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When data is capital: Datafication, accumulation, and extraction

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Abstract

The collection and circulation of data is now a central element of increasingly more sectors of contemporary capitalism. This article analyses data as a form of capital that is distinct from, but has its roots in, economic capital. Data collection is driven by the perpetual cycle of capital accumulation, which in turn drives capital to construct and rely upon a universe in which everything is made of data. The imperative to capture all data, from all sources, by any means possible influences many key decisions about business models, political governance, and technological development. This article argues that many common practices of data accumulation should actually be understood in terms of data *extraction*, wherein data is taken with little regard for consent and compensation. By understanding data as a form capital, we can better analyse the meaning, practices, and implications of datafication as a political economic regime.

Keywords

Big Data, digital capitalism, value, political economy, Marx, Bourdieu

> 'Contemporary organizations are both culturally impelled by the data imperative and powerfully equipped with the tools to enact it.'
> Marion Fourcade and Kieran Healy (2017: 13)

Introduction

Data has become central and essential for increasingly more sectors of contemporary capitalism. Industries focused on technology, infrastructure, finance, manufacturing, insurance, and energy are now treating data as a form of capital. No longer is data just a concern of scientists or a by-product of other processes. Until recently, companies simply deleted data or chose not to collect it because paying for storage did not seem like a good investment (Oracle and MIT Technology Review Custom, 2016). Now, though, companies are clamouring to collect data – as much as they can, wherever they can. For the increasing number of companies participating in the 'data economy' or 'digital economy,' deleting data because of storage costs would be like burning piles of money or dumping barrels of oil down the drain because renting a warehouse was too much trouble. While data is not the same as profit, they share a similar logic. Just as we expect corporations to be profit-driven, we should now expect organisations to be data-driven; that is, the drive to accumulate data now propels new ways of doing business and governance. It is a key factor in major corporate decisions, such as Amazon's acquisition of Whole Foods for $13.7 billion (Stevens and Haddon, 2017), and of government policies such as investment in urban sensor networks (Heinzmann, 2014). Indeed, as *The Economist* (2017b) has noted, 'Industrial giants such as GE and Siemens now sell themselves as data firms.' In short, data – and the accumulation of data – is a core component of political economy in the 21st century.

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As a paradigm and logic, the idea of data-as-capital affects and transforms many spaces and sectors. Thanks to technologies like the Internet of Things, online platforms, and data analytics the list of things that now count as 'digital products and services' – and hence what counts as part of the digital economy – is growing at a rapid pace (Srnicek, 2016). This, in turn, means that data is a foundational form of capital for everything from the 'smart home' to the 'smart city,' finance to governance, production to distribution, consumer devices to enterprise systems, and much more (Kitchin, 2014). Without data, many of these technologies and organisations would not be able to operate, let alone be able to generate value.

This article contributes to the study of data within contemporary capitalism by analysing data as a form of *capital*. The existing literature on the social, political and economic dimensions of data treats data as a *commodity*. Whether implicitly or explicitly, analyses in both academic and media outlets typically take this analytical frame as a given. Yet, as this article makes clear, the distinction between capital and commodity is important and we cannot assume data is always a commodity. By understanding data as a form of capital, we can better analyse the nature and dynamics of digital capitalism. Rather than data collection being seen as simply a way of producing and obtaining commodities that are somehow converted into monetary value, datafication takes shape as a political economic regime driven by the logic of perpetual (data) capital accumulation and circulation. Framing data as a form of capital casts new light on the imperatives motivating contemporary organisations, the ways value can be derived from data, and the normative importance of data extraction.

Data-driven capitalism

There are now a variety of labels that refer to the political economic relationship between data and capitalism, such as 'surveillance capitalism' (Foster and McChesney, 2014; Zuboff, 2015), 'informational capitalism' (Fuchs, 2010), 'communicative capitalism' (Dean, 2005), 'platform capitalism' (Srnicek, 2016) and 'iCapitalism' (Duff, 2016). These different labels are not interchangeable, but they do share common themes and conclusions. This paper builds on three broad insights from the growing literature on critical political economy of data: (1) data is valuable and value-creating (Arvidsson, 2016; Roderick, 2014; Srnicek, 2016); (2) data collection has a pervasive, powerful influence over how businesses and governments behave (Bouk, forthcoming; Fourcade and Healy, 2017; Zuboff, 2016); and (3) data systems are rife with relations of inequity, extraction, and exploitation (Aitken, 2017; Andrejevic, 2014; Fourcade and Healy, 2013; Poon, 2016; Thatcher et al., 2016).

Fourcade and Healy (2017) have argued that 'modern organisations' are now driven by a 'data imperative' that demands the extraction of all data, from all sources, by any means possible. 'Storing and studying people's everyday activities, even the seemingly mundane, has become the default rather than the exception' (Angwin and Valentino-Devries, 2012: n.p.). Fulfilling the data imperative involves more than just passively collecting data; it means actively creating data (IBM, 2014). This entails the (total) datafication and surveillance of people, places, processes, things, and relationships among them (van Dijck, 2014). Cisco, one of the companies building this all-encompassing system, calls it 'the Internet of Everything.' Similarly, IBM states that, 'Everything is made of data these days' (IBM, 2014).

What does it mean to see the world in a way that asserts everything is data? This is not just a neutral observation about the nature or substance of the world. Such statements do not merely *reveal* or *reflect* the world. They *order* and *construct* the world (Boyd and Crawford, 2012; Kitchin et al., 2015). By operating rhetorically (Rosenberg, 2013), they change how we understand and interact with the world, and they put those with data capital in a position of access and authority. They establish the context through which accumulation and use of data not only occurs, but becomes a driving logic that influences behaviour. They perform the power/knowledge relationship: to know the world is to exercise power over it and to exercise power is to know it – to examine its features and characteristics, to sort it into categories and norms, to render it legible and observable, to exclude other metrics and methods of knowing it (Bowker and Star, 2000).

Data mining is a misleading name; a more apt term would be data manufacturing. Data is not out there waiting to be discovered as if it already exists in the world like crude oil and raw ore (Gitelman, 2013). Data is a recorded abstraction of the world created and valorised by people using technology. The framing of data as a natural resource that is everywhere and free for the taking reinforces regimes of data accumulation. A 2014 video by Siemens, a major industrial manufacturer, illustrates the logic of the data imperative:

> 'We live in a universe of data that gains not only in volume, but importance, every day. The question of how to generate business value from it becomes more and more essential to us. We need to understand that data is everywhere, and it is generated every second of

> the day. We need to understand data as an asset – and turn it into a value.' (2014)

It is not a coincidence that data is treated as a universal substance right at the time when there is so much to gain for whoever can lay claim to that data and extract it from every source. Indeed, there is a feedback loop: many control systems rely on the constant gathering and processing of data, and in turn those control systems enable more data to be generated (Sadowski and Pasquale, 2015). Flows of data correspond to flows of power and profit, thus the alchemy of datafication promises to produce infinite reserves of both. At the same time, the rhetoric of universality reframes everything as within the domain of surveillance/platform/digital capitalism.

The goal of transforming everything into data and the search for new sources of data echoes imperialist modes of accumulation (Luxemburg, 1951; Thatcher et al., 2016). In short, as capitalism faces crises of accumulation, there is a need to find new sources of value and new places to offload goods. 'Old strategies of accumulation are re-attempted in new spaces and new strategies are crafted through trial and error in the never-ending quest to surpass or displace the internal contradictions which lead to crisis' (Greene and Joseph, 2015: 224). This could mean subjecting previously non-commodified and non-monetised parts of life to the logic of capitalism or colonising new territories so they are brought into the global capitalist web as sites of extraction (Moore, 2015). We can see this dynamic of 'data colonialism' when technology corporations like Facebook and Google move into territories like India and Africa (Thatcher et al., 2016). They do so under the guise of providing subsidised services that connect marginalised people to the Internet, yet the companies also benefit greatly by opening markets, locking people into their platforms, and tapping sources of data (Solon, 2017). These new places with new people provide new opportunities for data accumulation. The same imperialist tactics are being replayed now, but updated for the digital age.

As we can see, this growing body of research on critical data studies (Dalton et al., 2016) has shown how the production, distribution, and use of data is situated within an emerging political economy that has wide-ranging implications across society: from the restructuring of cities and the state (Kitchin et al., 2015; Leszczynski, 2012), to the (re)development of electrical and computational infrastructure (Levenda et al., 2016; Pickren, 2018). Equipped with the findings of this literature, this paper can be seen as a call to go back to basics by further analysing foundational questions in the political economy of data: What is the economic form of data? How can value be derived from data? Why does data collection matter? Opening back up these questions, I argue, productively reframes how we understand the form and dynamics of data.

Data capital

The 'Big Data strategist' for Oracle, one of the largest software companies in the world, has said, 'Data is in fact a new kind of capital on par with financial capital for creating new products and services. And it's not just a metaphor; data fulfils the literal textbook definition of capital.' (OracleANZ, 2015). This statement points to an emerging political economic shift in which data is created, collected, and circulated *as capital*. The previous section described how data has been critically analysed in the context of capitalism – implicitly or explicitly – *as a commodity*. However, as businesses and government bodies begin treating data as capital, there is a need for examining the characteristics and dynamics of 'data capital.' This section aims to do so by first reviewing two theories of capital, from Karl Marx and Pierre Bourdieu, then using them to analyse data.

In *Capital, Volume 1*, Marx describes capital as a relationship between money (M) and commodities (C); namely, the ways they circulate and transform, which he simplifies into two general formulas. The first formula represents consumption, C-M-C: a commodity is sold for money which is then used to buy another commodity. Therefore, C-M-C is the cycle of using money to turn one qualitatively different thing (e.g. labour power) into another qualitatively different thing (e.g. coffee). The cycle of consumption is motivated by the use-value of a commodity and it is completed when money is turned into a commodity.

The second formula represents capital, M-C-M′: money is used to buy a commodity which is then sold for more money. 'The value [of money] originally advanced, therefore, not only remains intact while in circulation but increases its magnitude, adds to itself a surplus-value, or is valorised. And this movement converts it into capital' (Marx, 1990: 252). The cycle of capital is motivated by exchange-value and the cycle does not complete because capital requires continuous circulation. When money is turned into a commodity for consumption, rather than invested to make profit, it ceases to be capital. In addition to 'money capital' (i.e., invested funds), Marx distinguishes between two forms of 'real capital' employed in the creation of surplus value. Constant capital is the means of production for commodities (i.e., factories, machinery, raw materials, etc.). Variable capital is the means of subsistence for labour power (i.e., the costs of hiring workers).

Expanding on Marx's foundational analysis, Bourdieu theorized two new forms of capital that are

distinct from what he terms economic capital, 'which is immediately and directly convertible into money and may be institutionalized in the form of property rights' (1986: 242). The other forms Bourdieu theorized, cultural capital and social capital, stand alone in their own right while also being 'convertible, in certain conditions, into economic capital' (p. 242). They are, at their root, 'transformed, disguised forms of economic capital' (p. 251).

Cultural capital contributes to a person's status and success in ways that go beyond the idea of 'human capital,' which focuses on monetary investment in education and skills. Cultural capital is a representation of class and tends to be invested by a person's family and transmitted from a person's domestic environment. Bourdieu (1986) identifies three types of cultural capital: embodied (e.g. character traits), objectified (e.g. art collection), and institutionalised (university degree). Social capital, according to Bourdieu (p. 248), 'is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition.' This form of capital accrues by being included in privileged groups, whether that means being inducted through rites of passage (e.g. fraternal orders) or through rites of inheritance (e.g. noble lineage). When people talk about the value of 'who you know' and 'networking,' they are talking about having and developing social capital.

Building from Marx, we can now frame two common analyses of data in terms of a debate about what economic form data represents. On one hand, data is cast as a digital raw material – constant capital – necessary in the production of commodities. It is hard to read media articles and business reports about data without seeing it called 'the new oil.' For instance, the cover of a 2017 issue of *The Economist* (2017b) proclaims 'The World's Most Valuable Resource' above an illustration of offshore oil platforms labelled with the names of major digital platforms like Facebook, Google, and Uber presumably drilling into an ocean of data. On the other hand, data is cast as a commodity produced by the digital labour of people posting on Facebook, clicking on Google, exercising with Fitbits, and all the other things we do that create data and that data is created about (Fuchs, 2014; Till, 2012). The cliché about the 'free' services provided digital platforms is that, 'If you're not the customer, you're the product.'[1] Through the work of using platforms and devices, people are turned into commodities that take the form of personal data, which is sold to advertisers and data brokers. In the age of mass media, this was termed the 'audience commodity' (Smythe, 1981). Now with social media it is called the 'data double' among other coinages (Haggerty and Ericson, 2000). Therefore, at the risk of oversimplification, these two ways of analysing data – as raw material and as product of digital labour – can be recast as a debate about the relationship between real capital and commodities in the digital economy.

Building from Bourdieu, I suggest a better framing of data is as a form of capital that is distinct from, but has its roots in, economic capital. Data capital is more than knowledge about the world, it is discrete bits of information that are digitally recorded, machine processable, easily agglomerated, and highly mobile. Like social and cultural capital, data capital is convertible, in certain conditions, to economic capital. But, as the next section 'Deriving value from data capital' shows, not all value derived from data is necessarily or primarily monetary. Data capital is institutionalised in the information infrastructure of collecting, storing, and processing data; that is, the smart devices, online platforms, data analytics, network cables, and server farms.

Importantly, these characteristics of data capital mean it can be continually captured and circulated, thus data collection is driven by the logic of capital accumulation as described by Marx. 'The circulation of money as capital is an end in itself, for the valorization of value takes place only within this constantly renewed movement. The movement of capital is therefore limitless' (Marx, 1990: 253). This unending accumulation of capital, represented by M-C-M′-C-M″-C-M‴. . . , is a defining feature of capitalism. In digital capitalism, data is not a substitute for money, but is rather elevated and put 'on the same level as financial capital,' as a report by Oracle and MIT Technology Review Custom (2016: 2) states. The imperative, then, is to constantly collect and circulate data by producing commodities that create more data and building infrastructure to manage data. The stream of data must keep flowing and growing.

Ultimately, continuing the cycle of data capital becomes an intrinsic motivation, a driving force, for firms. As Marx explains, 'Use-values must therefore never be treated as the immediate aim of the capitalist; nor must the profit on any single transaction. His aim is rather the unceasing movement of profit-making' (Marx, 1990: 254). The same can be said of data. The capitalist is not concerned with the immediate use of a data point or with any single collection, but rather the unceasing flow of data-creating. This point is illustrated by the fact that data is very often collected without specific uses in mind. Indeed, the practice of collecting data first and figuring it out later is increasingly a core part of how businesses and government bodies operate. 'It does not matter that the amounts [of data] collected may vastly exceed a firm's imaginative reach or analytic grasp. The assumption is that it will eventually be useful, i.e. valuable' (Fourcade and Healy, 2017: 13). At a public talk in early 2017, Andrew Ng, an artificial

intelligence researcher who has held top positions at Google, Baidu, and Coursera, was candid about this prevailing logic of data accumulation: 'At large companies, sometimes we launch products not for the revenue, but for the data. We actually do that quite often ... and we monetize the data through a different product' (Stanford Graduate School of Business, 2017). The conditions needed to convert data capital into economic capital may never arrive, but that does not stop the cycle of accumulation.

The shift towards data capital takes advantage of the ideological and regulatory groundwork that has been laid since at least the 1980s to create a political economic landscape conducive to finance capitalism (Konczal and Abernathy, 2015). Under neoliberal governance, financial capital is treated as if it exists in transnational space beyond borders and governance (Major, 2012). The same attitudes are directly applied to data capital. This view was crystallised by Carl Bildt (2015), the former Prime Minister of Sweden and chair of the Global Commission on Internet Governance, in an op-ed for the *Financial Times*: 'Barriers against the free flow of data are, in effect, barriers against trade.' Bildt was rebuking proponents of 'digital sovereignty' rules in Europe, which would require non-EU companies to keep data about EU citizens in servers that are geographically based in Europe. Any restraints on the flow of data are said to hinder economic growth and technological innovation (Morozov, 2015). Trade deals like the Transatlantic Trade and Investment Partnership and the Trans-Pacific Partnership (aim to) enshrine the free flow of data across countries and continents (Selby, 2017). Like finance, data is now governed as an engine of growth. If financial firms are free to shuttle capital from country to country, then similarly technology corporations must also be free to store and sell data wherever they want. This means, for example, that a company could collect the personal information of Americans, store the data in Taiwan, and sell it in Europe (Rossiter, 2017).

The focus on data and datafication should not be seen as usurping financialisation, but rather as adding new sources of value and new tools of accumulation. There is a long history of crossover between innovations in information technology and innovations in finance (MacKenzie, 2018). Far from being in competition with each other, Wall Street and Silicon Valley are converging around data capital as the new frontier of accumulation and circulation.

Deriving value from data capital

The question of what kinds of data are collected and how they are used is very important. So far, this paper has treated data in a generalised way for the sake of analysing it as a form of capital. Of course, not all data is the same, nor is it used in the same way. The same can be said of capital in general. Similarly, value is derived from data in a number of different ways. Different industries necessarily accumulate different kinds of data to fit their own motivations and goals. The focus is typically put on 'user data,' such as from exercise apps that collect data about people's physical activity, vital signs, and geolocation. But, as the examples below show, value can also be squeezed from many other kinds of data about things like machinery, transportation, and moon phases. A full analysis of different types of data and in-depth theorising of how value is derived from data are both outside the scope of this paper. However, in this section, I provide an outline of five major ways data is used to create value. The list is not meant to be comprehensive. Future work is needed about the increasing number of ways and reasons that data capital is accumulated and valorised, especially by companies, governments, and organisations that are not typically treated as part of the 'technology sector.'

- Data is used to *profile and target* people. Many business models and services in data capitalism are based on the value proposition that knowing more about people will, in some way, translate to more profit and/or power. Some examples include: Internet-based companies often make their revenue by serving personalised advertisements. Data brokers collate data to create dossiers on individuals and categorise them into market segments. Credit bureaus crunch data so they can assign scores meant to denote a person's financial risk and trustworthiness. Retailers can charge different prices based on the customer's characteristics. Political consultants analyse data to decide who is susceptible to certain kinds of messaging and influence.
- Data is used to *optimise* systems. Processes can become more efficient by analysing data that reveals how to eliminate waste, improve productivity, and do more with less. This might mean an industrial manufacturer installing sensors on machines to monitor and adjust their operation. Or, city government using algorithmic analysis to assess how public services should be run. This way of deriving value is also the basis for Taylorism, starting with time–motion studies of factory workers in the early 1900s. Now, digital Taylorism is represented by wristbands patented by Amazon that are strapped to warehouse workers to track where their hands are at all times and provide 'haptic feedback' when they work inefficiently (Novak, 2018).
- Data is used to *manage* and *control* things. This is a power/knowledge relationship in which data is a

digital, mobile, processable form of knowledge. The idea is that by amassing data about a thing, then the ability to exercise power over that thing – and, in turn, extract more data from it – is enhanced. This might be as mundane as a person keeping track of their diet and exercise so they can manage their health. Or, as worrying as police using body-worn cameras and drones equipped with facial recognition and license plate reader software. Or, as complex as an engineer overseeing the traffic patterns of a city so they can manage how millions of people move through space. Such data can be used to inform human decision-making or fed into automated systems that respond in real-time.

- Data is used to *model* probabilities. With enough data covering a wide range of variables over a period of the time – fed to the right algorithms and analysts – many companies promise they can predict the future. While these 'predictions' are actually probabilities, there is a growing market for data-driven forecasting tools. For example, police departments use 'predictive' systems to create 'heat lists' and 'hot spots' that name who and where has a high likelihood of criminal activity. HunchLab, a predictive policing tool, uses data about 'dozens of other factors like population density; census data; the locations of bars, churches, schools, and transportation hubs; schedules for home games – even moon phases' (Chammah and Hansen, 2016: n.p.). Similarly, urban control rooms process a constant stream of data to create simulations of events like disaster response and snapshots of what the city might look like at certain times and days in the future.
- Data is used to *build* stuff. Digital systems and services are often built on data. They require data to operate, they use existing stores of data, and they collect new streams of data. As services become platforms and devices become 'smart' they also become data-driven and Internet-connected to facilitate the flow of data. For example, Uber would not work without real-time data about drivers and passengers. Many upgrades to consumer goods (e.g. smart homes) and transformations to urban environments (e.g. smart cities) are premised on extracting and exploiting data. Advances in emerging technologies like artificial intelligence and autonomous vehicles also require mountains of diverse data.
- Data is used to *grow* the value of assets. Things like buildings, infrastructure, vehicles, and machinery are depreciating assets. They lose value over time as the forces of entropy – or, wear and tear – take their toll. However, upgrading assets with smart technologies that collect data about their use helps combat the normal cycle of deterioration. As financier Stuart Kirk (2018) states, 'Artificial intelligence combined with the internet of things will result in physical things becoming more adaptive and responsive – thereby extending their useful lives.' Rather than depreciating, smartified assets can maintain and gain value. Or, if they do not grow value, at least data can slow its decay.

Data extraction

When we talk about data as being 'collected,' 'gathered,' or even 'mined', the image conjured is one of neutral accumulation, as if data existed out in the world as a distinct thing readily available to be harvested. However, analysing this process in terms of extraction emphasises the people targeted by, and the exploitative nature of, dataveillance.

Much of the valuable data capital extracted from the world is about people – their identities, beliefs, behaviours, and other personal information. As Karen Gregory (2014: n.p.) puts it: 'Big Data, like Soylent Green, is made of people.' This means that accumulating data often goes hand-in-hand with increasingly invasive systems for probing, monitoring, and tracking people (Schneier, 2016). Surveillance – or, 'dataveillance' – capabilities are integrated into everything ranging from consumer goods to civic infrastructure. For businesses, much of the value produced by 'smart' technologies does not necessarily come from you buying the good, but rather from you using it. (Or, even just having it around since many smart technologies are always in sense and record mode.) Interacting with smart technologies – especially ones integrated into your everyday, personal life – generates reams of data that would otherwise be out of reach to the companies that want it. And, it seems, to the governments that want that data: In February 2016, the then US director of national intelligence, James Clapper, admitted to a Senate panel that government agencies may treat networked smart technologies as a portal into people's homes and lives: 'In the future, intelligence services might use the [Internet of Things] for identification, surveillance, monitoring, location tracking, and targeting for recruitment, or to gain access to networks or user credentials' (Ackerman and Thielman, 2016: n.p.).

A typical example of a smart update to an everyday technology is the refrigerator. The regular refrigerator is a passive object: it just keeps food cold. The smart refrigerator is an active object: it keeps food cold, but it also keeps track of things like your favourite brands, what foods you eat at what times, and when your food is almost out or expired. The smart refrigerator can then take that data and use it, for example, to send targeted advertisements, recommend sponsored recipes,

monitor your dietary intake, and purchase replacement food from the grocery store. The smart refrigerator can also be used for other purposes that are far from fridge-like, such as a surveillance device remotely accessed by police who wish to peek into the owner's house (Butler, 2017). This is how the logic of accumulation works: it transforms the refrigerator into a data producing, collecting and transmitting machine. The same logic is behind the growing stable of smart technologies that are increasingly embedded with sensors, processors and network connections. 'The genuine Internet of Things wants to invade that refrigerator, measure it, instrument it, monitor any interactions with it; it would cheerfully give away a fridge at cost,' argues Bruce Sterling (2014: loc. 68).

The pushback against business models based on data capital are already starting to play out: In 2017, an American appliance maker, Whirlpool, filed trade complaints that asked the US government to impose tariffs on its Korean competitors, LG and Samsung, because the Korean companies are selling smart appliances at cheap prices, which is eating into the market share of companies like Whirlpool. LG and Samsung are able to do this because they recognize, as *The New Yorker* observed, 'the way to win in a data-driven business is to push prices as low as possible in order to build your customer base, enhance data flow, and cash in in the long-term' (Davidson, 2017: n.p.). While Whirlpool is looking to cash in on the purchase of an appliance, LG and Samsung are banking on the data that comes from people using the appliance.

Thus, rather than existing only as a commodity to be sold, a smart device becomes (perhaps primarily) a means of producing data. This logic influences the design of systems ranging from robotic vacuum cleaners secretly mapping users' homes so the manufacturer can exploit that data (Deahl, 2017) to the methods of urban planning deployed to manage cities (Barns, 2017). Data accumulation drives many key decisions about technological development, political governance, and business models. As Shoshana Zuboff explains, within the context of what she calls 'surveillance capitalism,'

> 'The logic of accumulation organizes perception and shapes the expression of technological affordances at their roots. It is the taken-for-granted context of any business model. Its assumptions are largely tacit, and its power to shape the field of possibilities is therefore largely invisible. It defines objectives, successes, failures, and problems. It determines what is measured, and what is passed over; how resources and people are allocated and organized; who is valued in what roles; what activities are undertaken – and to what purpose. The logic of accumulation produces its own social relations and with that its conceptions and uses of authority and power.' (Zuboff, 2015: 77)

When data is treated as a form of capital, the imperative to collect as much data, from as many sources, by any means possible intensifies existing practices of accumulation and leads to the creation of new ones. Indeed, following in the footsteps of other extractive enterprises through capitalism's history such as land grabs and resource mining (Mezzadra and Neilson, 2017), many of the now common practices of data accumulation should actually be understood in terms of the more forceful practice of data *extraction,* wherein data is taken without *meaningful consent* and *fair compensation* for the producers and sources of that data. The terminology used to describe the ways data is accumulated – especially data about people – elides the fact that this data is often acquired in hidden ways for purposes unknown to the targets of dataveillance (Andrejevic, 2014).

The question of consent is relatively straightforward. The problematic way technology firms treat consent is no secret; it is an issue raised often by journalists and academics. When companies seek consent to record, use, and/or sell a person's data, it is typically done in the form of a contract. The most common kind is called an end-user licensing agreements (EULA). They are a hallmark of digital technology and account for most of the contracts we enter into – almost on a daily basis if you use the Internet or software (Thatcher et al., 2016). These are the pages on websites and applications that make you click 'agree' or 'accept' before you can use the service. EULAs are known as 'standard-form' or 'boilerplate' contracts because they are generically applied to all users (Zamir, 2014). They are one-sided, non-negotiated, and non-negotiable; you either agree or you are denied access. 'It is hard, therefore, to consider them to be free and voluntary arrangements since one party has no power to enact their demands' (Birch, 2016: 124). Companies are routinely caught smuggling dubious clauses into their EULAs; like, for example, requiring users to give up rights to ownership of their data or to restrict what kind of data is collected and how it is used (Hutton and Henderson, 2017). Moreover, EULAs are designed to prevent even the most enterprising person from being informed of the binding terms and conditions. They are long, dense legal documents. One study concluded it would take 76 days, working for 8 hours a day, to read the privacy policies a person typically encounters in a year (Madrigal, 2012).

EULAs are the ideal-type of *pro forma* 'consent,' which may be better-termed acquiescence (Pasquale, 2015). That is, EULAs are less a method of consent in any meaningful and more a form of compliance.

As Jaron Lanier (2013: 314) argues, 'The reason people click 'yes' is not that they understand what they're doing, but that that it is the only viable option other than boycotting a company in general, which is getting harder to do.' Thus, even in many cases where people must actively agree to their data being accumulated, this agreement bears little resemblance to common meanings of consent – let alone robust forms of informed consent. When a thing is taken without consent we call it 'theft.' Just because the thing taken here is information about a person, rather than some material object, the ethical relevance should not be nullified. It is extraction nonetheless.

The question of fair compensation is more complicated, in large part because it can be difficult to put a fair price on personal information. Different types of data are valued differently by different businesses. The value of data also rises non-linearly in relation to the amount of data. The larger and more diverse a data bank, the more information and uses can be derived from it. So one individual's data may not be readily converted to economic capital, but the aggregated data of hundreds, thousands, millions of individuals can be immensely valuable. Even though it is difficult to price data, we can judge the fairness of compensation in at least two ways: (1) what kind of compensation, if any, is offered for data and (2) what is the difference between the compensation for data producers and the value obtained by data capitalists?

First, compensation most often comes in the form of access to services like Facebook's platform and Google's search engine. Rather than charging money to use the service, the owner collects data as payment. Even if we concede that some people think this is perfectly fair compensation, these service providers are outnumbered by the countless companies that collect, use, and sell personal data often without the knowledge of – let alone compensation for – those whose data they possess (Bouk, forthcoming; Crain, 2016). Many companies fail the first test right away: receiving nothing can hardly be seen as fair.

Second, the value of data capital is massive. Some of the wealthiest companies in the world, like Facebook and Google, are built on data capital. The data broker industry is estimated to generate $200bn in annual revenue (Crain, 2016). The three biggest data brokers alone – Experian, Equifax and Transunion – each bring in billions of dollars annually. Even for relatively small data brokers, the difference between the value of data and the compensation provided for it is striking (Roderick, 2014). Additionally, other major sectors like finance, insurance and manufacturing are increasingly relying on data capital to generate value. For many of these companies the data they use is primarily about people and created by those people doing things. These companies are accumulating billions of dollars in surplus value from the 'digital labour' done by people (Scholz, 2012), while paying little to nothing in return. Thatcher et al. (2016: 994) argue that these extractive practices go so far as to 'mirror processes of primitive accumulation or accumulation by dispossession that occur as capitalism colonizes previously noncommodified, private times and places.' When a person does not receive a fair offer for the work they have done or thing they have sold, we call it 'exploitation' – and this level of exploitation and inequity is indicative of extraction.

Before concluding, it is important to note that not all data extraction is equal. There are crucial issues related to the ways identity and class affect how, what, and why data is extracted. At times, data is disproportionally extracted from certain groups, such as when poor people of colour are subjected to systematic tracking by government agencies and financial institutions (Eubanks, 2018). At other times, certain groups are missing from data sets, such as when facial recognition systems inaccurately identify people of colour because they have been trained with data composed of mostly white male faces – people who look like their programmers (Lohr, 2018). While it is beyond the scope of this article, there is a need for further analysis of the unevenness of data extraction. Such work should build from critical studies of information technology; some relevant, recent books include: *Digital Sociologies* (Daniels et al. 2016), *The Intersectional Internet* (Noble and Tynes, 2016), *Programmed Inequality* (Hicks, 2017), *Algorithms of Oppression* (Noble, 2018), and *Automating Inequality* (Eubanks, 2018). My hope is that this article also lends theoretical support to this future work.

Conclusion

This article has centred data as a core component of political economy in the 21st century. It has analysed the way in which data is collected and circulated like capital and is treated by governments and firms like capital. By applying the theories of Marx and Bourdieu, data is analysed as a form of capital that is distinct from, but has its roots in, economic capital. Data collection is thus driven by the perpetual cycle of capital accumulation, which in turn drives capital to construct and rely upon a world in which everything is made of data. The supposed universality of data reframes everything as falling under the domain of data capitalism. All spaces must be subjected to datafication. If the universe is conceived of as a potentially infinite reserve of data, then that means the accumulation and circulation of data can be sustained forever. The imperative to capture all data, from all sources,

by any means possible influences many key decisions about business models, political governance, and technological development. Following this imperative leads to accumulation by extraction in which personal data is taken with little regard for consent and compensation. By analysing surveillance technology and the data economy in terms of extraction, critical work can move beyond focusing (almost exclusively) on privacy and security. As important as these issues are, they elide the systemic issues of inequity and exploitation that are endemic to the contemporary political economy of data (Coll, 2014).

Moreover, conceiving of many common practices of data collection as extraction helps lay the normative groundwork for political and legal responses to rampant, invasive data accumulation. Such responses could include regulations – essentially capital controls – on what types of data companies can collect, how they can collect it, where they can send and store it, and how much data a company can possess, both in aggregate and about individuals. It could also include new models of data ownership and governance like, for example, 'managing crucial parts of the data economy as public infrastructure' (*The Economist,* 2017a: n.p.). The fact that a featured article in *The Economist* would recommend that governments take over parts of the data economy and break up monopolistic firms like Google should be seen as a bellwether for how powerful Big Data (as in Big Oil and Big Finance) has become. This illustrates the need for further critical thought about the political economy of data, as well as reforms and alternatives to data capitalism.

The analysis in this paper is not meant to mark a new epoch in political economy wherein – as executives and engineers in Silicon Valley are fond of saying – everything has changed and nothing will ever be the same. Instead, data capitalism is more of a shift in focus; it is a transition toward conceptualising a new kind of capital and new methods of accumulation. This transition follows from one of the dominant socio-economic regimes of the past few decades: finance capitalism (Davis and Walsh, 2017; Krippner, 2005; Konczal and Abernathy, 2015). As this article has shown, there are similarities between financialisation and datafication. Both have significant 'implications for the production of space, corporate governance, accumulation regimes, and everyday life' (Fields, 2017: 1). Both seek to maximise value extraction by using innovative methods of capital creation and circulation, whether through complex financial instruments or complex information technologies. Both use technically opaque systems that shield them from oversight (Pasquale, 2015), use their political influence to skirt regulation (Roderick, 2014), and use their powerful capabilities to engage in exploitative and predatory practices (Taylor and Sadowski, 2015). In addition to these similarities, there is direct overlap between the two regimes, such as credit agencies using large sets of personal and demographic data to create hyper-individualised policies and scores (Hurley and Adebayo, 2017) and Wall Street traders using 'high frequency trading' algorithms to circulate capital at hyper-speed (Arnoldi, 2016).

The institutions leading the way in data capitalism are explicit about the connections between financial capital and data capital. They are not calling for one to replace the other, rather they are arguing that finance and data should be seen as different but equal forms of capital, which supercharge each other. Datafication, like financialisation before it, is a new frontier of accumulation and next step in capitalism. Compared to financialisation, datafication is still in its early days, but the level of wealth and power wielded by data capitalists is already massive and still growing. The theories and methods used to analyse finance capitalism and information technology must now be synthesised and applied to studying the meaning, practices and implications of datafication as a political economic regime.

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1. The dynamic of digital labour and value extraction is, of course, much more complex than this cliché. See, for example, Arvidsson and Colleoni (2012), Mahmoudi and Levenda (2016) and Mueller (2016).

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