



Research article

Big other: surveillance capitalism and the prospects of an information civilization

Shoshana Zuboff^{1,2}

¹Harvard Business School Emerita, Boston, MA, USA;

²Berkman Center for Internet and Society, Cambridge, MA, USA

Correspondence:

S Zuboff, Berkman Center for Internet and Society, Cambridge, MA, USA.

E-mail: Szuboff@hbs.edu

Abstract

This article describes an emergent logic of accumulation in the networked sphere, ‘*surveillance capitalism*,’ and considers its implications for ‘information civilization.’ The institutionalizing practices and operational assumptions of Google Inc. are the primary lens for this analysis as they are rendered in two recent articles authored by Google Chief Economist Hal Varian. Varian asserts four uses that follow from computer-mediated transactions: ‘data extraction and analysis,’ ‘new contractual forms due to better monitoring,’ ‘personalization and customization,’ and ‘continuous experiments.’ An examination of the nature and consequences of these uses sheds light on the implicit logic of surveillance capitalism and the global architecture of computer mediation upon which it depends. This architecture produces a distributed and largely uncontested new expression of power that I christen: ‘Big Other.’ It is constituted by unexpected and often illegible mechanisms of extraction, commodification, and control that effectively exile persons from their own behavior while producing new markets of behavioral prediction and modification. Surveillance capitalism challenges democratic norms and departs in key ways from the centuries-long evolution of market capitalism.

Journal of Information Technology (2015) **30**, 75–89. doi:10.1057/jit.2015.5

Keywords: surveillance capitalism; big data; Google; information society; privacy; internet of everything

Introduction

A recent White House report on ‘big data’ concludes, ‘The technological trajectory, however, is clear: more and more data will be generated about individuals and will persist under the control of others’ (White House, 2014: 9). Reading this statement brought to mind a 2009 interview with Google Chairperson Eric Schmidt when the public first discovered that Google retained individual search histories that were also made available to state security and law enforcement agencies, ‘If you have something that you don’t want anyone to know, maybe you shouldn’t be doing it in the first place, but if you really need that kind of privacy, the reality is that search engines including Google do retain this information for some time ... It is possible that that information could be made available to the authorities’ (Newman, 2009). What these two statements share is the attribution of agency to ‘technology.’ ‘Big data’ is cast as the inevitable consequence of a technological juggernaut with a life of its own entirely outside the social. We are but bystanders.

Most articles on the subject of ‘big data’ commence with an effort to define ‘it.’ This suggests to me that a reasonable definition has not yet been achieved. My argument here is that we have not yet successfully defined ‘big data’ because we continue to view it as a technological object, effect or capability. The inadequacy of this view forces us to return over and over to the same ground. In this article I take a different approach. ‘Big data,’ I argue, is not a technology or an inevitable technology effect. It is not an autonomous process, as Schmidt and others would have us think. It originates in the social, and it is there that we must find it and know it. In this article I explore the proposition that ‘big data’ is above all the foundational component in a deeply intentional and highly consequential new logic of accumulation that I call *surveillance capitalism*. This new form of information capitalism aims to predict and modify human behavior as a means to produce revenue and market control. Surveillance capitalism has gradually constituted itself during the last decade, embodying

a new social relations and politics that have not yet been well delineated or theorized. While 'big data' may be set to other uses, those do not erase its origins in an extractive project founded on formal indifference to the populations that comprise both its data sources and its ultimate targets.

Constantiou and Kallinikos (2014) provide important clues to this new direction in their article 'New games, new rules: big data and the changing context of strategy,' as they lift the veil on the black box, that is 'big data,' to reveal its epistemic contents and their indigenous problematics. 'New games' is a powerful and necessary contribution to this opaque intellectual territory. The article builds on earlier warnings (e.g. boyd and Crawford, 2011; Bhimani and Willcocks, 2014) to sharply delineate the epistemic features of 'big data' – heterogeneous, unstructured, trans-semiotic, decontextualized, agnostic – and to illuminate the epistemological discontinuities such data entail for the methods and mindsets of corporate strategy's formal, deductive, inward-focused, and positivistic conventions.

In claiming this black box for the known world, Constantiou and Kallinikos (2014) also insist on the mysteries that remain unsolved. 'Big data,' they warn, heralds 'a transformation of contemporary economy and society ... a much wider shift that makes *everydayness qua* data imprints an intrinsic component of organizational and institutional life ... and also a primary target of commercialization strategies ...' Such changes, they say, concern 'the blurring of long-established social and institutional divisions ... the very nature of firms and organizations and their relations to individuals *qua* users, customers or clients, and citizens.' These challenges also 'recast management ... as a field and social practice in a new context whose exact outlines still remain unclear ... (10).'

In this brief article, I aim to contribute to a new discussion on these still untheorized new territories in which the roiling ephemera of Constantiou's and Kallinikos's 'big data' are embedded: the migration of everydayness as a commercialization strategy; the blurring of divisions; the nature of the firm and its relation to populations. In preparation for the arguments I want to make here, I begin with a very brief review of a few foundational concepts. I then move on to a close examination of two articles by Google Chief Economist Hal Varian that disclose the logic and implications of surveillance capitalism as well as 'big data's' foundational role in this new regime.

Computer mediation meets the logic of accumulation

Nearly 35 years ago I first developed the notion of 'computer mediation' in an MIT Working Paper called 'The Psychological and Organizational Implications of Computer-Mediated Work' (Zuboff 1981; see also Zuboff, 2013 for a history of this concept and its meaning). In that paper and subsequent writing I distinguished 'computer-mediated' work from earlier generations of mechanization and automation designed to substitute for or simplify human labor (e.g. Zuboff, 1988, 1985, 1982). I observed that information technology is characterized by a fundamental duality that had not yet been fully appreciated. It can be applied to automate operations according to a logic that hardly differs from that of centuries past: replace the human body with machines that enable more continuity and control. But when it comes to information technology, automation simultaneously generates information that provides a deeper level of

transparency to activities that had been either partially or completely opaque. It not only imposes information (in the form of programmed instructions), but it also produces information. The action of a machine is entirely invested in its object, but information technology also reflects back on its activities and on the system of activities to which it is related. This produces action linked to a reflexive voice, as computer-mediation symbolically renders events, objects, and processes that become visible, knowable, and shareable in a new way. This distinction, to put it simply, marks the difference between 'smart' and 'dumb.'

The word I coined to describe this unique capacity is *informate*. Information technology alone has the capacity to *automate* and to *informate*. As a result of the informing process, computer-mediated work extends organizational codification resulting in a comprehensive 'textualization' of the work environment – what I called 'the electronic text.' That text created new opportunities for learning and therefore new contests over who would learn, how, and what. Once a firm is imbued with computer mediation, this new 'division of learning' becomes more salient than the traditional division of labor. Even at the early stages of these developments in the 1980s, the text was somewhat heterogeneous. It reflected production flows and administrative processes along with customer interfaces, but it also revealed human behavior: phone calls, keystrokes, bathroom breaks and other signals of attentional continuity, actions, locations, conversations, networks, specific engagements with people and equipment, and so forth. I recall writing the words in the summer of 1985 that appeared in the final chapter of *In the Age of the Smart Machine*. They were regarded as outlandish then. 'Science fiction,' some said; 'subversive,' others complained: 'The informed workplace, which may no longer be a "place" at all, is an arena through which information circulates, information to which intellectual effort is applied. The quality, rather than the quantity, of effort will be the source from which added value is derived ... learning is the new form of labor' (Zuboff, 1988: 395).

Today we must strain to imagine when these conditions – computer mediation, textualization, learning as labor – were not the case, at least for broad sectors of the labor force. Real-time information-based computer-mediated learning has become so endogenous to everyday business activities that the two domains are more or less conflated. This is what most of us do now as work. These new facts are institutionalized in thousands, if not millions, of new species of action within firms. Some of these are more formal: continuous improvement methodologies, enterprise integration, employee monitoring, ICT systems that enable the global coordination of distributed manufacturing operations, professional activities, teams, customers, supply chains, inter-firm projects, mobile and temporary workforces, and marketing approaches to diverse configurations of consumers. Some are less formal: the unceasing flow of email, online search, smartphone activities, apps, texts, video meetings, social media interactions, and so forth.

The division of learning, however, is no pure form. During 20 years of fieldwork, I encountered the same lesson in hundreds of variations. The division of learning, like the division of labor, is always shaped by contests over these questions: Who participates and how? Who decides who participates? What happens when authority fails? In the market sphere, the electronic text and what can be learned

from it were never – and can never be – ‘things in themselves.’ They are always already constituted by the answers to these questions. In other words, they are already embedded in the social, their possibilities circumscribed by authority and power.

The key point here is that when it comes to the market sphere, the electronic text is already organized by the logic of accumulation in which it is embedded and the conflicts inherent to that logic. 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.

In the history of capitalism, each era has run toward a dominant logic of accumulation – mass production-based corporate capitalism in the 20th century shaded into financial capitalism by that century’s end – a form that continues to hold sway. This helps to explain why there is so little real competitive differentiation within industries. Airlines, for example, have immense information flows that are interpreted along more or less similar lines toward similar aims and metrics, because firms are all evaluated according to the terms of a single shared logic of accumulation.¹ The same could be said for banks, hospitals, telecommunications companies, and so forth.

Still, capitalism’s success over the *longue durée* has depended upon the emergence of new market forms expressing new logics of accumulation that are more successful at meeting the ever-evolving needs of populations and their expression in the changing nature of demand.² As Piketty acknowledges in his *Capital in the Twenty-First Century*, ‘There is no single variety of capitalism or organization of production ... This will continue to be true in the future, no doubt more than ever: new forms of organization and ownership remain to be invented’ (Piketty, 2014: 483). The philosopher and legal scholar Roberto Unger has also written persuasively on this point:

The concept of a market economy is institutionally indeterminate ... it is capable of being realized in different legal and institutional directions, each with dramatic consequences for every aspect of social life, including the class structure of society and the distribution of wealth and power ... Which of its institutional realizations prevails has immense importance for the future of humanity ... a market economy can adopt radically divergent institutional forms, including different regimes of property and contract and different ways of relating government and private producers. The forms now established in the leading economies represent the fragment of a larger and open-ended field of possibilities.

(Unger 2007: 8, 41)

New market forms emerge in distinct times and places. Some rise to hegemony, others exist in parallel to the dominant form, and others are revealed in time as evolutionary dead ends.

How can these conceptual building blocks help us make sense of ‘big data’? Some points are obvious: three of the world’s seven billion people are now computer-mediated in a wide range of their daily activities far beyond the traditional boundaries of the workplace. For them the old dream of ubiquitous computing (Weiser, 1991) is a barely noticeable truism. As a result of pervasive computer mediation, nearly every aspect of the world is rendered in a new symbolic dimension as events, objects, processes, and people become visible, knowable, and shareable in a new way. The world is reborn as data and the electronic text is universal in scale and scope.³ Just a moment ago, it still seemed reasonable to focus our concerns on the challenges of an information workplace or an information society. Now the enduring questions of authority and power must be addressed to the widest possible frame that is best defined as ‘civilization’ or more specifically – *information civilization*. Who learns from global data flows, what, and how? Who decides? What happens when authority fails? What logic of accumulation will shape the answers to these questions? Recognizing their civilizational scale lends these questions new force and urgency. Their answers will shape the character of information civilization in the century to come, just as the logic of industrial capitalism and its successors shaped the character of industrial civilization over the last two centuries.

In the brief space of this work, my ambition is to begin the task of illuminating an emergent logic of accumulation that vies for hegemony in today’s networked spaces. My primary lens for this brief exploration is Google, the world’s most popular website. Google is widely considered to be the pioneer of ‘big data’ (e.g. Mayer-Schönberger and Cukier, 2013), and on the strength of those accomplishments it has also pioneered the wider logic of accumulation I call surveillance capitalism, of which ‘big data’ is both a condition and an expression. This emerging logic is not only shared by Facebook and many other large Internet-based firms, it also appears to have become the default model for most online startups and applications. Like Constantiou and Kallinikos (2014), I begin this discussion with the characteristics of the data in ‘big data’ and how they are generated. But where those authors trained their sights on the data’s epistemic features, I want to consider their individual, social, and political significance.

This discussion here is organized around two extraordinary documents written by Google’s Chief Economist Hal Varian (Varian, 2014, 2010). His claims and observations offer a starting point for insights into the systemic logic of accumulation in which ‘big data’ are embedded. I note here that while Varian is not a Google line executive, his articles invite a close inspection of Google’s practices as a prime exemplar of this new logic of accumulation. In both pieces, Varian illustrates his points with examples from Google. He often uses the first person plural in these instances, such as, ‘Google has been so successful with our own experiments that we have made them available to our advertisers and publishers in two programs.’ Or, ‘Google has seen 30 trillion URLs, crawls over 20 billion of those a day and answers 100 billion search queries a month ... we have had to develop new types of databases that can store data in massive tables spread across thousands of machines and can process queries on more than a trillion records in a few seconds. We published descriptions of these tools ...’ (Varian, 2014: 27, 29). It therefore seems fair to assume that Varian’s perspectives reflect the substance of Google’s

business practices, and, to a certain extent, the worldview that underlies those practices.

In the two articles I examine here, Varian's theme is the universality of 'computer-mediated economic transactions.' He writes, 'The computer creates a record of the transaction ... I argue that these computer-mediated transactions have enabled significant improvements in the way transactions are carried out and will continue to impact the economy for the foreseeable future' (2010: 2). The implications of Varian's observation are significant. The informing of the economy, as he observes, is constituted by a pervasive and continuous recording of the details of each transaction. In this vision, computer mediation renders an economy transparent and knowable in new ways. This is a sharp contrast to the classic neoliberal ideal of 'the market' as intrinsically ineffable and unknowable. Hayek's conception of the market was as an incomprehensible 'extended order' to which mere individuals must subjugate their wills (Hayek, 1988: 14–15). It was precisely the unknowability of the universe of market transactions that anchored Hayek's claims for the necessity of radical freedom from state intervention or regulation. Given Varian's new facts of a knowable market, he asserts four new 'uses' that follow from computer-mediated transactions: 'data extraction and analysis,' 'new contractual forms due to better monitoring,' 'personalization and customization,' and 'continuous experiments' (Varian, 2014). Each one of these provides insights into an emerging logic of accumulation, the division of learning that it shapes, and the character of the information civilization toward which it leads.

Data, extraction, analysis

The first of Varian's new uses is 'data extraction and analysis ... what everyone is talking about when they talk about big data' (Varian, 2014: 27). I want to examine each word in this phrase – 'data,' 'extraction,' and 'analysis' – as each conveys insights into the new logic of accumulation.

Data

The data from computer-mediated economic transactions is a significant dimension of 'big data.' There are other sources too, including flows that arise from a variety of computer-mediated institutional and trans-institutional systems. Among these we can include a second source of computer-mediated flows that is expected to grow exponentially: data from billions of sensors embedded in a widening range of objects, bodies, and places. An often cited Cisco White Paper predicts \$14.4 trillion of new value associated with this 'Internet of Everything' (Cisco, 2013a, b). Google's new investments in machine learning, drones, wearables, self-driving cars, nano particles that 'patrol' the body for signs of disease, and smart devices for the home are each essential components of this growing network of smart sensors and Internet-enabled devices intended as a new intelligent infrastructure for objects and bodies (Bradshaw, 2014a, b; Kovach, 2013; BBC News, 2014; Brewster, 2014; Dwoskin, 2014; *Economist*, 2014; Fink, 2014; Kelly, 2014; Lin, 2014; Parnell, 2014; Winkler and Wakabayashi, 2014). A third source of data flows from corporate and government databases including those associated with banks, payment-clearing intermediaries, credit rating agencies, airlines, tax and census records, health care operations, credit card, insurance, pharmaceutical, and telecom companies, and more. Many of these data, along with the data

flows of commercial transactions, are purchased, aggregated, analyzed, packaged, and sold by data brokers who operate, in the US at least, in secrecy – outside of statutory consumer protections and without consumers' knowledge, consent, or rights of privacy and due process (U.S. Committee on Commerce, Science, and Transportation, 2013).

A fourth source of 'big data,' one that speaks to its heterogeneous and trans-semiotic character, flows from private and public surveillance cameras, including everything from smartphones to satellites, Street View to Google Earth. Google has been at the forefront of this contentious data domain. For example, Google Street View was launched in 2007 and encountered opposition around the world. German authorities discovered that some Street View cars were equipped with scanners to scrape data from private Wi-Fi networks (O'Brien and Miller, 2013). According to the Electronic Privacy Information Center's (EPIC) summary of a lawsuit filed by 38 states' Attorneys General and the District of Columbia, the court concluded that 'the company engaged in unauthorized collection of data from wireless networks, including private WiFi networks of residential Internet users.' The EPIC report summarizes a redacted version of an FCC report revealing that 'Google intentionally intercepted payload data for business purposes and that many supervisors and engineers within the company reviewed the code and the design documents associated with the project' (EPIC, 2014b). According to the *New York Times* account of Google's eventual seven million dollar settlement of the case, 'the search company for the first time is required to aggressively police its own employees on privacy issues ...' (Streitfeld, 2013). Street View was restricted in many countries and continues to face litigation over what claimants have characterized as 'secret,' 'illicit,' and 'illegal' data gathering tactics in the US, Europe, and elsewhere (Office of the Privacy Commission of Canada, 2010; O'Brien, 2012; Jammet, 2014).

In Street View, Google developed a declarative method that it has repeated in other data ventures. This *modus operandi* is that of incursion into undefended private territory until resistance is encountered. As one consumer watchdog summarized it for the *New York Times*, 'Google puts innovation ahead of everything and resists asking permission' (Streitfeld, 2013; see also Burdon and McKillop, 2013). The firm does not ask if it can photograph homes for its databases. It simply takes what it wants. Google then exhausts its adversaries in court or eventually agrees to pay fines that represent a negligible investment for a significant return.⁴ It is a process that Siva Vaidyanathan has called 'infrastructure imperialism' (Vaidyanathan, 2011). EPIC maintains a comprehensive online record of the hundreds of cases launched against Google by countries, states, groups, and individuals, and there are many more cases that never become public (EPIC, 2014a, b).

These institutionally produced data flows represent the 'supply' side of the computer-mediated interface. With these data alone it is possible to construct detailed individual profiles. But the universality of computer-mediation has occurred through a complex process of causation that includes subjective activities too – the demand side of computer-mediation. Individual needs drove the accelerated penetration curves of the Internet. In less than two decades after the Mosaic web browser was released to the public, enabling easy access to the World Wide Web, a 2010 BBC poll found that

79% of people in 26 countries considered Internet access to be a fundamental human right (BBC, 2010).

Outside the market-based hierarchical spaces of the workplace, Internet access, indexing, and search meant that individuals were finally free to pursue the resources they needed for effective life unimpeded by the monitoring, metrics, insecurity, role requirements, and secrecy imposed by the firm and its logic of accumulation. Individual needs for self-expression, voice, influence, information, learning, empowerment, and connection summoned all sorts of new capabilities into existence in just a few years: Google's searches, iPod's music, Facebook's pages, YouTube's videos, blogs, networks, communities of friends, strangers, and colleagues, all reaching out beyond the old institutional and geographical boundaries in a kind of exultation of hunting and gathering and sharing information for every purpose or none at all. It was *mine*, and I could do with it *what I wished!*⁵ These subjectivities of self-determination found expression in a new *networked individual sphere* characterized by what Benkler (2006) aptly summarized as non-market forms of 'social production.'

These non-market activities are a fifth principal source of 'big data' and the origin of what Constantiou and Kallinikos (2014) refer to as its 'everydayness.' 'Big data' are constituted by capturing small data from individuals' computer-mediated actions and utterances in their pursuit of effective life. Nothing is too trivial or ephemeral for this harvesting: Facebook 'likes,' Google searches, emails, texts, photos, songs, and videos, location, communication patterns, networks, purchases, movements, every click, misspelled word, page view, and more. Such data are acquired, datafied, abstracted, aggregated, analyzed, packaged, sold, further analyzed and sold again. These data flows have been labeled by technologists as 'data exhaust.' Presumably, once the data are redefined as waste material, their extraction and eventual monetization are less likely to be contested.

Google became the largest and most successful 'big data' company, because it is the most visited website and therefore has the largest data exhaust. Like many other born-digital firms, Google rushed to meet the waves of pent-up demand that flooded the networked individual sphere in the first years of the World Wide Web. It was a heroic exemplar of individual empowerment in the quest for effective life. But as pressures for profit mounted, Google's leaders were concerned about the effect that fees-for-service might have on user growth. They opted instead for an advertising model. The new approach depended upon the acquisition of user data as the raw material for proprietary analyses and algorithm production that could sell and target advertising through a unique auction model with ever more precision and success. As Google's revenues rapidly grew, they motivated ever more comprehensive data collection.⁶ The new science of big data analytics exploded, driven largely by Google's spectacular success.

Eventually it became clear that Google's business is the auction business, and its customers are advertisers (see useful discussions of this turning point in Auletta, 2009; Vaidhyanathan, 2011; and Lanier, 2013). AdWords, Google's algorithmic auction method for selling online advertising, analyzes massive amounts of data to determine which advertisers get which one of 11 sponsored links on each results page. In a 2009 *Wired* article on 'Googlenomics,' Google's Varian commented, 'Why does Google give away products ... ? Anything that increases Internet use ultimately enriches Google ...' The article continues, '... more eyeballs on the

Web lead inexorably to more ad sales for Google ... And since prediction and analysis are so crucial to AdWords, every bit of data, no matter how seemingly trivial, has potential value' (Levy, 2009). The theme is reiterated in Mayer-Schönberger and Cukier's *Big Data*: 'Many companies design their systems so that they can harvest data exhaust ... Google is the undisputed leader ... every action a user performs is considered a signal to be analyzed and fed back into the system' (2013: 113). This helps explain why Google outbid all competitors for the privilege of providing free Wi-Fi to Starbucks's 3 billion yearly customers (Schmarzo, 2014). More users produce more exhaust that improves the predictive value of analyses and results in more lucrative auctions. What matters is quantity not quality. Another way of saying this is that Google is 'formally indifferent' to what its users say or do, as long as they say it and do it in ways that Google can capture and convert into data.

Extraction

This 'formal indifference' is a prominent, perhaps decisive, characteristic of the emerging logic of accumulation under examination here. The second term in Varian's phrase, 'extraction,' also sheds light on the social relations implied by formal indifference. First, and most obvious, extraction is a one-way process, not a relationship. Extraction connotes a 'taking from' rather than either a 'giving to,' or a reciprocity of 'give and take.' The extractive processes that make big data possible typically occur in the absence of dialogue or consent, despite the fact that they signal both facts and subjectivities of individual lives. These subjectivities travel a hidden path to aggregation and decontextualization, despite the fact that they are produced as intimate and immediate, tied to individual projects and contexts (Nissebaum, 2011). Indeed, it is the status of such data as signals of subjectivities that makes them most valuable for advertisers. For Google and other 'big data' aggregators, however, the data are merely bits. Subjectivities are converted into objects that repurpose the subjective for commodification. Individual users' meanings are of no interest to Google or other firms in this chain. In this way, the methods of production of 'big data' from small data and the ways in which 'big data' are valued reflect the formal indifference that characterizes the firm's relationship to its populations of 'users.' Populations are the sources from which data extraction proceeds and the ultimate targets of the utilities such data produce.

Formal indifference is evident in the aggressiveness with which Google pursues its interests in extracting signals of individual subjectivities. In these extractive activities it follows the Street View model: incursions into legally and socially undefended territory until resistance is encountered. Its practices appear designed to be undetectable or at least obscure, and had it not been for NSA whistleblower Edward Snowden aspects of its operations, especially as they overlap state security interests, would still be hidden. Most of what was known about Google's practices erupted from the conflicts it produced (Angwin, 2014). For example, Google has faced legal opposition and social protest in relation to claims of (1) the scanning of email, including those of non-Gmail users and those of students using its educational apps (Herold, 2014; Plummer, 2014), (2) the capture of voice communications (Menn *et al.*, 2010), (3) bypassing privacy settings (Angwin, 2012;

Owen, 2014), (4) unilateral practices of data bundling across its online services (CNIL, 2014; Doyle, 2013), (5) its extensive retention of search data (Anderson, 2010; O'Brien and Crampton, 2007), (6) its tracking of smartphone location data (Mick, 2011; Snelling, 2014), and (7) its wearable technologies and facial recognition capabilities (EPIC, 2014a, <https://epic.org/privacy/google/glass/>). These contested data gathering moves face substantial opposition in the EU as well as the US (Barker and Fontanella-Khan, 2014; Gabriel, 2014; Garside, 2014; Kopczynski, 2014; Mance *et al.*, 2014; Steingart, 2014; Vasagar, 2014).

'Extraction' summarizes the absence of structural reciprocities between the firm and its populations. This fact alone lifts Google, and other participants in its logic of accumulation, out of the historical narrative of Western market democracies. For example, the 20th-century corporation canonized by scholars like Berle and Means (1991) and Chandler Jr (1977) originated in and was sustained by deep interdependencies with its populations. The firm and its bosses had many failings and produced many violent facts that have been well documented, but I focus here on a different point. That market form intrinsically valued its populations of newly modernizing individuals as its source of employees and customers; it depended upon its populations in ways that led over time to institutionalized reciprocities. In return for its rigors, the firm offered a quid pro quo that was consistent with the self-understanding and demand characteristics of its populations. On the inside were durable employment systems, career ladders, and steady increases in wages and benefits for more workers (Sklar, 1988). On the outside were the dramas of access to affordable goods and services for more consumers (Cohen, 2003).

The 'five dollar day' was emblematic of this systemic logic, recognizing as it did that the whole enterprise rested upon a consuming population. The firm, Ford realized, had to value the worker-consumer as a fundamental unity and the essential component of a new mass production capitalism. This social contract hearkened back to Adam Smith's original insights into the productive reciprocities of capitalism, in which price increases were balanced with wage increases, 'so that the labourer may still be able to purchase that quantity of those necessary articles which the state of the demand for labour ... requires that he should have' (Smith, 1994: 939–940). It was these reciprocities that helped constitute a broad middle class with steady income growth and a rising standard of living. Indeed, considered from the vantage point of the last 30-plus years during which this market form was systematically deconstructed, its embeddedness in the social order through these structural reciprocities appears to have been one of its most salient features (Davis, 2011, 2013).

Google and the 'big data' project represent a break with this past. Its populations are no longer necessary as the source of customers or employees. Advertisers are its customers along with other intermediaries who purchase its data analyses. Google employs only about 48,000 people as of this writing, and is known to have thousands of applicants for every job opening. (As contrast: at the height of its power in 1953, General Motors was the world's largest private employer.) Google, therefore, has little interest in its users as employees. This pattern is true of hyperscale high tech companies that achieve growth mainly by leveraging automation. For example, the top three Silicon Valley companies in 2014 had

revenues of \$247 billion, only 137,000 employees, and a combined market capitalization of \$1.09 trillion. In contrast, even as late as 1990, the three top Detroit automakers produced revenues of \$250 billion with 1.2 million employees and a combined market capitalization of \$36 billion (Manyika and Chui, 2014).

This structural independence of the firm from its populations is a matter of exceptional importance in light of the historical relationship between market capitalism and democracy. For example, Acemoglu and Robinson elaborate the mutual structuring of (1) early industrial capitalism's dependency on the masses, (2) prosperity, and (3) the rise of democracy in 19th-century Britain. Examining that era's successful new market forms and the accompanying shift toward democratic institutions they observe, 'Clamping down on popular demands and undertaking a coup against inclusive political institutions would ... destroy ... gains, and the elites opposing greater democratization and greater inclusiveness might find themselves among those losing their fortunes from this destruction' (2012: 313–314). Google bears no such risks. On the contrary, despite its role as the 'chief utility for the World Wide Web' (Vaidhyathan, 2011: 17) and its substantial investments in technologies with explosive social consequences such as artificial intelligence, robotics, facial recognition, wearables, nanotechnology, smart devices, and drones, Google has not been subject to any meaningful public oversight (see e.g. the discussion in Vaidhyathan, 2011: 44–50; see also Finamore and Dutta, 2014; Gibbs, 2014; Trotman, 2014; Waters, 2014). In an open letter to Europe, Google Chairperson Eric Schmidt recently expressed his frustration with the prospect of public oversight, characterizing it as 'heavy-handed regulation' and threatening that it would create 'serious economic dangers' for Europe (Schmidt, 2014).

Analysis

Google's formal indifference toward and functional distance from populations is further institutionalized in the necessities of 'analysis' that Varian emphasizes. Google is the pioneer of hyperscale. Like other hyperscale businesses – Facebook, Twitter, Alibaba, and a growing list of high volume information businesses such as telecoms and global payments firms – data centers require millions of 'virtual servers' that exponentially increase computing capabilities without requiring substantial expansion of physical space, cooling, or electrical power demands.⁷ Hyperscale businesses exploit digital marginal cost economics to achieve scale quickly at costs that approach zero.⁸ In addition to these material capabilities, Varian notes that analysis requires data scientists who have mastered the new methods associated with predictive analytics, reality mining, patterns-of-life analysis, and so forth. These highly specialized material and knowledge requirements further separate subjective meaning from objective result. In doing so, they eliminate the need for, or possibility of, feedback loops between the firm and its populations. The data travel through many phases of production, only to return to their source in a second phase of extraction in which the objective is no longer data but revenue. The cycle then begins again in the form of new computer-mediated transactions.

This examination of Varian's combination of data, extraction, and analysis begins to suggest some key features of the new logic of accumulation associated with big data and

spearheaded by Google. First, revenues depend upon data assets appropriated through ubiquitous automated operations. These constitute a new asset class: *surveillance assets*. Critics of surveillance capitalism might characterize such assets as ‘stolen goods’ or ‘contraband’ as they were taken, not given, and do not produce, as I shall argue below, appropriate reciprocities. The cherished culture of social production in the networked individual sphere relies on the very tools that are now the primary vehicles for the surveillance-based appropriation of the most lucrative data exhaust. These surveillance assets attract significant investment that can be called *surveillance capital*. Google has, so far, triumphed in the networked world through the pioneering construction of this new market form that is a radically disembedded and extractive variant of information capitalism, one that can be identified as *surveillance capitalism*. This new market form has quickly developed into the default business model for most online companies and startups, where valuations routinely depend upon ‘eyeballs’ rather than revenue as a predictor of remunerative surveillance assets.

Monitoring and contracts

Varian says, ‘Because transactions are now computer mediated, we can observe behavior that was previously unobservable and write contracts on it. This enables transactions that were simply not feasible before ... Computer-mediated transactions have enabled new business models ...’ (2014: 30). Varian offers examples: If someone stops making monthly car payments, the lender can ‘instruct the vehicular monitoring system not to allow the car to be started and to signal the location where it can be picked up.’ Insurance companies, he suggests, can rely on similar monitoring systems to check if customers are driving safely and thus determine whether or not to maintain their insurance or pay claims. He also suggests that one can hire an agent in a remote location to perform tasks and use data from their smartphones – geolocation, time stamping, photos – to ‘prove’ that they actually performed according to the contract.

Varian does not appear to realize that what he is celebrating here is not new contract forms but rather the ‘un-contract.’ His version of a computer-mediated world transcends the contract form by stripping away governance and the rule of law. Varian appears to be aiming for what Oliver Williamson calls ‘a condition of contract utopia’ (1985: 67). In Williamson’s transaction economics, contracts exist to mitigate the inevitability of uncertainty. They operate to economize on ‘bounded rationality’ and safeguard against ‘opportunism’ – both intractable conditions of contracts in the real world of human endeavor. He observes that certainty requires ‘unbounded rationality’ derived from ‘unrestricted cognitive competence,’ which in turn derives from ‘fully described’ adaptations to ‘publicly observable’ contingent events. Williamson notes that such conditions inhere to ‘a world of planning’ rather than to ‘the world of governance’ in which ‘other things being equal ... relations that feature personal trust will survive greater stress and will display greater adaptability’ (31–32, 63).

Varian’s vision of the uses of computer-mediated transactions empties the contract of uncertainty. It eliminates the need for – and therefore the possibility to develop – trust. Another way of saying this is that contracts are lifted from the

social and reimagined as machine processes. Consensual participation in the values from which legitimate authority is derived, along with free will and reciprocal rights and obligations, are traded in for the universal equivalent of the prisoner’s electronic ankle bracelet. Authority, which I have elsewhere described as ‘the spiritual dimension of power,’ relies on social construction animated by shared foundational values. In Varian’s economy, authority is supplanted by technique, what I have called ‘the material dimension of power,’ in which impersonal systems of discipline and control produce certain knowledge of human behavior independent of consent (Zuboff, 1988). This subject deserves a more detailed exploration than is possible here, so I limit myself to a few key themes.

In describing this ‘new use,’ Varian lays claim to vital political territory for the regime of surveillance capitalism. From Locke to Durkheim, the contract and the rule of law that supports it have been understood as derived from the social and the trust and organic solidarity of which the social is an effect (Durkheim, 1964: 215; Locke, 2010: 112–115, 339). For Weber, ‘the most essential feature of modern substantive law, especially private law is the greatly increased significance of legal transactions, particularly contracts, as a source of claims guaranteed by legal coercion ... one can ... designate the contemporary type of society ... as a “contractual” one’ (1978: 669).

As Hannah Arendt suggests, ‘the great variety of contract theories since the Romans attests to the fact that the power of making promises has occupied the center of political thought over the centuries.’ Most vivid is the operation of the contract as it enhances the mastery of individuals and the resilience of society. These goods derive precisely from the unpredictability ‘which the act of making promises at least partially dispels ...’ For Arendt, human fallibility in the execution of contracts is the price of freedom. The impossibility of perfect control within a community of equals is the consequence of ‘plurality and reality ... the joy of inhabiting together with others a world whose reality is guaranteed for each by the presence of all.’ Arendt insists that ‘the force of mutual promise or contract’ is the only alternative ‘to a mastery which relies on domination of one’s self and rule over others; it corresponds exactly to the existence of freedom which was given under the condition of non-sovereignty’ (1998: 244).

In contrast to Arendt, Varian’s vision of a computer-mediated world strikes me as an arid wasteland – not a community of equals bound through laws in the inevitable and ultimately fruitful human struggle with uncertainty. In this futurescape, the human community has already failed. It is a place adapted to the normalization of chaos and terror where the last vestiges of trust have long since withered and died. Human replenishment from the failures and triumphs of asserting predictability and exercising over will in the face of natural uncertainty gives way to the blankness of perpetual compliance. Rather than enabling new contractual forms, these arrangements describe the rise of a new universal architecture existing somewhere between nature and God that I christen *Big Other*. It is a ubiquitous networked institutional regime that records, modifies, and commodifies everyday experience from toasters to bodies, communication to thought, all with a view to establishing new pathways to monetization and profit. Big Other is the sovereign power of a near future that annihilates the freedom achieved by the rule of law. It is a new regime of independent and independently

controlled facts that supplants the need for contracts, governance, and the dynamism of a market democracy. Big Other is the 21st-century incarnation of the electronic text that aspires to encompass and reveal the comprehensive immanent facts of market, social, physical, and biological behaviors. The institutional processes that constitute the architecture of Big Other can be imagined as the material instantiation of Hayek's 'extended order' come to life in the explicated transparency of computer-mediation.

These processes reconfigure the structure of power, conformity, and resistance inherited from mass society and symbolized for over half a century as Big Brother. Power can no longer be summarized by that totalitarian symbol of centralized command and control. Even the panopticon of Bentham's design, which I used as a central metaphor in my earlier work (Zuboff, 1988, Ch. 9,10), is prosaic compared to this new architecture. The panopticon was a physical design that privileged a single point of observation. The anticipatory conformity it induced required the cunning production of specific behaviors while one was inside the panopticon, but that behavior could be set aside once one exited that physical place. In the 1980s it was an apt metaphor for the hierarchical spaces of the workplace. In the world implied by Varian's assumptions, habitats inside and outside the human body are saturated with data and produce radically distributed opportunities for observation, interpretation, communication, influence, prediction, and ultimately modification of the totality of action. Unlike the centralized power of mass society, there is no escape from Big Other. There is no place to be where the Other is not.

In this world of no escape, the chilling effects of anticipatory conformity⁹ give way as the mental agency and self-possession of anticipation is gradually submerged into a new kind of automaticity. Anticipatory conformity assumes a point of origin in consciousness from which a choice is made to conform for the purposes of evasion of sanctions and social camouflage. It also implies a difference, or at least the possibility of a difference, between the behavior one would have performed and the behavior one chooses to perform as an instrumental solution to invasive power. In a world of Big Other, without avenues of escape, the agency implied in the work of anticipation is gradually submerged into a new kind of automaticity – a lived experience of pure stimulus-response. Conformity is no longer a 20th century-style act of submission to the mass or group, no loss of self to the collective produced by fear or compulsion, no psychological craving for acceptance and belonging. Conformity now disappears into the mechanical order of things and bodies, not as action but as result, not cause but effect. Each one of us may follow a distinct path, but that path is already shaped by the financial and, or, ideological interests that imbue Big Other and invade every aspect of 'one's own' life. False consciousness is no longer produced by the hidden facts of class and their relation to production, but rather by the hidden facts of commoditized behavior modification. If power was once identified with the ownership of the means of production, it is now identified with ownership of the means of behavioral modification.

Indeed, there is little difference between the ineffable 'extended order' of the neoliberal ideal and the 'vortex of stimuli' responsible for all action in the vision of the classical theorists of behavioral psychology. In both worldviews, human autonomy is irrelevant and the lived experience of

psychological self-determination is a cruel illusion. Varian adds a new dimension to both hegemonic ideals in that now this 'God view' can be fully explicated, specified, and known, eliminating all uncertainty. The result is that human persons are reduced to a mere animal condition, bent to serve the new laws of capital imposed on all behavior through an implacable feed of ubiquitous fact-based real-time records of all things and creatures. Hannah Arendt treated these themes decades ago with remarkable insight as she lamented the devolution of our conception of 'thought' to something that is accomplished by a 'brain' and is therefore transferable to 'electronic instruments':

The last stage of the laboring society, the society of jobholders, demands of its members a sheer automatic functioning, as though individual life had actually been submerged in the over-all life process of the species and the only active decision still required of the individual were to let go, so to speak, to abandon his individuality, the still individually sensed pain and trouble of living, and acquiesce in a dazed, 'tranquilized,' functional type of behavior. The trouble with modern theories of behaviorism is not that they are wrong but that they could become true, that they actually are the best possible conceptualization of certain obvious trends in modern society. It is quite conceivable that the modern age – which began with such an unprecedented and promising outburst of human activity – may end in the deadliest, most sterile passivity history has ever known.

(Arendt, 1998: 322)

Surveillance capitalism establishes a new form of power in which contract and the rule of law are supplanted by the rewards and punishments of a new kind of invisible hand. A more complete theorization of this new power, while a central concern of my new work, exceeds the scope of this article. I do want to highlight, however, a few key themes that can help us appreciate the unique character of surveillance capitalism.

According to Varian, people agree to the 'invasion of privacy' represented by Big Other if they 'get something they want in return ... a mortgage, medical advice, legal advice – or advice from your personal digital assistant' (2014: 30). He is quoted in a similar vein by a PEW Research report, 'Digital Life in 2025': 'There is no putting the genie back in the bottle ... Everyone will expect to be tracked and monitored, since the advantages, in terms of convenience, safety, and services, will be so great ... continuous monitoring will be the norm (PEW Research, 2014). How to establish the validity of this assertion? To what extent are these supposed reciprocities the product of genuine consent? This question opens the way to another radical, perhaps even revolutionary, aspect of the politics of surveillance capitalism. This concerns the distribution of privacy rights and with it the knowledge of and choice to accede to Big Other.

Covert data capture is often regarded as a violation, invasion, or erosion of privacy rights, as Varian's language suggests. In the conventional narrative of the privacy threat, institutional secrecy has grown, and individual privacy rights have been eroded. But that framing is misleading, because privacy and secrecy are not opposites but rather moments in a sequence. Secrecy is an effect of privacy, which is its cause. Exercising one's right to privacy produces choice, and one can

choose to keep something secret or to share it. Privacy rights thus confer decision rights; privacy enables a decision as to where one wants to be on the spectrum between secrecy and transparency in each situation. US Supreme Court Justice Douglas articulated this view of privacy in 1967: ‘Privacy involves the choice of the individual to disclose or to reveal what he believes, what he thinks, what he possesses ...’ (*Warden v. Hayden*, 387 US 294,323, 1967, Douglas, J., dissenting, quoted in Farahany, 2012: 1271).

The work of surveillance, it appears, is not to erode privacy rights but rather to redistribute them. Instead of many people having some privacy rights, these rights have been concentrated within the surveillance regime. Surveillance capitalists have extensive privacy rights and therefore many opportunities for secrets. These are increasingly used to deprive populations of choice in the matter of what about their lives remains secret. This concentration of rights is accomplished in two ways. In the case of Google, Facebook, and other exemplars of surveillance capitalism, many of their rights appear to come from taking others’ without asking – in conformance with the Street View model. Surveillance capitalists have skillfully exploited a lag in social evolution as the rapid development of their abilities to surveil for profit outrun public understanding and the eventual development of law and regulation that it produces. In result, privacy rights, once accumulated and asserted, can then be invoked as legitimization for maintaining the obscurity of surveillance operations.¹⁰

The mechanisms of this growing concentration of privacy rights and its implications received significant scrutiny from legal scholars in the US and Europe, even before Edward Snowden accelerated the discussion. This is a rich and growing literature that raises many substantial concerns associated with the anti-democratic implications of the concentration of privacy rights among private and public surveillance actors (Schwartz, 1989; Solove, 2007; Michaels, 2008; Palfrey, 2008; Semitsu, 2011; Richards, 2013; Calo, 2014; Reidenberg, 2014; Richards and King, 2014). The global reach and implications of this extraction of rights – as well as data – present many challenges for conceptualization, including how to overcome the very secrecy that makes them problematic in the first place. Further, the dynamics I describe occur in what was until quite recently a blank area – one that is not easily captured by our existing social, economic, and political categories. The new business operations frequently elude existing mental models and defy conventional expectations.

These arguments suggest that the logic of accumulation that undergirds surveillance capitalism is not wholly captured by the conventional institutional terrain of the private firm. What is accumulated here is not only surveillance assets and capital, but also rights. This occurs through a unique assemblage of business processes that operate outside the auspices of legitimate democratic mechanisms or the traditional market pressures of consumer reciprocity and choice. It is accomplished through a form of unilateral declaration that most closely resembles the social relations of a pre-modern absolutist authority. In the context of this new market form that I call surveillance capitalism, hyperscale becomes a profoundly anti-democratic threat.

Surveillance capitalism thus qualifies as a new logic of accumulation with a new politics and social relations that replaces contracts, the rule of law, and social trust with the sovereignty of Big Other. It imposes a privately administered compliance regime of rewards and punishments that is

sustained by a unilateral redistribution of rights. Big Other exists in the absence of legitimate authority and is largely free from detection or sanction. In this sense Big Other may be described as an automated coup from above: not a *coup d’état*, but rather a *coup des gens*.

Personalization and communication

Varian claims that ‘nowadays, people have come to expect personalized search results and ads.’ He says that Google wants to do even more. Instead of having to ask Google questions, it should ‘know what you want and tell you before you ask the question.’ ‘That vision,’ he asserts, ‘has now been realized by Google Now ...’ Varian concedes that ‘Google Now has to know a lot about you and your environment to provide these services. This worries some people’ (2014: 28). However, Varian reasons that people share such knowledge with doctors, lawyers, and accountants whom they trust. He then continues, ‘Why am I willing to share all this private information? Because I get something in return ...’ (2014: 28).

In fact, surveillance capitalism is the precise opposite of the trust-based relationships to which Varian refers. Doctors, attorneys, and other trusted professionals are held to account by mutual dependencies and reciprocities overlain by the force of professional sanction and public law. Google, as we have seen, does not bear such burdens. Its formal indifference and distance from ‘users,’ combined with its current freedom from meaningful regulation, sanction, or law, buffer it and other surveillance capitalists from the consequences of mistrust. Instead of Varian’s implied reciprocities, the *coup des gens* introduces substantial new asymmetries of knowledge and power.

For example, Google knows far more about its populations than they know about themselves. Indeed, there are no means by which populations can cross this divide, given the material, intellectual, and proprietary hurdles required for data analysis and the absence of feedback loops. Another asymmetry is reflected in the fact that the typical user has little or no knowledge of Google’s business operations, the full range of personal data that they contribute to Google’s servers, the retention of those data, or how those data are instrumentalized and monetized. It is by now well known that users have few meaningful options for privacy self-management (for a recent review of the ‘consent dilemma,’ see Solove, 2013). Surveillance capitalism thrives on the public’s ignorance.

These asymmetries in knowledge are sustained by asymmetries of power. Big Other is institutionalized in the automatic undetectable functions of a global infrastructure that is also regarded by most people as essential for basic social participation. The tools on offer by Google and other surveillance capitalist firms respond to the needs of beleaguered second modernity individuals – like the apple in the garden, once tasted they are impossible to live without. When Facebook crashed in some US cities for a few hours during the summer of 2014, many Americans called their local emergency services at 911 (*LA Times*, 2014). Google’s tools are not the objects of a value exchange. They do not establish constructive producer-consumer reciprocities. Instead they are the ‘hooks’ that lure users into extractive operations and turn ordinary life into the daily renewal of a 21st-century Faustian pact. This social dependency is at the heart of the surveillance project. Powerful felt needs for effective life vie against the inclination to resist the surveillance project. This conflict produces a kind of

psychic numbing that inures people to the realities of being tracked, parsed, mined, and modified – or disposes them to rationalize the situation in resigned cynicism (Hoofnagle *et al.*, 2010). The key point here is that this Faustian deal is fundamentally illegitimate; it is a choice that –21st-century individuals should not have to make. In the world of surveillance capitalism, the Faustian pact required to ‘get something in return’ eliminates the older entanglements of reciprocity and trust in favor of a wary resentment, frustration, active defense, and, or, desensitization.

Varian’s confidence in Google Now appears to be buoyed by the facts of inequality. He counsels that the way to predict the future is to observe what rich people have, because that is what the middle class and the poor will want too. ‘What do rich people have now?’ he asks. ‘Personal assistants’ is his answer. The solution? ‘That’s *Google Now* (2014: 29),’ he says. Varian’s bet is that Google Now will be so vital a resource in the struggle for effective life that ordinary people will accede to the ‘invasions of privacy’ that are its *quid pro quo*.

In this formulation Varian exploits a longstanding insight of capitalism but bends it to the objectives of the surveillance project. Adam Smith wrote insightfully on the evolution of luxuries into necessities. Goods in use among the upper class and deemed to be luxuries can in time be recast as ‘necessaries,’ he noted. The process occurs as ‘the established rules of decency’ change to reflect new customs and patterns introduced by elites. These changing rules both reflect and trigger new lower cost production methods that transform former luxuries into affordable necessities (Smith, 1994: 938–939). Scholars of early modern consumption describe the ‘consumer boom’ that ignited the first industrial revolution in late 18th-century Britain as new middle-class families began to buy the sorts of goods – china, furniture, textiles – that only the rich had enjoyed. Historian Neil McKendrick describes this new ‘propensity to consume ... unprecedented in the depth to which it penetrated the lower reaches of society ...’ (McKendrick, 1982: 11) as luxuries were reinterpreted as ‘decencies’ and those were reinterpreted as ‘necessities’ (Weatherill, 1993). In 1767, the political economist Nathaniel Forster worried that ‘fashionable luxury’ was spreading ‘like a contagion,’ as he complained of the ‘perpetual restless ambition in each of the inferior ranks to raise themselves to the level of those immediately above them’ (Forster, 1767: 41). Historically, this powerful evolutionary characteristic of demand led to the expansion of production, jobs, higher wages, and lower cost goods. Varian has no such reciprocities in mind. Instead, he regards this mechanism of demand growth as the inevitable force that will push ordinary people into Google Now’s Faustian pact of ‘necessaries’ in return for surveillance assets.

Varian is confident that psychic numbing will ease the way for this unsavory drama. He writes, ‘Of course there will be challenges. But these digital assistants will be so useful that everyone will want one, and the statements you read today about them will just seem quaint and old fashioned’ (2014: 29). But perhaps not. There is a growing body of evidence to suggest that people in many countries may resist the *coup des gens* as trust in the surveillance capitalists is hollowed out by fresh outbreaks of evidence that suggest the remorseless prospect of Varian’s future society. These issues are now a matter of serious political debate within Germany and the EU where proposals to ‘break up’ Google are already being

discussed (Mance *et al.*, 2014; see also Barker and Fontanella-Khan, 2014; Döpfner, 2014; Gabriel, 2014; Vasagar, 2014). A recent survey by the *Financial Times* indicates that both Europeans and Americans are substantially altering their online behavior as they seek more privacy (Kwong, 2014). One group of scholars behind a major study of youth online behavior concludes that a ‘lack of knowledge’ rather than a ‘cavalier attitude toward privacy,’ as tech leaders have alleged, is an important reason why large numbers of youth ‘engage with the digital world in a seemingly unconcerned manner’ (Hoofnagle *et al.*, 2010). New legal scholarship reveals the consumer harm in lost privacy associated with Google and surveillance capitalism (Newman, 2014). WikiLeaks founder, Julian Assange, has published a sobering account of Google’s leadership, politics, and global ambitions (Assange, 2014). The PEW Research Center’s latest report on public perceptions of privacy in the post-Snowden Era indicates that 91% of US adults agree or strongly agree that consumers have lost control over their personal data, while only 55% agree or strongly agree that they are willing to ‘share some information about myself with companies in order to use online services for free’ (Madden, 2014).

Continuous experiments

Because ‘big data’ analysis yields only correlational patterns, Varian advises the need for continuous experiments that can tease out issues of causality. Such experiments ‘are easy to do on the web,’ assigning treatment and control groups based on traffic, cookies, usernames, geographic areas, and so on (2014: 29). Google has been so successful at experimentation that they have shared their techniques with advertisers and publishers. Facebook has consistently made inroads here too, as it conducts experiments in modifying users’ behavior with a view to eventually monetizing its knowledge, predictive capability, and control. Whenever these experiments have been revealed, however, they have ignited fierce public debate (Bond *et al.*, 2012; Flynn, 2014; Gapper, 2014; Goel, 2014; Kramer *et al.*, 2014; Lanier, 2014; Zittrain, 2014).

Varian’s enthusiasm for experimentation speaks to a larger point, however. The business opportunities associated with the new data flows entail a shift from the *a posteriori* analysis to which Constantiou and Kallinikos (2014) refer, to the real-time observation, communication, analysis, prediction, and modification of actual behavior now and soon (Foroohar, 2014; Gibbs, 2014; Lin, 2014; Trotman, 2014; Waters, 2014). This entails another shift in the source of surveillance assets from virtual behavior to actual behavior, while monetization opportunities are refocused to blend virtual and actual behavior. This is a new business frontier comprised of knowledge about real-time behavior that creates opportunities to intervene in and modify behavior for profit. The two entities at the vanguard of this new wave of ‘reality mining,’ ‘patterns of life analysis,’ and ‘predictive analytics’ are Google and the NSA. As the White House report puts it, ‘there is a growing potential for big data analytics to have an immediate effect on a person’s surrounding environment or decisions being made about his or her life’ (2014: 5). This is what I call the *reality business*, and it reflects an evolution in the frontier of data science from data mining to reality mining in which, according to MIT’s Sandy Pentland, ‘sensors, mobile phones, and other data capture devices’ provide the ‘eyes and ears’ of a

'world-spanning living organism' from 'a God's eye view' (Pentland, 2009: 76, 80). This is yet another rendering of the 'extended order,' fully explicated by computer-mediation. The electronic text of the informed workplace has morphed into a world-spanning living organism – an inter-operational, behavior-modifying, market-making, and proprietary God view.

Nearly 70 years ago historian Karl Polanyi observed that the market economies of the 19th and 20th centuries depended upon three astonishing mental inventions that he called 'fictions.' The first was that human life can be subordinated to market dynamics and be reborn as 'labor.' Second, nature can be subordinated and reborn as 'real estate.' Third, that exchange can be reborn as 'money.' The very possibility of industrial capitalism depended upon the creation of these three critical 'fictional commodities.' Life, nature, and exchange were transformed into things, that they might be profitably bought and sold. '[T]he commodity fiction,' he wrote, 'disregarded the fact that leaving the fate of soil and people to the market would be tantamount to annihilating them.'

With the new logic of accumulation that is surveillance capitalism, a fourth fictional commodity emerges as a dominant characteristic of market dynamics in the 21st century. Reality itself is undergoing the same kind of fictional metamorphosis as did persons, nature, and exchange. Now 'reality' is subjugated to commodification and monetization and reborn as 'behavior.' Data about the behaviors of bodies, minds, and things take their place in a universal real-time dynamic index of smart objects within an infinite global domain of wired things. This new phenomenon produces the possibility of modifying the behaviors of persons and things for profit and control. In the logic of surveillance capitalism there are no individuals, only the world-spanning organism and all the tiniest elements within it.

Conclusion

Technologies are constituted by unique affordances, but the development and expression of those affordances are shaped by the institutional logics in which technologies are designed, implemented, and used. This is, after all, the origin of the hack. Hacking intends to liberate affordances from the institutional logics in which they are frozen and redistribute them in alternative configurations for new purposes. In the market sphere, these circumscribing logics are logics of accumulation. With this view in mind, my aim has been to begin to identify and theorize the currently institutionalizing logic of accumulation that produces hyperscale assemblages of objective and subjective data about individuals and their habitats for the purposes of knowing, controlling, and modifying behavior to produce new varieties of commodification, monetization, and control.

The development of the Internet and methods to access the World Wide Web spread computer mediation from bounded sites of work and specialized action to global ubiquity both at the institutional interface and in the intimate spheres of everyday experience. High tech firms, led by Google, perceived new profit opportunities in these facts. Google understood that were it to capture more of these data, store them, and analyze them, they could substantially affect the value of advertising. As Google's capabilities in this arena developed and attracted historic levels of profit, it produced successively ambitious practices that expand the data lens from past virtual

behavior to current and future actual behavior. New monetization opportunities are thus associated with a new global architecture of data capture and analysis that produces rewards and punishments aimed at modifying and commoditizing behavior for profit.

Many of the practices associated with capitalizing on these newly perceived opportunities challenged social norms associated with privacy and are contested as violations of rights and laws. In result, Google and other actors learned to obscure their operations, choosing to invade undefended individual and social territory until opposition is encountered, at which point they can use their substantial resources to defend at low cost what had already been taken. In this way, surveillance assets are accumulated and attract significant surveillance capital while producing their own surprising new politics and social relations.

These new institutional facts have been allowed to stand for a variety of reasons: they were constructed at high velocity and designed to be undetectable. Outside a narrow realm of experts, few people understood their meaning. Structural asymmetries of knowledge and rights made it impossible for people to learn about these practices. Leading tech companies were respected and treated as emissaries of the future. Nothing in past experience prepared people for these new practices, and so there were few defensive barriers for protection. Individuals quickly came to depend upon the new information and communication tools as necessary resources in the increasingly stressful, competitive, and stratified struggle for effective life. The new tools, networks, apps, platforms, and media thus became requirements for social participation. Finally, the rapid buildup of institutionalized facts – data brokerage, data analytics, data mining, professional specializations, unimaginable cash flows, powerful network effects, state collaboration, hyperscale material assets, and unprecedented concentrations of information power – produced an overwhelming sense of inevitability.

These developments became the basis for a fully institutionalized new logic of accumulation that I have called surveillance capitalism. In this new regime, a global architecture of computer mediation turns the electronic text of the bounded organization into an intelligent world-spanning organism that I call Big Other. New possibilities of subjugation are produced as this innovative institutional logic thrives on unexpected and illegible mechanisms of extraction and control that exile persons from their own behavior.

Under these conditions, the division of learning and its contests are civilizational in scope. To the question 'who participates?' the answer is – those with the material, knowledge, and financial resources to access Big Other. To the question 'who decides?' the answer is, access to Big Other is decided by new markets in the commodification of behavior: markets in behavioral control. These are composed of those who sell opportunities to influence behavior for profit and those who purchase such opportunities. Thus Google, for example, may sell access to an insurance company, and this company purchases the right to intervene in an information loop in your car or your kitchen in order to increase its revenues or reduce its costs. It may shut off your car, because you are driving too fast. It may lock your fridge when you put yourself at risk of heart disease or diabetes by eating too much ice cream. You might then face the prospect of either higher premiums or loss of coverage. Google's Chief Economist Hal

Varian celebrates such possibilities as new forms of contract, when in fact they represent the end of contracts. Google's rendering of information civilization replaces the rule of law and the necessity of social trust as the basis for human communities with a new life-world of rewards and punishments, stimulus and response. Surveillance capitalism offers a new regime of comprehensive facts and compliance with facts. It is, I have suggested, a *coup* from above – the installation of a new kind of sovereign power.

The automated ubiquitous architecture of Big Other, its derivation in surveillance assets, and its function as pervasive surveillance, highlights other surprising new features of this logic of accumulation. It undermines the historical relationship between markets and democracies, as it structures the firm as formally indifferent to and radically distant from its populations. Surveillance capitalism is immune to the traditional reciprocities in which populations and capitalists needed one another for employment and consumption. In this new model, populations are targets of data extraction. This radical disembedding from the social is another aspect of surveillance capitalism's anti-democratic character. Under surveillance capitalism, democracy no longer functions as a means to prosperity; democracy threatens surveillance revenues.

Will surveillance capitalism be the hegemonic logic of accumulation in our time, or will it be an evolutionary dead-end that cedes to other emerging information-based market forms? What alternative trajectories to the future might be associated with these competing forms? I suggest that the prospects of information civilization rest on the answers to these questions. There are many dimensions of surveillance capitalism that require careful analysis and theorization if we are to reckon with these prospects. One obvious dimension is the imbrication of public and private authority in the surveillance project. Since Edward Snowden, we have learned of the blurring of public and private boundaries in surveillance activities including collaborations and constructive interdependencies between state security authorities and high tech firms. Another key set of issues involves the relationship of surveillance capitalism – and its potential competitors – to overarching global concerns such as equality and climate disruptions that effect all our future prospects. A third issue concerns the velocity of social evolution compared to that at which the surveillance project is institutionalized. It seems clear that the waves of lawsuits breaking on the shores of the new surveillance fortress are unlikely to alter the behavior of surveillance capitalists. Were surveillance capitalists to abandon their contested practices according to the demands of aggrieved parties, the very logic of accumulation responsible for their rapid rise to immense wealth and historic concentrations of power would be undermined. The value of the steady flow of legal actions is rather to establish new precedents and ultimately new laws. The question is whether the lag in social evolution can be remedied before the full consequences of the surveillance project take hold.

Finally, and most important for all scholars and citizens, is the fact that we are at the very beginning of the narrative that will carry us toward new answers. The trajectory of this narrative depends in no small measure on the scholars drawn to this frontier project and the citizens who act in the knowledge that deception-induced ignorance is no social contract, and freedom from uncertainty is no freedom.

Notes

- 1 For a recent example of this, see 'JetBlue to Add Bag Fees, Cut Legroom' (Nicas, 2014).
- 2 See Braudel's discussion on this point (1984: 620).
- 3 Consider that in 1986 there were 2.5 optimally compressed exabytes, only 1% of which were digitized (Hilbert, 2013: 4). In 2000, only a quarter of the world's stored information was digital (Mayer-Schönberger and Cukier, 2013: 9). By 2007, there were around 300 optimally compressed exabytes with 94% digitized (Hilbert, 2013: 4). Digitization and datafication (the application of software that allows computers and algorithms to process and analyze raw data) combined with new and cheaper storage technologies produced 1200 exabytes of data stored worldwide in 2013 with 98% digital content (Mayer-Schönberger and Cukier, 2013: 9).
- 4 The EU Court's 2014 ruling on the 'right to be forgotten' arguably represents the first time that Google has been forced to substantially alter its practices as an adaptation to regulatory demands – the first chapter of what is sure to be an evolving story.
- 5 For an extended discussion of this theme, see Zuboff and Maxmin (2002, especially chapters 4, 6, and 10).
- 6 With the competitive advantage of Google's exponentially expanding data capture, Google's ad revenues jumped from \$21 billion in 2008 to over \$50 billion in 2013. By February 2014, 15 years after its founding, Google's \$400 billion dollar market value edged out Exxon for the #2 spot in market capitalization, making it the second richest company after Apple (Farzad, 2014).
- 7 Consider these facts in relation to Google and Facebook, the most hyper of the hyperscale firms. Google processes four billion searches a day. A 2009 presentation by Google engineer Jeff Dean indicated that it was planning the capacity for ten million servers and an exabyte of information. His technical article published in 2008 described new analytics that allowed Google to process 20 petabytes of data per day (1000 petabytes = 1 exabyte), or about 7 exabytes a year (Dean and Ghemawat, 2008; Dean, 2009). One analyst observed that these numbers have likely been substantially exceeded by now, 'particularly given the volume of data being uploaded to YouTube, which alone has 72h worth of video uploaded every minute' (Wallbank, 2012). As for Facebook, it has more than a billion users. At the time of its float on the US stock market in 2012, it claimed to have more than seven billion photos uploaded each month and more than 100 petabytes of photos and videos stored in its servers (Ziegler, 2012).
- 8 Smaller firms without hyperscale revenues can leverage some of these capabilities with cloud computing services (Manyika and Chui, 2014; Münstermann *et al.*, 2014).
- 9 See my discussion of anticipatory conformity in Zuboff (1988: 346–356). For an update, see recent research on Internet search behavior in Marthews and Tucker (2014).
- 10 This process is apparently exemplified in the US federal lawsuit concerning Google's data mining of student emails sent and received by users of its Apps for Education cloud service. See Herold (2014).

References

- Acemoglu, D. and Robinson, J.A. (2012). *Why Nations Fail: The origins of power, prosperity, and poverty*, New York, NY: Crown Business.
- Anderson, N. (2010). Why Google keeps your data forever, tracks you with ads, *ArsTechnica*. 8 March [WWW document] <http://arstechnica.com/tech-policy/news/2010/03/google-keeps-your-data-to-learn-from-good-guys-fight-off-bad-guys.ars>(accessed 21 November 2014).

- Angwin, J.** (2012). Google faces new privacy probes, *Wall Street Journal*. 16 March [WWW document] <http://online.wsj.com/articles/SB1000142405270230469280457283821586827892> (accessed 21 November 2014).
- Angwin, J.** (2014). *Dragnet Nation: A quest for privacy, security, and freedom in a world of relentless surveillance*, New York: Times Books.
- Arendt, H.** (1998). *The Human Condition*, Chicago, IL: University of Chicago Press.
- Assange, J.** (2014). *When Google Met WikiLeaks*, New York, NY: OR Books.
- Auletta, K.** (2009). *Googled: The end of the world as we know it*, New York, NY: Penguin Books.
- Barker, A. and Fontanella-Khan, J.** (2014). Google feels political wind shift against it in Europe, *Financial Times*. 21 May [WWW document] <http://www.ft.com/intl/cms/s/2/7848572e-e0c1-11e3-a934-00144feabdc0.html#axzz3JjXPNno5> (accessed 21 November 2014).
- BBC** (2010). Internet access 'a human right', *BBC News*. 8 March [WWW document] <http://news.bbc.co.uk/2/hi/8548190.stm>.
- BBC News** (2014). Wearables tracked with Raspberry Pi. 1 August [WWW document] <http://www.bbc.com/news/technology-28602997> (accessed 22 November 2014).
- Benkler, Y.** (2006). *The Wealth of Networks: How social production transforms markets and freedom*, New Haven, CT: Yale University Press.
- Berle, A.A. and Means, G.C.** (1991). *The Modern Corporation and Private Property*, New Brunswick, NJ: Transaction Publishers.
- Bhimani, A. and Willcocks, L.** (2014). Digitisation, 'Big Data' and the Transformation of Accounting Information, *Accounting and Business Research* 44(4): 469–490.
- Bond, R.M., Fariss, C.J., Jones, J.J., Kramer, A.D.I., Marlow, C., Settle, J.E. and Fowler, J.H.** (2012). A 61-million-person Experiment in Social Influence and Political Mobilization, *Nature* 482(Sept 13): 295.
- boyd, danah and Crawford, K.** (2011). Six provocations for big data. Presented at the *A Decade in Internet Time: Symposium on the Dynamics of the Internet and Society*, Oxford Internet Institute. [WWW document] <http://www.ssrn.com/abstract=1926431>.
- Bradshaw, T.** (2014a). Google bets on 'internet of things' with \$3.2bn Nest deal, *Financial Times*. 13 January [WWW document] <http://www.ft.com/intl/cms/s/0/90b8714a-7c99-11e3-b514-00144feabdc0.html#axzz3hbfc0he> (accessed 22 November 2014).
- Bradshaw, T.** (2014b). Google buys UK artificial intelligence start-up, *Financial Times*. 27 January [WWW document] <http://www.ft.com/intl/cms/s/0/f92123b2-8702-11e3-aa31-00144feab7de.html#axzz3HBfEc0HE> (accessed 22 November 2014).
- Braudel, F.** (1984). *The Perspective of the World*, New York, NY: Harper & Row.
- Brewster, T.** (2014). Traffic lights, fridges and how they've all got it in for us, *Register*. 23 June [WWW document] http://www.theregister.co.uk/2014/06/23/hold_interthreat/ (accessed 22 November 2014).
- Burdon, M. and McKillop, A.** (2013). *The Google Street View Wi-Fi Scandal and Its Repercussions for Privacy Regulation* (Research Paper No. 14-07), University of Queensland TC Beime School of Law. [WWW document] http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2471316.
- Calo, R.** (2014). Digital Market Manipulation, *George Washington Law Review* 82(4): 995–1051.
- Chandler, Jr A.D.** (1977). *The Visible Hand: The Managerial Revolution in American Business*, Cambridge, MA: Belknap Press.
- Cisco** (2013a). Embracing the internet of everything to capture your share of \$14.4 trillion, *Cisco Systems, Inc.* [WWW document] http://www.cisco.com/web/about/ac79/docs/innov/IoE_Economy.pdf (accessed 9 June 2014).
- Cisco** (2013b). The internet of everything: global private sector economic analysis, *Cisco Systems, Inc.* [WWW document] http://www.cisco.com/web/about/ac79/docs/innov/IoE_Economy_FAQ.pdf (accessed 22 November 2014).
- CNIL** (2014, September 25). Google privacy policy: WP29 proposes a compliance package, *Commission Nationale de L'informatique et Des Libertés*. [WWW document] <http://www.cnil.fr/english/news-and-events/news/article/google-privacy-policy-wp29-proposes-a-compliance-package/> (accessed 21 November 2014).
- Cohen, L.** (2003). *A Consumers' Republic: The politics of mass consumption in postwar America*, New York, NY: Knopf.
- Constantiou, I.D. and Kallinikos, J.** (2014). New Games, New Rules: Big data and the changing context of strategy, *Journal of Information Technology*, advance online publication 9 September, doi: 10.1057/jit.2014.17.
- Davis, G.** (2011). The Twilight of the Berle and Means Corporation, *Seattle University Law Review* 34(4): 1121–1138.
- Davis, G.** (2013). After the Corporation, *Politics & Society* 41(2): 283–308.
- Dean, J.** (2009). Challenges in building large-scale information retrieval systems, *Google Fellow Presentation*. [WWW document] <http://static.googleusercontent.com/media/research.google.com/en/us/people/jeff/WSDM09-keynote.pdf> (accessed 22 November 2014).
- Dean, J. and Ghemawat, S.** (2008). MapReduce: Simplified data processing on large clusters, *Communications of the ACM* 51(1): 107.
- Döpfner, M.** (2014). Why we fear Google, *Frankfurter Allgemeine Zeitung*. [WWW document] <http://www.faz.net/aktuell/feuilleton/debatten/mathias-doepfner-s-open-letter-to-eric-schmidt-12900860.html> (accessed 17 April 2014).
- Doyle, J.** (2013, November 15). Google facing legal action in EVERY EU country over 'data goldmine' collected about users, *Daily Mail Online*. [WWW document] <http://www.dailymail.co.uk/sciencetech/article-2302870/Google-facing-legal-action-EVERY-EU-country-data-goldmine-collected-users.html> (accessed 21 November 2014).
- Durkheim, E.** (1964). *The Division of Labor in Society*, New York, NY: Free Press.
- Dwoskin, E.** (2014). What secrets your phone is sharing about you, *Wall Street Journal*. 14 January [WWW document] <http://online.wsj.com/articles/SB10001424052702303453004579290632128929194>.
- Economist** (2014). The new GE: Google, everywhere. 18 January [WWW document] <http://www.economist.com/news/business/21594259-string-deals-internet-giant-has-positioned-itself-become-big-inventor-and>.
- EPIC** (2014a). Google glass and privacy, *Electronic Privacy Information Center*. [WWW document] <https://epic.org/privacy/google/glass/> (accessed 15 November 2014).
- EPIC** (2014b). Investigations of Google Street View, *Electronic Privacy Information Center*. [WWW document] <https://epic.org/privacy/streetview/> (accessed 21 November 2014).
- Farahany, N.A.** (2012). Searching Secrets, *University of Pennsylvania Law Review* 160(5): 1239–1308.
- Farzad, R.** (2014). Google at \$400 billion: a new no. 2 in market cap, *BusinessWeek: Technology*. 12 February [WWW document] <http://www.businessweek.com/articles/2014-02-12/google-at-400-billion-a-new-no-dot-2-in-market-cap>.
- Finamore, E. and Dutta, K.** (2014). 'Summoning the demon': artificial intelligence is real threat to humanity, says PayPal founder, *The Independent*. [WWW document] <http://www.independent.co.uk/life-style/gadgets-and-tech/news/tesla-boss-elon-musk-warns-artificial-intelligence-development-is-summoning-the-demon-9819760.html> (accessed 22 November 2014).
- Fink, E.** (2014). This drone can steal what's on your phone, *CNNMoney*. 20 March [WWW document] <http://money.cnn.com/2014/03/20/technology/security/drone-phone/index.html> (accessed 22 November 2014).
- Flynn, K.** (2014). Facebook will share users' political leanings with ABC news, *BuzzFeed, Huffington Post*. 31 October [WWW document] http://www.huffingtonpost.com/2014/10/31/facebook-buzzfeed-politics_n_6082312.html (accessed 22 November 2014).
- Foroohar, R.** (2014). Tech titans are living in a naïve, dangerously insular bubble, *Time*. 24 January [WWW document] <http://business.time.com/2014/01/24/eric-schmidt-george-soros-a-tale-of-two-titans/>.
- Forster, N.** (1767). *An Enquiry into the Causes of the Present High Price of Provisions*, London, UK: J. Fletcher and Co.
- Gabriel, S.** (2014). Sigmar Gabriel political consequences of the Google debate, *Frankfurter Allgemeine Zeitung*. 20 May [WWW document] <http://www.faz.net/aktuell/feuilleton/debatten/the-digital-debate/sigmar-gabriel-consequences-of-the-google-debate-12948701.html>.
- Gapper, J.** (2014). We are the product facebook has been testing, *FT*. [WWW document] <http://www.ft.com/intl/cms/s/0/6576b0c2-0138-11e4-a938-00144feab7de.html#axzz3R6dH0dDm> (accessed 5 July 2014).
- Garside, J.** (2014). From Google to Amazon: EU goes to war against power of US digital giants, *Guardian*. 5 July [WWW document] <http://www.theguardian.com/technology/2014/jul/06/google-amazon-europe-goes-to-war-power-digital-giants> (accessed 21 November 2014).
- Gibbs, S.** (2014). Google's founders on the future of health, transport – and robots, *Guardian*. 7 July [WWW document] <http://www.theguardian.com/technology/2014/jul/07/google-founders-larry-page-sergey-brin-interview> (accessed 21 November 2014).
- Hayek, F.A.** (1988). *The Fatal Conceit: The errors of socialism*, Chicago, IL: University of Chicago Press.
- Herold, B.** (2014). Google under fire for data-mining student email messages – education week, *Education Week*. 26 March [WWW document] <http://www.edweek.org/ew/articles/2014/03/13/26google.h33.html>.

- Hilbert, M.** (2013). Technological Information Inequality As an Incessantly Moving Target: The redistribution of information and communication capacities between 1986 and 2010, *Journal of the American Society for Information Science and Technology* 65(4): 821–835.
- Hoofnagle, C.J., King, J., Li, S. and Turow, J.** (2010). How different are young adults from older adults when it comes to information privacy attitudes and policies? *SSRN Electronic Journal* [WWW document] <http://www.ssrn.com/abstract=1589864>.
- Jammet, A.** (2014). The Evolution of EU Law on the Protection of Personal Data, *Center for European Law and Legal Studies* 3(6): 1–18.
- Kelly, H.** (2014). Smartphones are fading. Wearables are next, *CNNMoney*. 19 March [WWW document] <http://money.cnn.com/2014/03/19/technology/mobile/wearable-devices/index.html> (accessed 22 November 2014).
- Kopczynski, P.** (2014). French consumer rights watchdog sues Google, Facebook, Twitter for privacy violations, *Reuters*. 25 March [WWW document] <http://rt.com/news/france-facebook-google-suit-129/> (accessed 21 November 2014).
- Kovach, S.** (2013). Google's plan to take over the world, *Business Insider*. 18 May [WWW document] <http://www.businessinsider.com/googles-plan-to-take-over-the-world-2013-5> (accessed 22 November 2014).
- Kramer, A.D.I., Guillory, J.E. and Hancock, J.T.** (2014). Experimental Evidence of Massive-Scale Emotional Contagion through Social Networks, *Proceedings of the National Academy of Sciences* 111(24): 8788–8790.
- Kwong, R.** (2014). Did privacy concerns change your online behaviour?, *FT Data Blog*. 17 September [WWW document] <http://blogs.ft.com/ftdata/2014/09/17/didprivacy-concerns-change-your-online-behaviour/> (accessed 21 November 2014).
- Lanier, J.** (2013). *Who Owns the Future?* New York, NY: Simon & Schuster.
- Lanier, J.** (2014). Should Facebook manipulate users?: Lack of transparency in Facebook study, *The New York Times*. 30 June [WWW document] <http://www.nytimes.com/2014/07/01/opinion/jaron-lanier-on-lack-of-transparency-in-facebook-study.html>.
- LA Times, A. T. S.** (2014, August 1). 911 calls about Facebook outage angers L.A. County sheriff's officials, *Los Angeles Times*. [WWW document] <http://www.latimes.com/local/lanow/la-me-ln-911-calls-about-facebook-outage-angers-las-sheriffs-officials-20140801-htmlstory.html>.
- Levy, S.** (2009). Secret of googlenomics: data-fueled recipe brews profitability, *Wired*. [WWW document] http://archive.wired.com/culture/culturereviews/magazine/17-06/nep_googlenomics (accessed 22 November 2014).
- Lin, P.** (2014). What if your autonomous car keeps routing you past Krispy Kreme? *The Atlantic*. 22 January [WWW document] <http://www.theatlantic.com/technology/archive/2014/01/what-if-your-autonomous-car-keeps-routing-you-past-krispy-kreme/283221/> (accessed 22 November 2014).
- Locke, J.** (2010). *Two Treatises of Government*. New York: Kessinger Publishing, LLC.
- Madden, M.** (2014). Public perceptions of privacy and security in the post-Snowden era [WWW document] <http://www.pewinternet.org/2014/11/12/public-privacy-perceptions/>.
- Mance, H., Ahmed, M. and Barker, A.** (2014). Google break-up plan emerges from Brussels, *Financial Times*. 21 November [WWW document] <http://www.ft.com/intl/cms/s/0/617568ea-71a1-11e4-9048-00144feabd0c.html#axzz3JjXPNo5> (accessed 21 November 2014).
- Manyika, J. and Chui, M.** (2014). Digital era brings hyperscale challenges, *Financial Times*. 13 August [WWW document] <http://www.ft.com/intl/cms/s/0/f30051b2-1e36-11e4-bb68-00144feabd0c.html?siteedition=intl#axzz3JjXPNo5> (accessed 22 November 2014).
- Mathews, A. and Tucker, C.** (2014). *Government Surveillance and Internet Search Behavior*, Cambridge, MA: Digital Fourth. [WWW document] <http://www.ssrn.com/abstract=2412564>.
- Mayer-Schönberger, V. and Cukier, K.** (2013). *Big Data: A revolution that will transform how we live, work, and think*. Reprint edn Boston, MA: Houghton Mifflin Harcourt.
- McKendrick, N.** (1982). The Consumer Revolution of Eighteenth-Century England, in N. McKendrick, J. Brewer and J.H. Plumb (eds.) *The Birth of a Consumer Society: The commercialization of eighteenth-century England*, Bloomington, IL: Indiana University Press.
- Menn, J., Schäfer, D. and Bradshaw, T.** (2010). Google set for probes on data harvesting, *Financial Times*. 17 May [WWW document] <http://www.ft.com/intl/cms/s/2/254ff5b6-61e2-11df-998c-00144feab49a.html#axzz3JjXPNo5> (accessed 21 November 2014).
- Michaels, J.D.** (2008). All the President's Spies: Private-public intelligence partnerships in the war on terror, *California Law Review* 96(4): 901–966.
- Mick, J.** (2011). ACLU fights for answers on police phone location data tracking, *Daily Tech*. 4 August [WWW document] <http://www.dailytech.com/ACLU+Fights+for+Answers+on+Police+Phone+Location+Data+Tracking/article22352.htm> (accessed 21 November 2014).
- Münstermann, B., Smolinski, B. and Sprague, K.** (2014). The Enterprise IT Infrastructure Agenda for 2014, *McKinsey & Company White Paper*: 1–8.
- Newman, J.** (2009). Google's Schmidt Roasted for Privacy Comments, *PCWorld*. 11 December [WWW document] http://www.pcworld.com/article/184446/googles_schmidt_roasted_for_privacy_comments.html (accessed 21 November 2014).
- Newman, N.** (2014). The costs of lost privacy: consumer harm and rising economic inequality in the age of Google, *William-Mitchell Law Review* 40(2): 12.
- Nicas, J.** (2014). JetBlue to add bag fees, reduce legroom, *Wall Street Journal*. 20 November [WWW document] <http://online.wsj.com/articles/jetblue-to-add-bag-fees-reduce-legroom-1416406199>.
- Nissebaum, H.** (2011). A Contextual Approach to Privacy Online, *Daedalus* 140(4): 32–48.
- O'Brien, K.J.** (2012). European regulators may reopen Google Street View inquiries, *The New York Times*. 2 May [WWW document] <http://www.nytimes.com/2012/05/03/technology/european-regulators-to-reopen-google-street-view-inquiries.html>.
- O'Brien, K.J. and Crampton, T.** (2007). E.U. probes Google over data retention policy, *The New York Times*. 26 May [WWW document] <http://www.nytimes.com/2007/05/26/business/26google.html>.
- O'Brien, K.J. and Miller, C.C.** (2013). Germany's complicated relationship with Google Street View, *Bits Blog*. 23 April [WWW document] <http://bits.blogs.nytimes.com/2013/04/23/germanys-complicated-relationship-with-google-street-view/> (accessed 21 November 2014).
- Office of the Privacy Commission of Canada** (2010). Google contravened Canadian privacy law, investigation finds, *Office of the Privacy Commissioner of Canada*. 19 October [WWW document] https://www.priv.gc.ca/media/nr-c/2010/nr-c_101019_e.asp (accessed 21 November 2014).
- Owen, J.** (2014). Google in court again over 'right to be above British law' on alleged secret monitoring, *The Independent*. 8 December.
- Palfrey, J.** (2008). The Public and the Private the United States Border with Cyberspace, *Mississippi Law Journal* 78(2): 241–294.
- Parnell, B.-A.** (2014). Is Google building SKYNET? Ad kingpin buys AI firm DeepMind, *Register*. 27 January [WWW document] http://www.theregister.co.uk/2014/01/27/google_deep_mind_buy/ (accessed 22 November 2014).
- Pentland, A.** (2009). Reality mining of mobile communications: Toward a new deal on data, in *The Global Information Technology Report, World Economic Forum & INSEAD*, pp. 75–80.
- PEW Research Center** (2014). Digital life in 2015. (Research Report). [WWW document] <http://www.pewinternet.org/2014/03/11/digital-life-in-2015/>.
- Piketty, T.** (2014). *Capital in the Twenty-First Century*, Cambridge, MA: Belknap Press of Harvard University Press.
- Plummer, Q.** (2014). Google email tip-off draws privacy concerns, *Tech Times*. 5 August [WWW document] <http://www.techtimes.com/articles/12194/20140805/google-email-tip-off-draws-privacy-concerns.htm> (accessed 21 November 2014).
- Reidenberg, J.R.** (2014). Data surveillance state in the United States and Europe, *Wake Forest Law Review* 48(1): 583.
- Richards, N.M.** (2013). The Dangers of Surveillance, *Harvard Law Review* 126: 1934–1965.
- Richards, N.M. and King, J.H.** (2014). *Big Data Ethics*. (Accepted Paper Series) Saint Louis, MO: Wake Forest Law Review.
- Schmarzo, B.** (2014). The value of data: Google gets It!, *EMC InFocus*. 10 June [WWW document] https://infocus.emc.com/william_schmarzo/the-value-of-data-google-gets-it/.
- Schmidt, E.** (2014). A chance for growth, *Frankfurter Allgemeine Zeitung*. 9 April [WWW document] <http://www.faz.net/aktuell/feuilleton/debatten/eric-schmidt-about-the-good-things-google-does-a-chance-for-growth-12887909.html>.
- Schwartz, P.** (1989). The Computer in German and American Constitutional Law: Towards an American right of informational self-determination, *American Journal of Comparative Law* 37(4): 675–701.
- Semitsu, J.P.** (2011). From Facebook to Mug Shot: How the dearth of social networking privacy rights revolutionized online government surveillance, *Pace Law Review* 31(1): 291.

- Sklar, M.J.** (1988). *The Corporate Reconstruction of American Capitalism: 1890–1916: The market, the law, and politics*, New York, NY: Cambridge University Press.
- Smith, A.** (1994). *The Wealth of Nations*. (E. Cannan, ed.), Later Printing edn New York: Modern Library.
- Snelling, D.** (2014). Google Maps is tracking you! How your smartphone knows your every move, *Express.co.uk*. 18 August <http://www.express.co.uk/life-style/science-technology/500811/Google-Maps-is-tracking-your-every-move> (accessed 21 November 2014).
- Solove, D.J.** (2007). 'I've Got Nothing to Hide' and Other Misunderstandings of Privacy, *San Diego Law Review* **44**: 745.
- Solove, D.J.** (2013). Introduction: Privacy self-management and the consent dilemma, *Harvard Law Review* **126**(7): 1880–1904.
- Steingart, G.** (2014). Google debate our weapons in the digital battle for freedom, *Frankfurter Allgemeine Zeitung*. 23 June [WWW document] <http://www.faz.net/aktuell/feuilleton/debatten/the-digital-debate/google-debatte-waffen-im-digitalen-freiheitskampf-13005653.html>.
- Streitfeld, D.** (2013). Google admits Street View project violated privacy, *New York Times*. 12 March [WWW document] <http://www.nytimes.com/2013/03/13/technology/google-pays-fine-over-street-view-privacy-breach.html>.
- Trotman, A.** (2014). Google boss Larry Page: Europe needs to be more like Silicon Valley and support technology, *Telegraph*. 31 October [WWW document] <http://www.telegraph.co.uk/technology/google/11202850/Google-boss-Larry-Page-Europe-needs-to-be-more-like-Silicon-Valley-and-support-technology.html>.
- Unger, R.M.** (2007). *Free Trade Reimagined: The world division of labor and the method of economics*, Princeton, NJ: Princeton University Press.
- U.S. Committee on Commerce, Science, and Transportation** (2013). A review of the data broker industry: collection, use and sale of consumer data for marketing purposes, Office of Oversight and Investigations. [WWW document] http://www.commerce.senate.gov/public/?a=Files.Serve&File_id=0d2b3642-6221-4888-a631-08f2f255b577.
- Vaidhyanathan, Siva.** (2011). *The Googilization of Everything*, Berkeley, CA: University of California Press.
- Varian, H.R.** (2010). Computer Mediated Transactions, *American Economic Review* **100**(2): 1–10.
- Varian, H.R.** (2014). Beyond Big Data, *Business Economics* **49**(1): 27–31.
- Vasagar, J.** (2014). Google could face 'cyber courts' in Germany over privacy rights, *Financial Times*. 27 May [WWW document] <http://www.ft.com/intl/cms/s/0/a7580826-e59d-11e3-8b90-00144feabd0.html#axzz3jJXPNno5> (accessed 21 November 21 2014).
- Wallbank, P.** (2012). How much server space do Internet companies need to run their sites? *Decoding the New Economy*. 23 August [WWW document] <http://paulwallbank.com/2012/08/23/how-much-server-space-do-internet-companies-need-to-run-their-sites/> (accessed 22 November 2014).
- Waters, R.** (2014). FT interview with Google co-founder and CEO Larry Page – FT.com, *Financial Times*. 31 October [WWW document] <http://www.ft.com/intl/cms/s/2/3173f19e-5fbc-11e4-8c27-00144feabd0.html#axzz3jJXPNno5> (accessed 21 November 2014).
- Weatherill, L.** (1993). The Meaning of Consumer Behavior in the Seventeenth and Early Eighteenth-Century England, in J. Brewer and R. Porter (eds.) *Consumption and the World of Goods*, London, UK: Routledge.
- Weber, M.** (1978). *Economy and Society: An outline of interpretive sociology*. Vol. 1 Berkeley, CA: University of California Press.
- Weiser, M.** (1991). The Computer for the 21st Century, *Scientific American* **265**(3): 94–104.
- White House** (2014). Big Data: seizing opportunities, preserving values (Report for the President), Washington D.C., USA: Executive Office of the President. [WWW document] http://www.whitehouse.gov/sites/default/files/docs/big_data_privacy_report_may_1_2014.pdf.
- Williamson, O.E.** (1985). *The Economic Institutions of Capitalism*, New York: London: Free Press.
- Winkler, R. and Wakabayashi, D.** (2014). Google to buy nest labs for \$3.2 billion – update, *EuroInvestor*. 14 January [WWW document] <http://www.euroinvestor.com/news/2014/01/14/google-to-buy-nest-labs-for-32-billion-update/12658007> (accessed 22 November 2014).
- Ziegler, C.** (2012). Facebook IPO facts and figures: the house that 100 petabytes built, *Verge*. 1 February [WWW document] <http://www.theverge.com/2012/2/1/2764905/facebook-ipo-facts-and-figures-the-house-that-100-petabytes-built> (accessed 22 November 2014).
- Zittrain, J.** (2014). Facebook could decide an election without anyone ever finding out, *New Republic*. 1 June [WWW document] <http://www.newrepublic.com/article/117878/information-fiduciary-solution-facebook-digital-gerrymandering>.
- Zuboff, S.** (1981). Psychological and Organizational Implications of Computer-Mediated Work, MIT Working Paper, Center for Information Systems Research.
- Zuboff, S.** (1982). New Worlds of Computer-Mediated Work, *Harvard Business Review* **60**(5): 142–152.
- Zuboff, S.** (1985). Automate/Informate: The two faces of intelligent technology, *Organizational Dynamics* **14**(2): 5–18.
- Zuboff, S.** (1988). *In the Age of the Smart Machine: The future of work and power*, New York, NY: Basic Books.
- Zuboff, S.** (2013). Computer-Mediated Work, In *Sociology of Work: An Encyclopedia*, Thousand Oaks, CA: SAGE Publications, Inc. [WWW document] <http://knowledge.sagepub.com/view/sociology-of-work/n41.xml>.
- Zuboff, S. and Maxmin, J.** (2002). *The Support Economy: Why corporations are failing individuals and the next episode of capitalism*, New York, NY: Viking Penguin.

About the author

Shoshana Zuboff is the Charles Edward Wilson Professor of Business Administration (Emerita) and a Faculty Associate at the Berkman Center for Internet and Society, Harvard Law School. She is currently completing a new book, *Master or Slave? The Fight for the Soul of Our Information Civilization* (forthcoming, Public Affairs and Eichborn 2016). She is also the author of *In the Age of the Smart Machine: The future of work and power* and *The Support Economy: Why corporations are failing individuals and the next episode of capitalism*.