The Political Economy of Silicon Valley

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Abstract

This paper examines the political economy behind Silicon Valley, used as a metonym for the (predominantly American) high-tech industry. Part One is focused on the past, mapping out the historical context that led to Silicon Valley's ascendance and explaining how it came to be a uniquely American phenomenon. Part Two is focused on the present, considering Silicon Valley's role in the new regime of capital accumulation especially as it pertains to the commodification of information and the attendant impacts of that on labour markets. Particular attention is paid to the negative aspects of Silicon Valley's dominance over global value chains of commodity production in terms of global inequalities. Finally, Part Three is about the future of what Silicon Valley could look like. In response to increased criticism and concern over unethical behaviour by Silicon Valley companies in recent years, various policy proposals have been floated around, along the lines of better regulation or breaking up monopolies. Unfortunately, many of the more mainstream proposals fail to address the root causes of the problems they purport to solve. A more fruitful way of viewing the current conjuncture is as the outcome of a political struggle, whereby technology is developed under a particular balance of class forces; changing the latter, then, can change possibilities for the former. It then closes by proposing a new forward vision, combining theoretical discussions of transcending information capitalism with some practical bright spots around worker power being built within the technology industry.

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Introduction

With news that Apple has recently become the world's first trillion-dollar company (Davies, 2018), and with the same five tech giants on permanent rotation among the top ten companies by stock market capitalisation, it's clear that Silicon Valley - not the geographic region, but the American-centric high tech industry that it represents - has become a crucial fixture in contemporary capitalism. The tech industry has crept up over the last few decades to become "systematically important, much in the same way as finance" (Srnicek, 2016, p5).

Unlike finance, however, the narrative around Silicon Valley is mostly positive, a tale of innovation and creating the future. The goal of this paper is to poke holes in that narrative. What is this tale distracting us from? What's actually happening behind the scenes, behind all the shiny gadgets and lush corporate campuses and billion-dollar valuations?

This paper is an attempt to reground technology in the political economy of its development, with an eye on larger trends and holistic factors. The goal is to draw out the commonalities among companies in order to identify the *sine qua non* of Silicon Valley as it relates to the wider economic system. Insofar as I'll be using examples from specific companies, it will be to illustrate the contours of how technology has enabled a reconfiguration of capital accumulation. I'll mostly focus on the five top tech companies by stock market capitalisation: Apple, Google (Alphabet), Facebook, Microsoft, and Amazon, while recognising these companies own multiple products in different verticals. Occasionally, I'll mention private companies with large valuations, like Uber and Airbnb.

The main perspective undergirding this analysis is, as Streeck (2016) writes on the fundamental insight of political economy, to recognise that the "natural laws of the economy" are really "projections of social-power relations" (p.169). That means a focus on the role of technology within class struggle, as the ascendance of the technology industry has, thus far, been the tale of capital's ascendance over labour. These companies have reconfigured capital flows, extracting wealth from all over the world via invisible value chains of commodity production. While this isn't necessarily new, the rapidity and scale is, and should be cause for concern.

This paper begins with some notes on methodology: how my personal experience in the tech industry shapes my view, and the sources I chose. Part One looks at the historical context; Part Two describes how Silicon Valley works today; Part Three focuses on the future, assessing policy proposals for fixing Silicon Valley's problems.

Ultimately, the goal of this paper is to shift the discourse into a more active register, by advocating for change. To me, Silicon Valley is not merely a subject of quiet study; it is instead the most accelerated component of a broader economic system founded on oppression on a massive scale, and its current wealth derives from maintaining that exploitation in a way that entrenches global inequality. This paper, then, is intended to stake out an opposition. My hope is that illuminating the way wealth extraction works within Silicon Valley will reveal, in stark form, the horrors of the current situation, while also shining a light on the possibility of alternate worlds.

Notes on methodology

My approach is theoretical, uniting varying strands in the relevant literature: media and communication studies; Marxist explorations of the rise of neoliberalism; more mainstream analyses of technology companies; and, most crucially, criticism of technology companies rooted in political economy. It's meant to be a bird's eye view of the landscape, highlighting the shape of the new form of capitalism heralded by Silicon Valley. More specifically, this is meant to be a look at the dark side of the industry and its effects on global capital flows, a side that's not always mentioned in mainstream coverage. Ethical failures, wasted investments, tax avoidance, worker exploitation - all these are linked, and are all part of the story of Silicon Valley.

When it comes to the less critical sources, often coming from industry insiders, I will use them for insight into how the industry works, without relying on their normative judgments - these accounts are often caught up in valorisation of the genius at the top of the industry, and accept the inequality implicit in the status quo. Academic sources, on the other hand, often suffer from being out of date, given how rapidly the field changes and the length of peer review cycles; however, they are useful for understanding the political economic context. Unifying these disparate perspectives, while also guided by a few recent critical publications, is the goal of this paper.

My own perspective is shaped by my own personal experience of having worked in the tech industry. I had been on the path, albeit hesitantly, toward a career as a software engineer at Google before I took a detour into startups as a way to escape what I saw as corporate stultification. It took me a few years to realise that my startup was a false escape, and to consider the possibility that my disillusionment with the tech industry was the result of structural problems with the industry itself.

That was the drive that brought me to this master's program: the desire to understand, from a social scientific perspective, what had gone wrong with the industry I once loved. That personal experience has definitely informed my perspective in this paper, though not in a way conducive to academic citations. I've had to cite some non-academic sources, some by people still in the tech industry who had to publish anonymously out of fear of retaliation. I recognise that this is unorthodox, but given the fast-moving nature of the topic and the way parts of the tech industry are deliberately left opaque to outsiders, it would be difficult to find equivalent academic sources that would advance my argument.

Literature review

Academic research into contemporary technology companies has a short history, simply due to the rapid pace of change within the industry. Still, there has been some strong recent work on the political economy of contemporary tech platforms. Nick Srnicek's *Platform Capitalism* (2016) provides a Marxist exposition of various major tech platforms. Evgeny Morozov's "Socialize the Data Centres!" interview with *New Left Review* (2015) suggests changing the legal status of data. *Ours to Hack and to Own* (2017), edited by Trebor Scholz and Nathan Schneider, explores platform co-operatives and other economic models. Dmitri Kleiner's *The Telekommunist Manifesto* (2010) questions intellectual property conventions in the digital age.

A little older, but with insight into political economy: Yann-Moulier Boutang's *Cognitive Capitalism* (2011), on the structural transformation brought about by intangible-asset-heavy corporations. McKenzie Wark's *A Hacker Manifesto* (2004) is more normative than informative and is somewhat dated, but is still enlightening on how technology companies fit within the transhistorical capitalist system. Wendy Brown's *Undoing the Demos* (2011), the edited collection *Does Capitalism Have A Future?* (2013), and works by Wolfgang Streeck and David Harvey are useful on mapping the contours of neoliberalism.

From a media and communications perspective, Christian Fuchs brings a Marxist lens to the question of digital labour in *Digital Labour and Karl Marx* (2014), *Critical Theory of Communication* (2016) and the collection *Marx in the Age of Digital Capitalism* (2017), co-edited with Vincent Mosco. Mosco's own *The Digital Sublime* (2005) looks at the myth legitimating "cyberspace". The edited collection *The Audience Commodity in a Digital Age* (2014) revisits Dallas Smythe's notion of the audience commodity in light of today's social media platforms. Robert McChesney sheds light on the relationship these platforms and democracy in *Digital Disconnect* (2013). Richard Barbrook and Andy Cameron's 1996 paper "The Californian Ideology" sheds light on the prevailing ideology among certain successful Silicon Valley figures at the time.

In terms of class composition: Trebor Scholz's edited collected *Digital Labor* combines some media and communications perspectives on audience labour with ruminations on labour within the digital age more generally. Nick Dyer-Witheford's *Cyber-Proletariat* (2015) looks at class composition both within and beyond Silicon Valley, with the autonomist Marxist tradition as the theoretical point of departure. Kim Moody's *On New Terrain* (2017) and Beverly J. Silver's *Forces of Labor* (2003) look at class composition more generally, and the edited collection *Choke Points* (2018) features reflections on possibilities for worker disruption in the logistics sector. The online publication *Notes From Below* also features some pieces on worker power specific to the tech industry, occasionally from a first-person perspective.

On surveillance and attention: Yves Citton's *Ecology of Attention* (2017) looks at attention. Shoshanna Zuboff's paper on surveillance capitalism, "Big other" (2015), analyses how our data is used by companies like Facebook and Google.

From an economics lens, Mariana Mazzucato's *The Entrepreneurial State* (2013) provides historical evidence of how the costs of innovation have been borne primarily the state. Haskel and Westlake's *Capitalism Without Capital* (2017) offers a more uncritical perspective on the rise of intangibles.

When it comes to more mainstream accounts of the technology industry (with varying degrees of criticism, but not explicitly grounded in a Marxist framework), I'd be drawing on Alec J. Ross's *Industries of the Future* (2016), Jaron Lanier's *Who Owns the Future?* (2014), Ryan Avent's *The Wealth of Humans* (2016), Tim O'Reilly's *What's The Future?* (2017), Frank Pasquale's *The Black Box Society* (2015), Douglas Rushkoff's *Throwing Rocks at the Google Bus* (2017), Tom Slee's *What's Yours Is Mine* (2017) and Franklin Foer's *World Without Mind* (2017). Antonio Garcia Martinez's *Chaos Monkeys* (2016) offers a first-person account of working at Facebook in its early days. *Platform Revolution* (2016) is more of a business-oriented look at how technology platforms work.

My own paper is taking a wide-angle view of the existing literature, synthesising various different strands, and paying special attention to the topic of class composition.

Part one: The historical context

The first point of emphasis is that Silicon Valley is not simply *sui generis*. Both criticism and praise of Silicon Valley often falls into the trap of treating it as a some sort of parthenogenic phenomenon, disconnected from historical factors and the imperatives of capitalism (Morozov, 2015, p56). The political economy of Silicon Valley includes the broader historical narrative that has shaped its emergence, recognising that seemingly new and unprecedented companies like Google and Facebook are merely a "a deepening and extension of old forms of power" (Mosco, 2005, p83).

In this section, I will set the stage for the ascendance of Silicon Valley through its imbrication with the rise of neoliberalism, which I take to be "ongoing effort [...] to construct a regulatory regime in which the market is the principal means of governance" (Mann, 2013, p148) in order to "restore and consolidate capitalist class power" (Harvey, 2011, p10). We can analyse this along three key dimensions: the economic conditions tipping in favour of capital at the expense of labour; the geopolitical arrangements that maintained US economic dominance; and the ideological aspects that has provided the foundation for private entrepreneurship.

The economic conditions

Financialisation

The end of the post-war golden ages - and the ascent of neoliberalism - is often said to be characterised by a distributional struggle between capital and labour, which was decisively won by capital (Mann, 2013). The outcome has been a switch to post-Fordism at the level of production concomitant with capital seeking out more speculative avenues for return, particularly via intangible assets, to maintain growth (Srnicek, 2016, p6). These symbiotic strands have resulted in an increased financialisation of the economy and the corresponding crushing of organised labour movements in the name of global competitivity.

The first strand, financialisation, is key to understanding the funding structures behind Silicon Valley. The first dotcom bubble was characterised by a period of loose monetary policy in the United States (Srnicek, 2016, p23) - this resulted in a glut of capital, much of which was channeled into technological ventures that claimed to offer high rates of return when interest rates were historically low. Although that bubble has since burst, the same conditions resurfaced soon afterward, leading to the present situation of overstuffed venture capital funds seeking out returns at a time when technology appears to be the only profitable sector. Correspondingly, the ability of technology startups to raise so much private funding - so crucial to the proliferation of Silicon Valley companies - owes to the capital-heavy funding environment created by the financialisation of the economy in recent decades. Much of the money invested by venture capital firms comes either directly from the financial sector, or from more ancillary features of financialisation like pension funds and university endowments (Wiener, 2017)

Beyond private funding, there's the matter of the relationship between Silicon Valley and the stock market. Though many public technology companies are profitable in their right, for many their revenue stream is dwarfed by their outsize stock market capitalisation - the result of investor exuberance when it comes to high-technology stocks. What's more, the top 5 tech giants are all public companies, which means that their financial performance is watched closely by institutional

investors, wielding power over corporate decisions in a way that may be unprecedented in the trajectory of capitalism (Lee, 2014, p177).

Another lens through which to view Silicon Valley is Moulier-Boutang's concept of 'cognitive capitalism' (2012), which he sees as the mutually constitutive relationship between financialisation and the shift towards more intangible assets resulting from an intensification of production of knowledge-based goods. Corporations like Google, Microsoft and Facebook are much more intangible asset-heavy than older industries like manufacturing, and their success stems from the ability of their intangible assets to scale much better than corresponding tangible assets (Haskel and Westlake, 2017, p71). This rise of intangibles is, then, part and parcel of this broader shift towards financialisation, and thus higher returns to capital, resulting from the ability of technology platforms to "de-link ownership of the physical asset from the value it creates" (Parker, Alstyne and Choudary, 2016, p69). Such de-linking is crucial to these corporations' ability to generate massive revenues with comparatively little in terms of physical (tangible) assets.

The rise of intellectual property

Undergirding the shift toward intangibles as part of the rise of neoliberalism, we see the tightening of global regulatory regimes around intellectual property. Though neoliberalism is often thought of as primarily involving deregulation - in terms of liberalising markets - it has also required the strengthening (and creation) of regulation where it would facilitate more opportunities for corporate gain (Mann, 2013, p149). In particular, this means deepening rules around intellectual property, producing a restrictive legal framework of patent and copyright laws explicitly designed to favour corporations, propagated by various trade agreements and global institutions (Standing, 2017, p32). This has occurred primarily at the behest of the nation-states who stand to benefit from it the most, by virtue of having well-developed national innovation systems with plenty of intangible assets to protect (Smith, 2015).

Organised labour

The other main aspect characterising the rise of neoliberalism has been the crushing of organised labour movements in response to the threat that they posed to profitability (Silver, 2016). On the level of production, Harvey's (2011) account of the "spatial fix" and Silver's addition of the "technological fix" (2016) are helpful for understanding the economic imperatives driving the structuring of labour via technology: capital reorganised production, both geographically and within the workplace, so as to suppress the possibility of conflict. Furthermore, technology introduced in the workplace destroyed class cohesiveness by stratifying workers into "skilled" workers who reap higher wages, and "unskilled" workers who are more disposable, undermining solidarity between workers and thus posing a challenge to unionisation (Atkinson, 2015, p94). This weakening of organised labour has been further aided by legislation as well as the tendency of working-class electoral parties to make concessions to capital (Williams and Srnicek, 2016, p20).

The result was the collapse of the organised labour movement the 80s and 90s in the United States in particular (Silver, 2016, p46), though the repercussions have been felt to a lesser extent all over the world. This has had consequences on multiple fronts. Weak labour movements are more susceptible to conceding advantages to capital, and this primarily consists of the increased "flexibility" of labour, moving away from the secure employment model that characterised the Golden Ages and towards leaner business models where more costs of business are borne by workers (Srnicek, 2016, p34). Firms that take advantage of this more flexible labour landscape are

essentially able to "divest themselves of their productive capacity" (Wark, 2004, p32), which means outsourcing actual production in novel ways in order to cut costs.

Another outcome of the weakening of organised labour: the means of *contesting* such a situation are increasingly slipping out of reach. Streeck (2017) describes "a progressive shifting of the arenas of class conflict 'upwards'" (p.10) out of the realm of labour markets themselves, such that labour struggles are determined by capital. The manifestation of this effect in our current era is that such contestation has become technologically mediated, with labour increasingly controlled by algorithmically-determined marketplaces over which workers have little say.

Geopolitical factors

Another important dimension of this story is geopolitical. It's no accident that Silicon Valley is a uniquely *American* phenomenon, with the top 5 giants started and headquartered in the US and initially funded by US-based investors. The US military played a key role in driving some of the research and innovation that Silicon Valley companies have capitalised on, and many of these companies continue to enjoy close relations with various arms of the US government (Morozov, 2015, p62; McChesney, 2018, p16).

More generally, beyond the direct angle of military investment - though linked - is the phenomenon of US economic superiority at the end of the 20th century in the first place, stemming from its central role in the Bretton Woods system that underpinned the postwar Golden Ages (Mann, 2013, p114). The result is a global economic system which enshrines the structural power of both the American state and American capital (Gindin, 2011, p109), reinforcing the increasingly unassailable political economic domination of the U.S. The story of Google's founding is illustrative: not was it started as an outgrowth of research at Stanford University, but the first fundraising check was provided by a Silicon Valley venture capitalist. Such fortuitous geography indicates the physical concentration of the U.S. academic-military-industrial complex (Lee, 2014, p190). In fact, Stanford itself materially benefits from the success of companies like Google through its patents over campus inventions, in a positive feedback loop (Stolzoff, 2017).

Another geographic consideration is within the United States itself. In the case of Silicon Valley companies that are disrupting the media industry, the flexible labour arrangements that contributed to their success must be considered against the backdrop of the heavily unionised footholds of the old media sectors, especially on the East Coast (Press, 2018); correspondingly, the birth of so many tech companies on the West Coast can partly be seen as owing to their evasion of the union structures out east. The ability of Silicon Companies to rely on nonstandard work arrangements using digital technology is key to their business models (Ross, 2012, p23), and this should be seen through the lens of the historical geographical dispersion of unionisation.

More broadly, since the collapse of Bretton Woods in 1971, the geopolitical stage has been characterised by a detente whereby nation-states are unwilling or unable to effectively challenge power of global capital (Streeck, 2017, p166). This appears in the form of a crisis of national sovereignty, whereby meaningful control over national economies has been ceded to the global capitalist class (Appadurai, 2017, p2). Simultaneously, transnational corporations - massively centralised hierarchical systems - have crept over the world without democratic assent (Hughes, 2016, p263). Increasingly, the largest of these companies are coming to resemble nation-states in appearance and scope (Parker, Alstyne and Choudary, 2016, p159).

Ideological factors

Finally, the prevailing ideology among successful founders and investors in Silicon Valley is important to consider. Overwhelmingly aligned with neoliberal subjectivity, the dominant ideology combines the glorification of personal liberty with a pro-market stance. Barbrook and Cameron (1996) described this as the "Californian ideology": deregulated markets and over-empowered corporations in the guise of "freedom" - but, at Mosco (2005) writes, such freedom is "the freedom to choose after all the major political, economic, and social decisions have already been made." (p.60) In practice, this means favourising privatisation; in conjunction with advances in information technology, the outcome is the transfer of power from the public to the private sector (Mosco, 2005, p43).

Another ideological component is the primacy of a rising consumer subjectivity. The explosion of consumer goods with the onset of neoliberalism has reshaped the way people view the world: the idea of public services pale in comparison to their privatised counterparts, shifting one's identity from citizen to *consumer* (Streeck, 2016). Correspondingly, the rise of private services like Google and Facebook - which, in an earlier era, would have existed as public infrastructure - feels unproblematic in an era typified by a lack of outcry to the continued commodification of information.

Part two: the present conjuncture

This leads us to the present conjecture. The overarching economic picture of Silicon Valley is that of a new stage of capitalism, characterised by use of digital technology to facilitate capital accumulate through the commodification of information and its derivatives. I will be mainly guided by several threads in the literature with slightly different, though overlapping, perspectives: Srnicek's (2016) notion of 'platform capitalism'; Moulier-Boutang's (2011) 'cognitive capitalism'; Wark's (2004) description of the 'vectoralist class'.

Starting with a bird's eye view, I will describe the new regime of capital accumulation as it functions on the digital terrain. Then, I will look at how Silicon Valley has led to or sped up the reconceptualisation of labour around the world - for the benefit of corporations' profit margins, and to the detriment of most workers. Finally, I will explore how "innovation" - that much-vaunted justification for Silicon Valley's excesses - actually functions today, and how it's sheared from socially useful purposes due to warped structural incentives.

From the perspective of political economy, the predominant business strategy within Silicon Valley is the continual commodification of the digital domain. Mosco (2005) writes that the modern Internet is defined by "the mutual constitution of digitization and commodification" (p156), whereby the flow of information is captured then subject to measurement and monitoring in order to produce exchange value. This represents the logical extension of neoliberal principles into the digital age. Technological advances have allowed capital to refigure circulation such that rent becomes more crucial than surplus value (Weatherby, 2017) - instead of producing *new* value, these companies merely manage access to information, charging arbitrary rents for their use while also amassing massive amounts of cultural power (Foer, 2017, p82).

My goal is to counter the positive narratives around Silicon Valley with an expressly critical one. Accounts of the Internet's inherent decentralising, democratising or openness-generating capabilities are distractions from the monopolised, undemocratic and corporate-driven extraction game that the Internet has actually become. Claims of the Internet's "democratising" powers never extend to the economic realm; any such "democracy" in terms of access is overshadowed by the lack of democracy in terms of income, ownership, or control (Schneider, 2017, p129).

Capital accumulation in the information era

No story of the information era is complete without mentioning capitalism. The Internet - the medium that has facilitated the spread of information at an enormous scale - has been turned into another site for the capital accumulation process (McChesney, 2013, p97). This stage of capitalism - defined here as the drive for the "endless accumulation of capital" (Wallerstein, 2013, p10) - can be seen through the lens of world-systems theory as the latest external (if virtual) area to be "incorporated and turned into the periphery of the system" (Collins, 2013, p57). This could also be seen as the expressing of financialisation in the digital domain, which "calls for the creation of new enclosures by means of new property rights" (Moulier-Boutang, 2012, p146).

What's special about the digital frontier is how it enables even more profitable forms of dispossession and commodification. Wark (2004) elaborates: by aggregating digital content - often freely provided by users - and charging for access to them (either directly, or via advertising), these companies are profiting from selling back to the producing classes "its own subjectivity in

commodified form" (p.170); in short, selling them their own souls (p.312). The strategy is to own the platform which controls content in order to extract rent, all while shedding the responsibility to actually *maintain* the means of production. As Srnicek (2016) writes: "These platforms operate through a hyper-outsourced model, whereby workers are outsourced, fixed capital is outsourced, maintenance costs are outsourced, and training is outsourced." (p.76)

Consider, for instance, the "sharing" and "gig" economies. Often marketed as tools for "liberation", they are more accurately characterised as tools for survival for workers who need to sell their labour or rent out rooms in an era of general precarity (Srnicek, 2016, p36). Apps like Uber and Airbnb are merely digital conduits for neoliberalism, whereby goods and services flow freely in unregulated markets (Ross, 2016, p92) - markets which were themselves created by technology extending commodity logic into new areas of our lives (Slee, 2017, p19). These platforms use technology to engage in regulatory arbitrage to pay less in taxes and labour costs (Slee, 2017, p11) while skimming off the top of every transaction by virtue of their status as gateways to these goods and services. In the case of Airbnb in particular, since it's about seeking rent from owned capital (housing), the inevitable outcome is a compounding concentration of capital due to the unequal distribution of home ownership and ability to rent it out.

Or consider the advertising engines within Facebook and Google that are responsible for most of their revenues. If we view consumption as a structure (Baudrillard, 1998), advertising is a way for commodity-dispensing firms to have control over demand for their product. The need, then, is to inflate demand of their product in order to boost profits. As we live in an era in which consumption is detached from actual material need (Streeck, 2016, p65), advertising is the means by which consumers are convinced to discover new, virtual needs, beyond what is needed for material subsistence (Streeck, 2016, p210).

This is the landscape upon which digital advertising platforms like Facebook and Google have descended. Responding to other corporations' willingness to invest substantial resources to activate potential customers' desire to consume, these platforms commodify the information that users freely provide via surveillance and use this data to turbocharge advertising's ability to stimulate demand (Foer, 2017, p187; Fisher, 2017, p198; Zuboff, 2015). Even if it doesn't work on everyone, and even if billions of dollars are siphoned by click farm operators who conduct ad fraud (Rushkoff, 2017, p36), this does inflate consumption on aggregate (Andrejevic, 2014, p195).

On one level, this is wasteful because it produces an attention arms race (Citton, 2017, p58) whereby these companies are "investing ever greater resources into the machinery of attention attraction" to stave off dissatisfaction by consumers. It also means that the very technology itself is infested by commodity logic, directing attention according to what would maximise financial returns (Citton, 2017, p73). The most notable way in which this seeps into the culture of these platforms is through the phenomenon of "influencer marketing", whereby even putatively non-advertising content is meant to advertise goods by association with particular lifestyles (Jhally, 2014, p107); this is especially common on Google's YouTube and Facebook's Instagram.

A more pressing consideration is where these companies' revenues actually come from. As Bickerton (2015) writes, the advertising expenditures of other firms is a function of "the surplus extracted from workers who produce 'actual things'" (p147). This means that their profits originate from "the work done by the workers in the global fields and factories, who are producing the commodities being advertised" (Kleiner, 2017, p65). Even this new information-based regime of accumulation couldn't exist without the "world of material production" underneath (Moulier-Boutang, 2012, p48), and the massive wealth accumulated by these gateways to digital

advertising is directly linked to deepened intensification of work simultaneously with decreased profits further down the value chain (Ross, 2012, p28; Parker, Alstyne and Choudary, 2016, p208). This has implications for what could be a more equitable distribution of their profits.

More generally, tertiary industries like the tech industry are only made possible by the technological infrastructure underpinning their existence. The highly-paid software engineers, executives and investors so commonly taken as representative with Silicon Valley owe their income to the workers below them in the value chain, from coltan miners in the Congo, to hardware assemblers at Foxconn factories in China, to service workers in their own companies - all of whom take home a much smaller share of the pie (Fuchs, 2016, p61).

Seen in that light, the political economy of Silicon Valley starts to look a lot more sinister - a lot like neo-imperialism. Rather than physical territorial intervention, platform-style imperialism is virtual, enabled by technology and mediated by capital flows whereby rent is extracted at various points of global value chains and ends up in the pockets of a few US-based corporations (Yong Jin, 2017, p337). The manner of this is not uniform - gig economy apps like Uber have different dynamics than sharing economy apps like Airbnb, both of which are entirely separate to retail platforms like Amazon or digital advertising companies like Facebook and Google - but the main outcome is that revenue is redirected away from labour and instead siphoned off by Silicon Valley. The Internet is, then, a new digital territory on which to carry out the spirit of colonialism (Rushkoff, 2017, p.136).

Finally, the tech giants owe part of their wealth to their participation in quite brazen schemes for avoiding taxes, including the case of Apple claiming its headquarters are worth $200 (Ho, 2018). This stems from their use of immaterial assets, which are more internationally mobile and thus harder to tax than the fixed assets that characterise older industries (Haskel and Westlake, 2017, p140; Zucman, 2017). This both starves public coffers of tax revenue while leaving them with massive cash hoards that they can then use for investing in R&D, or buying up startups (Srnicek, 2016, p32).

The new terrain of labour

This has outcomes for labour. Those unable to work with these new technologies often find their job prospects dwindling. The gig economy, in particular, functions as the apotheosis of labour markets under neoliberalism: everyone becomes an entrepreneur of the self, more and more atomised and precarious (Brown, 2015). This is most salient in the case of microwork platforms like Amazon Mechanical Turk, which uses technology to organise and distribute fragmented tasks among workers all while providing them pitiful remuneration outside of any sort of employment relationship (Aytes, 2012, p93); this effectively constitutes an industrial reserve army of labour, with the digital gateway provided by Amazon.

This phenomenon is entwined with the changes in capital accumulation outlined in the previous sections: new technologies enable corporations to turn "lean" by "outsourcing" responsibilities in various novel forms. By exposing their workers to the vicissitudes of the market, they minimise their own risks and abdicate their responsibility to provide for them even as they continue to make money off their work (Lordon, 2014, p57; Liu, 2017a). This is made possible by technologies that facilitate increased monitoring of workers, which has shifted boundaries of the firm (Avent, 2017, p102); enough information about worker efficiency - often provided by an always-on smartphone

app - allows corporations to offload work to contractors as opposed to making them employees in line with Coasean theories of the firm (Rogers, 2018).

Ultimately, this stems from a fundamental power asymmetry, with the platform able to arbitrarily set terms for both workers and customers. This belies the story these companies like to tell about themselves, where they emphasise flexibility and opportunity for workers, and convenience for customers. Uber, for instance, takes advantage of their drivers' economic dependence by imposing strenuous rules (Slee, 2017, p67), cutting their wages (Dubal, 2018), and surveilling their labour in order to train algorithms to automate their jobs away (Avent, 2017, p52). What's more, they save on management costs by outsourcing part of the disciplinary process to customers, whom they ask to "police the quality of their service" (O'Reilly, 2018, p94), with the implicit threat of job loss and thus material deprivation if they fail to consistently impress (Slee, 2017, p87). Consequently, these workers find themselves "below the API" (Greenfield, 2017, p196), reduced to bargaining with the algorithms that surveil them.

This pattern is even more prominent among content platforms - platform owners have gatekeeper power that they are structurally incentivised to exercise in a way that is disadvantageous to content creators (Hu, 2018). Video platforms like Twitch (owned by Amazon) and YouTube offload the process of creating content to un-salaried and un-unionised individuals who behave as micro-entrepreneurs, many of whom are in a constant state of anxiety over their income prospects (Stokel-Walker, 2018). The platform, of course, doesn't assume any of the risks associated with producing content even as it makes money from it, by virtue of being the gatekeeper - a "profoundly asymmetrical deal" (Ross, 2012, p16). Following Aytes (2012), we can see this as labour arbitrage in pursuit of higher profits: an attempt to break apart the "relationship between the national labor legislations and the worker as citizen" (p91), using technology to deterritorialise labour in order to make it more flexible and disciplined.

Whether this should actually be thought of as labour - a controversial topic (Srnicek, 2016; Fuchs, 2017, p53) - is immaterial, in a sense. The point is the ones who control the network are well-placed to reap the massive rewards while excluding anyone else who might have a claim to it. When Instagram sold to Facebook for $1 billion, it only had 13 employees; but that should be seen as the outcome of labour arbitrage, as all the people contributing content were not directly employed or even paid at all (Lanier, 2014, p2). Similarly, consider the example of Airbnb, which has more available rooms than most hotel groups but fewer employees (O'Reilly, 2018, p10): this is made possible by shifting tasks like cleaning and checking in guests to contractors, instead of hiring salaried staff.

We should also consider the effects that the tech industry has had on other industries, like journalism. Foer (2017) characterises journalism as being in "a state of abject financial dependence on tech companies", the result of having to pander to Google's and Facebook's algorithms since so much traffic flows through those sources (p6). The field has also been losing money: "Between 2006 and 2017, advertiser spending on newspapers dropped by nearly 75 percent, with most of that money redirected to Facebook and Google" (Foer, 2017, p211). As publications themselves get an ever-shrinking portion of total advertising expenditures, Google and Facebook take more - but they are not using that money to reinvest in journalism (McChesney, 2018, p18). The journalism profession has dwindled in recent years,with mass layoffs, while also losing editorial freedom due to the power of Facebook and Google.

Within the tech industry itself, class composition is entirely novel in some ways while also being reminiscent of older industries in others. Overall, it's characterised by more autonomy than most

traditional industries, due to its reliance on creativity for the production of intangible assets: "capital has had to grant some concessions in order to guarantee a supply of cognitive skills" (Ross, 2012, p27). This means that disciplinary mechanisms are weaker, or at least more subtle, for these workers.

The industry is not uniform, though. Those near the point of production - software engineers, product managers, designers with sought-after skills - are showered with lavish benefits and often paid in stock as well as cash (Liu, 2018d). Those considered less crucial to production, and thus more dispensable, are placed on precarious contracts and compensated comparatively poorly (Liu, 2018b). One reason behind this drive to bifurcate labour has to do with financialisation, especially for public companies facing shareholder pressure to cut wages (O'Reilly, 2018, p247); after all, CEOs are legally obligated to focus on the short-term bottom line in order to maximise quarterly returns (Rushkoff, 2017, p118). Another reason is the containment of labour, by stratifying into high- and low- paid work in a way reminiscent of the Toyotist model in the auto industry, which relied on "extensive use of temporary workers to limit the total number of their higher-paid workers and keep up hopes among the lower-paid workers that they will be selected to move into the higher-paid group" (Parker, 2017, p193). Such a measure, then, is as much a disciplinary and repressive strategy as much as it is a cost-saving one.

The new "innovation"

Finally, we will consider how technological innovation is carried out within Silicon Valley. Due to the funding environment - whereby overaccumulation has led to a surplus of capital looking for outlets - Silicon Valley is filled with corporations with excessively high valuations, incommensurate with the social value of what they're produced, and sometimes even disproportionate with potential revenues (Liu, 2017b). These dynamics tend to select for good marketing over genuine technical innovation, meaning that the majority of products created are not about responding to actual needs, but instead are products that need to create their own market (Harvey, 2017, p125).

Part of the problem is the venture capital model itself, which generally works with 7-10 time-spans and thus forces founders to aim for an "exit" - either an IPO or an acquisition - within that timeframe (O'Reilly, 2018, p283). The model also expects that most investments will fail outright, which means that the remaining few need to aim big, creating a go-big-or-go-home mentality where only the most outlandish schemes get funded (Schneider and Scholz, 2017, p34; Paley, 2017; Cutler, 2018). In short, structural incentives are not aligned with creating socially useful products; instead, it's about "massive growth above all else" (Rushkoff, 2017, p187).

Compounding this situation is the presence of the tech giants, all of whom have the resources to acquire promising new startups (and sometimes via debt-leveraged buyouts, for tax purposes). This changes the psychological dynamics for founders, producing an environment where many startup founders get to fail "upward" and secure a job with a nice bonus even if their startup fails (Liu, 2018d). In such an environment, there's little point trying to create something truly revolutionary or useful; instead, the safer bet is to produce a fairly useless product - even without a real business model - and gain some traction among users in order to get acquired (Pasquale, 2015, p141). The startup scene in Silicon Valley now largely resembles "the field offices of a large distributed workforce assembled by venture capitalists … doing low-overhead, low-risk R&D for five corporate giants" (Payne, 2013). In practice, startups are very unlikely to ever get big enough to

truly displace any of the tech giants, and this grows increasingly true as the latter get more powerful. The possibility of competition to dislodge monopolistic behaviour is largely a farce.

Part three: Looking ahead

In this section, I'd like to sketch out some potential futures for Silicon Valley, by assessing the feasibility of various policy proposals in the existing discourse around addressing some of the problems raised by Silicon Valley's effects on the world. I place these proposals in one of two categories: superficial reforms that would leave the present concentration of power intact, and deeper changes aimed at structural transformation. The latter are more promising, though they tend to favour technocratic policy-driven approaches over worker self-determination and so run the risk of being reformist rather than truly transformative.

Finally, I will propose a new framing, one that draws on the historical role of technology under capitalism and thus treats Silicon Valley not as an unprecedented and *sui generis* phenomenon but rather as the vanguard of capital within the latest stage of capitalism. While the technologies involved may present new challenges and problems, the solutions must be rooted in a historical understanding of class struggle, and must involve pushing back the power of capital on this latest battlefield.

Preserving the concentration of power

More ethical founders and investors

There seems to be a common idea that the people currently in positions of power in the industry are best placed to fix it (Sauter, 2017; Tarnoff and Weigel, 2018). This is, of course, a narrative spearheaded by those who would benefit from it, and so should be viewed with suspicion. More concerningly, such an approach neglects the structural factors that led to the way things are now. The financial incentives of the system will overwhelmingly result in ethics being overlooked for the sake of profit, and so larger-scale behaviour, beyond that of a few founders or investors who manage to resist such pressures, can only be changed by changing the system.

More taxation

A common proposal when it comes to the tech giants' propensity for tax avoidance is to tax them based on sales, rather than in the jurisdiction where they allocate their immaterial assets (Zucman, 2017). Although this would be an improvement in ability to collect taxes, it is not enough on its own to curb the economic, social and political power these platforms will continue to accrue. Such a proposal is an example of what Fraser (2004) would call an "affirmative" strategy, and is incapable of addressing global inequality - it would affirm these companies' positions at the top of the value chain and preserve their ability to benefit from cost or regulatory arbitrage when it comes to overseas labour (Anonymous, 2018a), while leaving intact the neocolonial structure of exploitation underneath. The largest economies (most notably the US) would benefit the most from such a scheme, which would entrench inequality between nations while also reifying the boundaries of the nation-state in a potentially dangerous way.

Consumer boycotts

Though this would theoretically undercut these corporations' power, this is unlikely to work on platforms that approach monopoly status (O'Brien, 2018b). It's especially tricky for advertising-fueled companies like Facebook and Google - for one, consumers aren't the real customers, advertisers are, and individual users have very little power (Ceglowski, 2017, p59). It's also difficult for people to stop using these platforms in any case, as they'll suffer social disadvantages (Fuchs, 2013, p90; Ekman, 2017, p125). Plus, these companies own many other platforms besides their core product - some of which most of the public does not know they own - and have become so deeply imbricated in the digital advertising ecosystem that it's not always possible to know what publishers and platforms to boycott in the first place. Ad-blocking as a mechanism for boycotting these platforms has had some limited success, but is incapable of posing a threat at scale. For one, it doesn't work on mobile phones, which account for a large proportion of ad views. For another, ad-blocking extensions that get too popular have faced pushback from Facebook and Google, and these two have the resources to win any arms race in order to circumvent the blocking if necessary, either through engineering around it or simply buying them out (Murphy, 2016; Pangburn, 2017).

Collecting micropayments

This is an idea proposed by Jaron Lanier (2014) as a potential solution to the hollowing-out of the middle class, which he sees as linked to the rise of digital advertising. Lanier suggests an even deeper commodification of our personal data, such that corporations would have to pay us for the ability to access our data in order to show us advertising. Notwithstanding the technical barriers to such a system - of which there are many - this proposed deepening of markets into the realm of information would do little to rectify inequality, and, as Morozov (2015) writes, "would produce a human landscape worse even than the current neoliberal subjectivity" (p.65). Those who have more valuable data, by virtue of having greater spending power, would either receive greater dividends or would be able to afford privacy, while less wealthy individuals would stand to benefit much less (Srnicek, 2018). The drive behind this proposal appears to be an attempt to extend the commodity form to the domain of personal data, whereas a better alternative would be, as Fuchs (2013) writes, "the creation of non-commercial non-profit alternatives that altogether escape ... the commodity form" (p89).

Better privacy regulation

Such an individualised framing does not address the deeper economic factors, as it considers privacy in terms of personal choice while overlooking how "information has become the *private* property of the commercial entities" (Andrejevic, 2012, p150). Recent privacy regulation like GDPR has done little to disrupt the power of behemoths like Google and Facebook, while potentially making things more difficult for smaller organisations with the added regulatory burden.

Structural transformations

Breaking up monopolies

Antitrust law fails when it comes to tech giants; it typically looks at impact on consumers through price-fixing, which doesn't make sense in this digital age when products are often free (O'Brien, 2018). Monopolies may also pose a threat in terms of poor working conditions - workers at Amazon

warehouses, for example, have no job security, few benefits, little prospect for job advancement and barely any autonomy (Greenfield, 2017, p195). In light of that, a better framework for assessing monopolistic threats is to look at power and ability for others to compete. Still, though, recognising monopolistic tendencies isn't necessarily enough; the typical policy response would be to break them up, but that doesn't make sense from a consumer perspective when some of these platforms are natural monopolies whose services are improved with more data (Morozov, 2015, p60). It also doesn't make sense from a labour perspective, as breaking them up wouldn't necessarily balance out the power between workers and businesses; it would mean more choice over whom to sell labour to without guaranteeing better conditions or a larger share of the profits (O'Brien, 2018a).

Nationalising

A more radical alternative to simply breaking up monopolies is to nationalise or municipalise them, recognising that they are natural monopolies that should be treated as infrastructure (Liu, 2018a). McChesney (2018) describes this as taking these platforms "out of the capital-accumulation process" and instead setting them up with "independent, nonprofit, noncommercial concerns" (p.31). Though this avenue is promising, there are many open questions around how this could actually be done for these particular technology platforms. For one, how do you nationalise something so lacking in geographic fixity - based on immaterial assets like software and data - and does it even make sense to draw national borders around something not physically hampered by borders? Would it require eminent domain, or would shareholders have to be paid an (inflated) price, and either way, what government is capable of doing this? In any case, who would take over their maintenance? These companies are complex organisations that require lots of worker coordination to keep things working.

Srnicek (2016) expands on the concept of nationalising by suggesting the development of public platforms, independent of the surveillance state apparatus. This is great in theory, but investing in building the technology seems wasteful when it exists already, and not every nation has the resources to do this on its own; ideally, there would be international cooperation among developing these alternatives, making use of existing technologies.

Platform co-ops

This idea suffers from similar flaws to the above. Unless they're publicly funded by a well-resourced government, it's hard to see how they'd get enough funding to compete with private alternatives (Fuchs, 2013, p302). Plus, co-ops are often subject to pressures to exploit their own workers in order to remain competitive, though this could be ameliorated with solved with government support in banning private competitors, which has happened before (Ackerman, 2015). On the other hand, the idea of a technology platform being owned by a for-profit company - even a co-op - feels suboptimal. In the case of Facebook and Google, given that their profits are rent extracted from workers who produce the actual commodities being advertised, it's hard to see how any reasonable co-op structure would rectify that source of global inequality.

Zooming out

The main shortcoming of the more mainstream proposals comes from their tendency to treat Silicon Valley as if it will always exist, rather than recognising how contingent it is upon the political

landscape. Calls to tax Silicon Valley more, or for more 'ethical' behaviour, or better regulation all suffer from the same inability to imagine a world *without* Silicon Valley - a world without this American nexus of wealth and power resulting from a successful colonisation of the world carved out by information technology. But perhaps it is precisely the abolition of Silicon Valley that we need.

This means going beyond compromise positions that cede ground to capital by assuming that only corporations can be successful stewards of the technologies they make money from - as if it's a choice between innovation on capital's terms, or no innovation at all. This is a false dichotomy that these corporations themselves love to use when it suits them, in order to justify the status quo. This is clearly not even true given the level of state involvement in pioneering some of these technologies (Mazzucato, 2013), and in any case does not need to be true in the future.

The alternative, then, is to reassert the importance of the political. As Siva Vaidhyanathan writes of Facebook, "we can't depend on market forces to rein in Facebook's destructive power"; we need, instead, "a global political movement" (2018). In particular, that means eschewing individualist approaches that rely on 'ethical' founders or investors to change the system from within, in favour of collective action to change it from without. After all, structural problems require structural solutions.

That doesn't mean treating every corporation the same - it'll be necessary to come up with a specific approach for each. Still, there are some general changes that can be implemented more structurally, along three main fronts.

The first is in the domain of intellectual property rights, recognising that the current global regime is intended to protect the capability of corporations to secure profits by commodifying information. This only serves corporations, while "potential benefits of free information are subordinated" to their interests (Wark, 2004, p132). The whole point of information technology is that it opens up new possibilities, as Wark (2012) writes: "not to liberalize intellectual property but to conceive of the world without it altogether" (p.71). In short, that means recovering the information commons - decommodifying information, which, uniquely, has the ability to "escape the commodify form altogether" (Wark, 2004, p253) - using the lever of government policy.

This is not unprecedented. Technology companies like Microsoft and Google - even if they're now happy to support IP laws that redound to their benefit - only got to their current dominance by violating (or liberally interpreting) these laws when it suited them (Standing, 2017, p32). The technologies they rely on, and have helped build, are able to let us transcend these laws (Doctorow, 2008). After all, the commodification of information occurred by the extension of existing property relations to the digital realm (Andrejevic, 2012, p157). Information goods are, in economics terms, both non-rival and non-exclusionary, and the marketplace that currently exists was only made possible by direct government intervention through the creation of a particular regulatory regime (McChesney, 2013, p78).

Challenging this requires seeing intellectual property as merely the latest battleground of a centuries-old stories of dispossession via property rights in order to facilitate capital accumulation (Liu, 2018d). The current regime, especially around data (Morozov, 2015, p64) is what underpins these tech giants' dominance, which entails restricting the power of the technology that makes these companies possible in the first place. The relations of production have hardened, suffocating the technology underneath. Loosening intellectual property laws really means breaking technology outside the confines of the for-profit corporation, treating information as something that is "not

scarce and has no owners" (Wark, 2012, p71). This is definitely a political struggle; though open source and other commons-based movements have the *potential* to break corporations hold over intellectual property, the "flimsy grounds" upon which they've reaped such lucrative profits by extracting rent unhindered do not mean they'll simply give up once revealed (Fleming, 2017, p50). And this has to be a structural change, not an individual one, to handle the countervailing forces (Liu, 2018d).

The second involves revisiting the funding model that gave rise to the fundraising culture responsible for producing so many wasteful startups. After all, the main barrier to innovation is often not the technology itself, as advances in technology have made building new products easier; instead, the main barrier is access to finance (Martin, 2017, p188). The ideal would be to shift away from the return-driven venture capital model and toward a state-backed model of social entrepreneurship with the intent to create a public service (Mazzucato, 2013). Funding more co-ops could also be part of the solution, though this would depend on the specifics of the platform, and they would ideally be open, rather than replicating the "false scarcities" that proprietary platforms enforce in order to capture surplus value (Bauwens and Kostakis, 2017, p166). This would be backed by a legal framework geared toward a more socially-oriented and democratic regime of accumulation (Spehr, 2017, p58). The Ecuadorian government's "Free, Libre, Open Knowledge" program which proposes "commons"-based licenses for content that anyone except corporations could use freely is a step in the right direction (Rushkoff, 2017, p218). Ultimately, the goal should be reclaiming the commons, in order to limit these companies' ability to extract rent from controlling access to it for the benefit of the few (Andrejevic, 2012, p155).

Finally, it'll be necessary to build worker power, both within the tech industry and beyond it. Within, the long-term goal is to foster an industrial union model encompassing all workers affected by the tech industry, not just the highly-paid software engineers: that means contractors packing boxes for Amazon, or driving for Uber, or cleaning offices in Silicon Valley could all have representation in decision-making structures. Such industry-wide representation would be ideal as it would combine the material needs of lower-wage workers with the capacity to disrupt production of higher-wage workers, resulting in more leverage overall (Anonymous, 2018b; Tech Workers Coalition, 2018). After all, it's often workers in the most oppressive industries who are most likely to disrupt production in order to put a halt on runaway capital accumulation (Greenfield, 2017, p203); if conditions are presently not ideal for them to disrupt, at least there is potential for uniting within the industry in solidarity, a point which some tech workers themselves recognise (Tech Workers Coalition, 2018; Anonymous, 2018b). Plus, when it comes to app-based platforms like Uber, management oversight is automated way in the hopes of becoming more "lean", which means there may be more room for worker resistance (O'Brien, 2018a). Beyond the confines of the industry, a strong wider organised labour movement would offer resistance to technology being used to facilitate increased worker exploitation via surveillance or regulatory arbitrage (Rogers, 2018).

Part of the impetus for more worker power within the tech industry is that it's hard to imagine any sort of nationalisation-like project *without* it. This is especially true for anything approaching *internationalisation* - an internationally-coordinated project to free technology from the fetters of intellectual property law would need the consent of workers who are able to run and maintain it, rather than it being decided solely by bureaucrats unfamiliar with the technical details. Workers in the tech industry are, then, the best lever for change in this regard, as they are best positioned to exact concessions from capital in this new technology-enabled battleground.

None of this will be easy, of course. It's difficult to even imagine most of this, or envision what an alternate world could look like. Part of this is because Silicon Valley is itself the outgrowth of our economic system as a whole, magnifying its most predatory tendencies due to the role of technology under capitalism - it manifests "an acceleration of the capitalist logic of production" (Terranova, 2012, p46). After all, the business models of the tech giants are "deeply entrenched" within the current system, and so challenging that requires challenging the whole system (McChesney, 2018, p8).

Initially, this will mean changing the balance of class forces, by building worker power (Moody, 2017), while also dismantling the structures that allow capital to maintain its power via financialisation and the property laws that support it. If Silicon Valley can be thought of as a class project - using technology to augment capital at the expense of labour (Smith, 2015, p77) - then abolishing it will mean turning that around.

Following Fraser (2004), we need a transformative strategy, to address the problem at the root "by transforming the framework that generates it" (p74). Rather than merely ameliorating the worst excesses of the Silicon Valley as it stands today, we can instead enact proactive measures that get to the root of the problem. After all, the problems with Silicon Valley are not disconnected, and they're not isolated to Silicon Valley itself; the cause is deeper and more historical. Rather than hoping against hope that executives and investors will behave ethically, knowing that they're structurally incentivised to abuse their power in the search for profit, we can instead dismantle the system that gives them this power in the first place.

Conclusion

The purpose of investigating the political economy of Silicon Valley is to demonstrate what I see as the injustice of the present situation, founded as it is on entrenched inequality and exploitation on a global scale. Far from launching us into a new era of global prosperity, Silicon Valley companies are using the power they have over key technology platforms to maximise their own profits - no matter the cost to other stakeholders - under cover of spreading innovation. Addressing this requires holistic solutions, not a piecemeal approach handling companies in isolation. It's not that Silicon Valley has gone awry somewhere along the way; instead, it needs to be abolished.

What this means, in practice, is liberating potentially socially useful technologies from the confines of for-profit corporations. After all, the latter is merely an empty legal construct for the purpose of discarding any considerations other than profit; such a vehicle has always resulted in negative impacts on society, but it is the digital age that magnifies these tendencies in a way which makes their contradictions clear.

The way out, then, is to equip ourselves with an understanding of the current situation while recognising our own agency in going beyond it. Rather than merely trying to stop the worst excesses of capitalism in the information age - to slow the inevitable tide of creeping commodification along digital frontier - we should be seeking to transcend it, to emancipate ourselves from it.

This new wave of information technology has created a new battleground on which capital has, so far, flourished. But as with any hegemony there are always pockets of resistance, and in the ashes of our current dystopia there are prefigurative glimpses of utopia. We can see that in movements around open-source software and creative commons - "the virtual proof for the parasitic and superfluous nature" of the corporations that commodify information (Wark, 2004, p206). We can see it in the slow buildup of worker power in the tech industry, both among workers in the outskirts over material conditions (Anonymous, 2018a; Moody, 2017), and among workers in the heart of Silicon Valley itself over ethical concerns (Tarnoff, 2018).

These glimpses constitute what Raymond Williams called the emergent: "the shape of a Utopian future looming through the mist, which we must seize as an opportunity to exercise the Utopian imagination more fully" (Jameson, 2016). Resistance against the hegemonic system opens a path towards counter-hegemony, demonstrating that, as Stuart Hall (2011) wrote on Williams, "history is never closed but maintains an open horizon towards the future" (p26). From the darkness of Silicon Valley, amidst all the ill-gotten wealth founded on exploitation, we are starting to see glimmers of hope - glints of light in what would otherwise be an eternal night. A way out is faintly illuminated, and what once felt hopeless is suddenly made possible again.

Bibliography

1. Ackerman, S. (2015, April 07). How to Socialize Uber. *Jacobin*. Retrieved from https://www.jacobinmag.com/2015/04/uber-exploitation-worker-cooperative-socialize/
2. Gindin, S. (2011). Capitalist Crisis and Radical Renewal. In Lilley, S. (ed) *Capital and Its Discontents: Conversations with Radical Thinkers in a Time of Tumult*. PM Press, pp. 105-122
3. Andrejevic, M. (2012). Estranged Free Labor. In Scholz, T. (ed) *Digital Labor: The Internet as Playground and Factory*. Routledge, pp. 149-164
4. Andrejevic, M. (2014). "Free Lunch" in the Digital Era: Organization Is the New Content. In McGuigan, L. and Manzerolle, V. (eds) *The Audience Commodity in a Digital Age: Revisiting a Critical Theory of Commercial Media*. Peter Lang Inc., International Academic Publishers, pp. 193-206
5. Anonymous (2018a). Stop Treating Us Like Dogs! Workers Organizing Resistance at Amazon in Poland. In Alimahomed-Wilson, J. and Ness, I. (eds) *Choke Points*. Pluto Press, pp. 96-109
6. Anonymous. (2018b). Prospects on Organizing the Tech Industry. *Notes From Below*. Retrieved from http://www.notesfrombelow.org/article/prospects-for-organizing-the-tech-industry
7. Appadurai, A. (2017). Democracy fatigue. In Geiselberger, H. (ed) *The Great Regression*. Polity Press, pp. 1-9
8. Atkinson, A. B. (2015). *Inequality: What Can Be Done?* Harvard University Press.
9. Avent, R. (2017). *The Wealth of Humans: Work and its Absence in the Twenty-First Century*. Penguin Books Ltd.
10. Aytes, A. (2012). Return of the Crowds: Mechanical Turk and Neoliberal States of Exception. In Scholz, T. (ed) *Digital Labor: The Internet as Playground and Factory*. Routledge, pp. 79-97
11. Barbrook, R. and Cameron, A. (1996). The Californian Ideology. *Science as Culture*, 6(1), pp. 44-72
12. Baudrillard, J. (1998). *The Consumer Society: Myths and Structures*. Sage Publications Ltd.
13. Bauwens, M. and Kostakis, V. (2017). Why Platform Co-ops Should Be Open Co-ops. In Schneider, N. and Scholz, T. (eds) *Ours to Hack and to Own. OR Books*, pp. 163-168
14. Bickerton, E. (2015). Culture After Google. *New Left Review*, 92, pp. 145-156
15. Brown, W. (2015). *Undoing the Demos: Neoliberalism's Stealth Revolution*. MIT Press.
16. Ceglowski, M. (2017). Solidarity Forever. In *Tech Against Trump*. Logic Foundation, pp. 55-72
17. Citton, Y. (2017). *The Ecology of Attention*. Polity Press.
18. Collins, R. (2013). The End of Middle-Class Work: No More Escapes. In J. Calhoun, C. et al (eds) *Does Capitalism Have a Future?* Oxford University Press, pp. 37-70
19. Cutler, K.M. (2018). The Unicorn Hunters. *Logic Magazine*, 4, pp. 133-147
20. Davies, R. (2018, August 2). Apple becomes world's first trillion-dollar company. *The Guardian*. Retrieved from https://www.theguardian.com/technology/2018/aug/02/apple-becomes-worlds-first-trillion-dollar-company
21. Doctorow, C. (2008). *Content: Selected Essays on Technology, Creativity, Copyright, and the Future of the Future*. Tachyon Publications.
22. Dubal, V. (2018, June 28). Rule-Making as Structural Violence: From a Taxi to Uber Economy in San Francisco. *Law and Political Economy*. Retrieved from

https://lpeblog.org/2018/06/28/rule-making-as-structural-violence-from-a-taxi-to-uber-economy-in-san-francisco/

23. Dyer-Witheford, N. (2015). *Cyber-Proletariat: Global Labour in the Digital Vortex*. Pluto Press.
24. Ekman, M. (2017). The Relevance of Marx's Theory of Primitive Accumulation for Media and Communication Research. In Fuchs, C. and Mosco, V. (eds) *Marx in the Age of Digital Capitalism*. Haymarket, pp. 105-132
25. Fisher, E. (2017). How Less Alienation Creates More Exploitation? Audience Labour on Social Network Sites. In Fuchs, C. and Mosco, V. (eds) *Marx in the Age of Digital Capitalism*. Haymarket, pp. 180-203
26. Fleming, P. (2017). *The Death of Homo Economicus: Work, Debt and the Myth of Endless Accumulation*. Pluto Press.
27. Foer, F. (2017). *World Without Mind*. Jonathan Cape.
28. Fraser, N. (2004). Social Justice in the Age of Identity Politics: Redistribution, Recognition, and Participation. In Honneth, A. and Fraser, N. (eds) *Redistribution or Recognition? A Political-Philosophical Exchange*. Verso, pp. 7-109
29. Fuchs, C. (2013). *Digital Labour and Karl Marx*. Routledge.
30. Fuchs, C. (2016). *Critical Theory of Communication: New Readings of Lukács, Adorno, Marcuse, Honneth and Habermas in the Age of the Internet*. University of Westminster Press.
31. Fuchs, C. (2017). Towards Marxian Internet Studies. In Fuchs, C. and Mosco, V. (eds) *Marx in the Age of Digital Capitalism*. Haymarket, pp. 22-67
32. Garcia Martinez, A. (2016). *Chaos Monkeys: Obscene Fortune and Random Failure in Silicon Valley*. Harper.
33. Greenfield, A. (2017). *Radical Technologies: The Design of Everyday Life*. Verso.
34. Hall, S. (2011). *The neoliberal revolution*. Soundings, 48, pp. 9-156
35. Harvey, D. (2011). *The enigma of capital: and the crises of capitalism*. Profile Books.
36. Harvey, D. (2017). *Marx, Capital and the Madness of Economic Reason*. Profile Books.
37. Haskel, J. and Westlake, S. (2017). *Capitalism Without Capital: The Rise of the Intangible Economy*. Princeton University Press.
38. Ho, C. (2018, August 12). Want a lower tax bill? So do Apple and Genentech. *San Francisco Chronicle*. Retrieved from https://www.sfchronicle.com/business/article/Want-a-lower-tax-bill-So-do-Apple-and-Genentech-13148121.php
39. Hu, C. (2018, August 10). Music Biz Slams Citi Report on Industry & Artist Revenue as 'Inconsistent,' 'Inaccurate': Analysis. *Billboard*. Retrieved from https://www.billboard.com/articles/business/8469666/citi-report-music-biz-industry-artist-revenue-inconsistent-analysis
40. Hughes, B. (2016). *The Bleeding Edge: Why Technology Turns Toxic in an Unequal World*. New Internationalist.
41. Jameson, F. (2016, July 14). Fredric Jameson: Wal-Mart as Utopia. *Verso Blog*. https://www.versobooks.com/blogs/2774-fredric-jameson-wal-mart-as-utopia
42. Jhally, S. (2014). Watching as Working: The Valorization of Audience Consciousness. In McGuigan, L. and Manzerolle, V. (eds) *The Audience Commodity in a Digital Age: Revisiting a Critical Theory of Commercial Media*. Peter Lang Inc., International Academic Publishers, pp. 91-114
43. Kleiner, D. (2010). *The Telekommunist Manifesto*. Institute of Network Cultures.
44. Kleiner, D. (2017). Counterantidisintermediation. In Schneider, N. and Scholz, T. (eds) *Ours to Hack and to Own.* OR Books, pp. 63-68
45. Lanier, J. (2014). *Who Owns the Future?* Simon Schuster.

46. Lee, M. (2014). From Googol to Guge: The Political Economy of a Search Engine. In McGuigan, L. and Manzerolle, V. (eds) *The Audience Commodity in a Digital Age: Revisiting a Critical Theory of Commercial Media*. Peter Lang Inc., International Academic Publishers, pp. 175-192

47. Liu, W. (2017a). The inevitability of the gig economy. *New Socialist*. Retrieved from https://newsocialist.org.uk/the-gig-economy/

48. Liu, W. (2017b). Labour's Digital Strategy is a Missed Opportunity. *New Socialist*. Retrieved from https://newsocialist.org.uk/labours-digital-strategy/

49. Liu, W. (2018a). Labour's New Economics Conference: Part Two, Digital Session. *New Socialist*. Retrieved from https://newsocialist.org.uk/labours-new-economics-conference-part-two-digital-session/

50. Liu, W. (2018b). Organising Silicon Valley's Shadow Workforce. *Notes From Below*. Retrieved from https://www.notesfrombelow.org/article/organising-silicon-valleys-shadow-workforce

51. Liu, W. (2018c). Silicon Inquiry. *Notes From Below*. Retrieved from http://www.notesfrombelow.org/article/silicon-inquiry

52. Liu, W. (2018d). Freedom Isn't Free. *Logic Magazine*. Retrieved from https://logicmag.io/05-freedom-isnt-free/

53. Lordon, F. (2014). *Willing Slaves of Capital: Spinoza and Marx on Desire*. Verso.

54. Mann, G. (2013). *Disassembly Required: A Field Guide to Actually Existing Capitalism*. AK Press.

55. Martin, B. (2017). Money Is the Root of All Platforms. In Schneider, N. and Scholz, T. (eds) *Ours to Hack and to Own*. OR Books, pp. 187-191

56. Mazzucato, M. (2013). *The Entrepreneurial State: debunking private vs. public sector myths*. Anthem Press.

57. McChesney, R. (2013). *Digital Disconnect: How Capitalism is Turning the Internet Against Democracy*. The New Press.

58. McChesney, R. (2018). Between Cambridge and Palo Alto. *Catalyst*, (2)1, pp. 7-34

59. Moody, K. (2017). *On New Terrain*. Haymarket Books.

60. Morozov, E. (2015). Socialize the Data Centres! *New Left Review*, 91, pp. 45-68

61. Mosco, V. (2005). *The Digital Sublime: Myth, Power, and Cyberspace*. MIT Press.

62. Moulier-Boutang, Y. (2012). *Cognitive Capitalism*. Polity Press.

63. Murphy, K. (2016, February 21). The Ad Blocking Wars. *The New York Times*. Retrieved from https://www.nytimes.com/2016/02/21/opinion/sunday/the-ad-blocking-wars.html

64. O'Brien, H. (2018a). Breaking the Chain: Building Worker Power under Monopoly Capitalism. *Notes From Below*. Retrieved from http://www.notesfrombelow.org/article/breaking-the-chain

65. O'Brien, H. (2018b). Monopoly's Fallacy. *New Socialist*. Retrieved from https://newsocialist.org.uk/monopolys-fallacy/

66. O'Reilly, T. (2018). *WTF?: What's the Future and Why It's Up to Us*. Random House Business.

67. Paley, E. (2017, October 26). Toxic VC and the marginal-dollar problem. *Techcrunch*. Retrieved from https://techcrunch.com/2017/10/26/toxic-vc-and-the-marginal-dollar-problem/

68. Pangburn, D. (2017, April 25). How Google Blocked A Guerrilla Fighter In The Ad War. *Fast Company*. Retrieved from https://www.fastcompany.com/3068920/google-adnauseam-ad-blocking-war

69. Parker, G., Van Alstyne, M. and Choudary, S. (2016). *Platform Revolution: How Networked Markets Are Transforming the Economy--and How to Make Them Work for You*. W. W. Norton Company.

70. Parker, M. (2017). Management-By-Stress. *Catalyst,* 1(2), pp. 173-194

71. Pasquale, F. (2015). *The Black Box Society: The Secret Algorithms That Control Money and Information*. Harvard University Press.
72. Payne, A. (2013). Letter To A Young Programmer Considering A Startup. *Alex Payne*. Retrieved from https://al3x.net/posts/2013/05/23/letter-to-a-young-programmer.html
73. Press, A. (2018). Code Red. *n+1*, 31, pp. 14-22
74. Rogers, B. (2018, July 11). Worker Surveillance and Class Power. *Law and Political Economy*. Retrieved from https://lpeblog.org/2018/07/11/worker-surveillance-and-class-power/
75. Ross, A. (2012). In Search of the Lost Paycheck. In Scholz, T. (ed) *Digital Labor: The Internet as Playground and Factory*. Routledge, pp. 13-32
76. Ross, A. J. (2016). *The Industries of the Future*. Simon Schuster.
77. Rushkoff, D. (2017). *Throwing Rocks at the Google Bus: How Growth Became the Enemy of Prosperity*. Portfolio.
78. Sauter, M. (2017, October 23). Why is anyone listening to Tim O'Reilly? *The Outline*. Retrieved from https://theoutline.com/post/2413/why-is-anyone-listening-to-tim-o-reilly
79. Schneider, N. (2017). This Platform Kills Fascists. In *Tech Against Trump*. Logic Foundation, pp. 129-140
80. Schneider, N. and Scholz, T. (2017). *Ours to Hack and to Own*. OR Books.
81. Silver, B.J. (2003). *Forces of Labor*. Cambridge University Press.
82. Silver, B.J. (2016). Workers of the World. *Jacobin*, 22, pp. 45-54
83. Slee, T. (2017). *What's Yours is Mine: against the sharing economy*. Scribe.
84. Smith, T. (2015). Red Innovation. *Jacobin*, 17, pp. 75-82
85. Smythe, D. (2014). Communications: Blindspot of Western Marxism. In McGuigan, L. and Manzerolle, V. (eds) *The Audience Commodity in a Digital Age: Revisiting a Critical Theory of Commercial Media*. Peter Lang Inc., International Academic Publishers, pp. 29-54
86. Spehr, C. (2017). SpongeBob, Why Don't You Work Harder? In Schneider, N. and Scholz, T. (eds) *Ours to Hack and to Own*. OR Books, pp. 54-58
87. Srnicek, N. (2016). *Platform Capitalism*. Polity Press.
88. Srnicek, N. (2018). *The Social Wealth Fund: The Social Wealth of Data*. Autonomy.
89. Standing, G. (2017). *Basic Income: And How We Can Make It Happen*. Pelican.
90. Stokel-Walker, C. (2018, August 12). Why YouTubers are feeling the burn. *The Guardian*. Retrieved from https://www.theguardian.com/technology/2018/aug/12/youtubers-feeling-burn-video-stars-crumbling-under-pressure-of-producing-new-content
91. Stolzoff, S. (2017, July 24). Are Universities Training Socially Minded Programmers? *The Atlantic*. Retrieved from https://www.theatlantic.com/technology/archive/2018/07/socially-minded-programmers/563921/
92. Streeck, W. (2016). *How Will Capitalism End? Essays on a Failing System*. Verso.
93. Streeck, W. (2017). *Buying Time: The Delayed Crisis of Democratic Capitalism*. Verso.
94. Tarnoff, B. (2018, August 9). Can Silicon Valley workers rein in big tech from within? *The Guardian*. Retrieved from https://www.theguardian.com/commentisfree/2018/aug/09/silicon-valley-tech-workers-labor-activism
95. Tarnoff, B. and Weigel, M. (2018, May 3). Why Silicon Valley can't fix itself. *The Guardian*. Retrieved from https://www.theguardian.com/news/2018/may/03/why-silicon-valley-cant-fix-itself-tech-humanism

96. Tech Workers Coalition. (2018). Tech workers, platform workers, and workers' inquiry. *Notes From Below.* Retrieved from http://www.notesfrombelow.org/article/tech-workers-platform-workers-and-workers-inquiry

97. Terranova, T. (2012). Free Labor. In Scholz, T. (ed) *Digital Labor: The Internet as Playground and Factory*. Routledge, pp. 33-57

98. Wallerstein, I. (2013). Structural Crisis, or Why Capitalists May No Longer Find Capitalism Rewarding. In J. Calhoun, C. et al *Does Capitalism Have a Future?* Oxford University Press, pp. 9-36

99. Wark, M. (2004). *A Hacker Manifesto*. Harvard University Press.

100. Wark, M. (2012). Considerations on a Hacker Manifesto. In Scholz, T. (ed) *Digital Labor: The Internet as Playground and Factory*. Routledge, pp. 69-78

101. Wark, M. (2017). Worse Than Capitalism. In Schneider, N. and Scholz, T. (eds) *Ours to Hack and to Own*. OR Books, pp. 43-47

102. Weatherby, L. (2017, April 24). Delete Your Account: On the Theory of Platform Capitalism. *Los Angeles Review of Books*. Retrieved from https://lareviewofbooks.org/article/delete-your-account-on-the-theory-of-platform-capitalism

103. Wiener, A. (2017, March 01). It's Getting Harder to Believe in Silicon Valley. *The Atlantic*. Retrieved from https://www.theatlantic.com/magazine/archive/2017/03/the-shine-comes-off-silicon-valley/513815/

104. Williams, A. and Srnicek, N. (2016). *Inventing the Future: Postcapitalism and a World Without Work*. Verso.

105. Vaidhyanathan, S. (2018, July 27). The panic over Facebook's stock is absurd. It's simply too big to fail. *The Guardian*. Retrieved from https://www.theguardian.com/technology/2018/jul/27/facebook-stock-plunge-panic-absurd-too-big-too-fail

106. Yong Jin, D. (2017). The Construction of Platform Imperialism in the Globalisation Era. In Fuchs, C. and Mosco, V. (eds) *Marx in the Age of Digital Capitalism*. Haymarket, pp. 322-349

107. Zuboff, S. (2015). Big other: surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology*, 30(1), pp. 75–89

108. Zucman, G. (2017, November 10). How Corporations and the Wealthy Avoid Taxes (and How to Stop Them). *The New York Times*. Retrieved from https://www.nytimes.com/interactive/2017/11/10/opinion/gabriel-zucman-paradise-papers-tax-evasion.html