereby an estimated $400 billion in infrastructure and economic development in 152 countries (2019) not only provides political and economic leverage over these countries and regions (Europe, Asia, Middle East and Africa) but acts also as an essential outlet for its own domestic capital. See Lily Kuo and Niko Kommenda (2018) 'What is China's Belt and Road Initiative?' *The Guardian Online*, 30th July. https://www.theguardian.com/cities/ng-interactive/2018/jul/30/what-china-belt-road-initiative-silk-road-explainer
[40] Mark Andrejevic (2007) *iSpy: Surveillance and Power in the Interactive Era*. Lawrence, KS: University Press of Kansas, p.2.
[41] Dwayne Winseck (2011) 'The Political Economies of Media and the Transformation of the Global Media Industries' in *Political Economies of Media*, Dwayne Winseck and Dal Yong Jin (eds.) New York: Bloomsbury, p.23.
[42] Tom Devine (2018) *The Scottish Clearances: a History of the Dispossessed 1600 to 1900*. London: Allen Lane.
[43] Eric Hobsbawm (1996) *The Age of Revolution*. London: Weidenfeld & Nicholson, p.153.
[44] Karl Marx (1976) *Capital* Volume 1. Harmondsworth: Penguin, p.915.
[45] Mark Andrejevic (2007) *iSpy: surveillance and power in the Interactive era*, p.8.
[46] Vincent Mosco (1989) *The Pay-per Society: Computers and Communication in the Information Age: Essays in Critical Theory and Public Policy*. Westport: Praeger Publishers.

[47] For an example of the latter, see Howard Rheingold's (2000) *The Virtual Community*: *Homesteading on the Electronic Frontier*. Cambridge, Mass.: MIT Press.

[48] For an excellent analysis of the process of privatisation as it occurred, see Dan Schiller's (2000) *Digital Capitalism*. Cambridge, Mass: MIT Press

[49] Evgeny Morozov (2013) 'The Meme Hustler', *The Baffler*, April. https://thebaffler.com/salvos/the-meme-hustler

[50] Ibid.

[51] Tim O'Reilly (2005) 'What is Web 2.0? Design, Patterns and Business Models for the Next Generation of Software', *O'Reilly Network*, 30th September. http://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html

[52] Ibid.

[53] Morozov, 'The Meme Hustler'.

[54] Steve Jobs (2000) 'Apple's One-Dollar-a-Year Man' [Interview with *Fortune* magazine], *CNN Money*, 24th January. https://money.cnn.com/magazines/fortune/fortune_archive/2000/01/24/272277/

[55] Scott Harper (2017) Castlewood Productions. *You're Soaking in It.* A documentary that looks at the interaction between the semiotics of advertising through algorithmic networks.

[56] Franco Berardi (2008) *Precarious Rhapsody*: *Semiocapitalism and the Pathologies of the Post-Alpha Generation*. New York: Autonomedia, p.108.

[57] Ibid., p.44.

[58] Walter Ong (2002) *Orality and Literacy: the Technologizing of the Word*. London: Routledge.

[59] Ibid., p.73.

[60] Berardi, *Precarious Rhapsody,* p. 104.

[61] Michael Sandel (2012) *What Money Can't Buy*: *The Moral Limits of Markets*. London: Penguin, pp.3–5.

[62] The point is that vis-à-vis the relationship with digital capitalism, today almost everyone confronts it in some way. Some, such as precarious platform workers, are individuated and subjugated to a much greater degree than, say, service workers in the professions, such as in education or health. Platform workers and casualised service workers are generally unorganised or weakly organised as groups and must fight an individual or collective rearguard action against encroaching commercialisation, marketisation and automation of their labour.

[63] Anecdotally, this seems to be changing. Self-check-outs in supermarkets are becoming increasingly popular, especially with younger people. It is the same, to an even greater degree, with cashless purchasing. Card purchases for even small amounts of money are now simple and fast, and often processed without surcharge. Moreover, what Peter Thiel, founder of PayPal, called the 'flinch moment', a psychological stage where a customer who might think twice before handing over a thick wad of notes, is avoided now that she only has to touch a machine with a card for the transaction to be

completed in a second or two. We can see this as another dimension of alienation, where the connection via the analogue human at the check-out, or paper money in the wallet, disappears—and the individual loses another tangible feature of interacting with the world. On 'the flinch moment' see Jacques Peretti (2017) *The Deals that Made the World*. New York: Hodder & Stoughton, p. 177–178.

[64] Marc Levinson (2018) *U.S. Manufacturing in International Perspective*, Congressional Research Service. https://fas.org/sgp/crs/misc/R42135.pdf

[65] German manufacturing has successfully been able both to outsource much capacity to lower waged economies in Europe and Asia, notably China, and to continue to have a strong domestic exporting manufacturing sector, albeit with depressed wage levels. This is especially the case in electronics, with companies such as Siemens, and in car manufacturing through the big brands such as Volkswagen, Audi, Mercedes and BMW. On the relation between outsourcing and the wage levels of non-outsourced German manufacturing from the early 1990s until more recently, see Deborah Goldschmidt and Johannes Schmieder (2017) 'The Rise of Domestic Outsourcing and the Evolution of the German Wage Structure', *The Quarterly Journal of Economics*, 132(3), 1165–1217.

[66] See Jack Qiu (2016) *Goodbye iSlave: A Manifesto for Digital Abolition*. Urbana: University of Illinois Press.

[67] Lawrence Mishel, Elise Gould and Josh Bivens (2015) *Wage Stagnation in Nine Charts*, Economic Policy Institute, p.4. https://www.epi.org/files/2013/wage-stagnation-in-nine-charts.pdf.

[68] Cited in Dominic Rushe (2018) 'Critics fear Amazon's minimum wage hike will distract from its other issues', *The Observer* (London), 7th October: https://www.theguardian.com/us-news/2018/oct/06/critics-fear-amazons-minimum-wage-hike-will-distract-from-its-other-issues

[69] Ibid.

[70] McKinsey Global Institute (2017) 'Harnessing Automation for a Future that Works', p.6. https://www.mckinsey.com/featured-insights/digital-disruption/harnessing-automation-for-a-future-that-works

[71] Ibid., p.7

[72] Ibid., p.9

[73] International Federation of Robotics (IFR) (2016) *World Robotics Report*. https://ifr.org/news/world-robotics-report-2016

[74] See Hon Hai Precision Industry Co., Ltd: Annual Report (2017), p.91. https://www.foxconn.com/Files/annual_rpt_e/2018_annual_rpt_e.pdf

[75] Kensaku Ihara (2018) 'Foxconn plots $4bn automation push as labor costs bite', *Nikkei Asian Review* 24th February. https://asia.nikkei.com/Asia300/Foxconn-plots-4bn-automation-push-as-labor-costs-bite

[76] Jane Wakefield (2016) 'Foxconn replaces 60,000 factory workers with robots', BBC News. https://www.bbc.com/news/technology-36376966

[77] Ziyi Tang and Tripti Lahiri (2018) 'Here's how the plan to replace the humans who make iPhones with bots is going', Quartz, 22nd June. https://qz.com/1312079/iphone-maker-foxconn-is-churning-out-foxbots-to-replace-its-human-workers/

[78] See for example, Lucia Moses (2017) 'The Washington Post's robot reporter has published 850 articles in the past year', *Digiday*, 14th September. https://digiday.com/media/washington-posts-robot-reporter-published-500-articles-last-year/

[79] Norbert Wiener (1954) *The Human Use of Human Beings*. New York: Houghton Mifflin, p.162.

[80] The explosion in the popularity of Airbnb has interesting characteristics that show the extent of the colonisation process that reaches from the poorest person, whose only 'asset' is a spare room in New York, or Barcelona, to rent for a little extra money, to owners of second homes how who are able to make significant rentier income from the Airbnb platform. Both extremes, however, contribute to increasing replacing rental properties by the much more lucrative Airbnb short-term leases, taking previously longer-term leases off the market. Additionally, much of the activity is illegal. See David Wachsmuth, et al. (2018) *'The High Cost of Short-Term Rentals in New York City. A report from the Urban Politics and Governance research group School of Urban Planning McGill University.* https://mcgill.ca/newsroom/files/newsroom/channels/attach/airbnb-report.pdf

[81] Nick Srnicek (2017) *Platform Capitalism*. Cambridge: Polity.

[82] Julia Tomassetti (2016) 'Does Uber Redefine the Firm? The Postindustrial Corporation and Advanced Information Technology', *Indiana Legal Studies Research Paper No. 345.*

[83] Alex Rosenblat (2018) *Uberland: How Algorithms Are Rewriting the Rules of Work*. Oakland: University of California Press, p.85.

[84] Daniel Abebe (2016) 'Cyberwar, International Politics, and Institutional Design', *The University of Chicago Law Review* 83(1), 1–22, p.19.

[85] Ibid., p.16. Abebe makes the point that the US and China have much larger budgets than Russia, but Russia's legacy in computer science research from the USSR means that 'its (Russia's) technological sophistication might make up for its shortfall in resources' (p.18).

[86] For information about the number of data and 'device' requests from the US government complied with by the major tech companies, see, Joon Ian Wong (2016) 'Here's how often Apple, Google, and others handed over data when the US government asked for it', *Quartz*, February. https://qz.com/620423/heres-how-often-apple-google-and-others-handed-over-data-when-the-us-government-asked-for-it/

[87] Harvey, *The New Imperialism*, p.86.

[88] Ibid., pp. 147 & 157.

[89] Nancy Brune, Geoffrey Garrett and Bruce Kogut, (2004) 'The International Monetary Fund and the Global Spread of Privatization', *IMF Staff Papers* 51(2), 195–219

[90] Harvey, *The New Imperialism*, pp.147–148.

[91] Marx, *Capital*, p.799.

[92] Ibid., p.147.

[93] For example, a major underpinning of the 2003 Iraq invasion, which is a prominent concern in Harvey's book, is the so-called 'Rumsfeld Doctrine'. It is not mentioned, and Rumsfeld appears briefly, and only as a member of the neo-conservatives who were keen on the war. Nonetheless, the actual invasion was predicated on Rumsfeld's new vision for warfare, which was centrally dependent upon information technologies and the concept of the time-space compression. In his *Foreign Affairs* essay from 2002, Rumsfeld spelled out that the new US military would be characterised by 'rapidly deployable, fully integrated joint forces, capable of reaching distant theatres quickly and working with our air and sea forces to strike adversaries swiftly and with devastating effect'. See Donald Rumsfeld (2002) 'Transforming the Military: Riding to the Future' *Foreign Affairs* May-June. https://www.foreignaffairs.com/articles/2002-05-01/transforming-military

[94] Howard Rheingold (1993) *The Virtual Community*.

[95] Ursula Oberst et al. (2017) 'Negative Consequences from Heavy Social Networking in Adolescents: The Mediating Role in Fear of Missing Out', *Journal of Adolescence* 55 (February), 51–60.

[96] Silvia Estévez (2009) 'Is Nostalgia Becoming Digital?' *Social Identities*, 15(3), 393–410, p.401.

[97] Raymond Williams (1979) *Politics and Letters*: *Interviews with New Left Review.* London: Verso, p.252.