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Larsson, Stefan

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LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

CHAPTER 6

ALL-SEEING GIANTS AND BLINDFOLDED DWARFS: ON INFORMATION-ASYMMETRIES ON DATA-DRIVEN MARKETS

STEFAN LARSSON

INTRODUCTION: THE POLICY CHALLENGES OF A DATA-DRIVEN DIGITAL ECONOMY

Much has happened with the “digital economy” in the more than 20 years that have passed since the term was established by Don Tapscott’s book with the same title. In 1996, the modern data-driven platform giants Google, Facebook, Alibaba, as well as contemporary pioneers of the sharing economy as Uber and Airbnb, were yet to be founded. Apple – today the world’s largest technology company by total assets – was a struggling and seemingly confused producer of a variety of consumer technologies. While much of the early thinking on the digital economy revolved around the democratisation of knowledge, the distribution of the internet and the meaning of the shift from analogue to digital, the digital economy has evolved into a highly data-driven ecosystem deeply involved in most aspects of our everyday lives. Elsewhere, I have addressed challenges to policy and regulation of internet-dependent innovation as one of the key policy-related modern challenges, particularly dependent on how to understand the new phenomena (Larsson, 2017a) and in relation to the fundamental challenge of sustaining consumer trust in new data-driven innovations (Larsson, 2017c), where personal data becomes the very means of payment (Larsson & Ledendal, 2017).

The top five companies with the largest absolute increase in market capitalisation in 2009–2017 were all very much consumer-focused data-driven tech companies: Apple, Alphabet (Google), Amazon, Microsoft, and Facebook (PwC, 2017). By March 2017, these five data-driven companies had taken five of the top six spots in terms of market capitalisation globally, overtaking the oil companies and to some extent the financial institutions that were at the top only a decade ago. This is an indication of a recent and very much ongoing development of a digital economy based on the collection, analysis and trade of personal data. The behavioural patterns of individuals, the sociogrammatic links between them, their geolocation, purchasing patterns, as well as their long-used demographic information, all form the inherent value of the digital economy. Consumer profiling, therefore, increasingly serves as a foundation for innovation in this data-driven world, including not only the “big five”, but a rapidly increasing undergrowth of platform-based companies and data brokers at the core of a growing “sharing economy” (Christl, 2017; Leurs & Zimmer, 2017).

The objective of this chapter is to contribute to the understanding of the growth of this global data-driven market ecology, mainly in order to pinpoint important regulatory challenges, where individual choice and agency, as well as competition, seem undermined. Truly, this development holds many promises for new innovation, some more disruptive than others, but also poses challenges that in this chapter is discussed in terms of lack of transparency on the data’s destination and how it is used. As more types of industries develop their own sophisticated uses of personal data, the collaboration between multiple parties by necessity develops. This does however contribute to the lack of insight for individuals and authorities, but also risks skewing the markets to the favour of those in control of distribution platforms and search engines. The challenge then regards how to deal with data-driven dominance and gatekeeping, i.e., the notion of antitrust in relation to digital-markets.

The chapter thereby focuses on: (1.) the “ecosystem” of global data-driven markets and the lack of incentives for data collectors to be more transparent; in order to analyse (2.) the extent to which the information asymmetry brings monopolistic tendencies and a power asymmetry between data-collecting and data-utilising platforms, on the one hand, and individuals and small and medium-sized enterprises (SMEs), on the other, and to (3.) suggest counter-measures to problems arising from this asymmetry. For the sake of expressing the related points, I mainly use the EU commission as the regulatory entity at play.

BACKGROUND: PLATFORM GIANTS AND POWER ASYMMETRIES

About a year before the strategy on the collaborative economy, which is returned to below, the EU commission issued a communication on a digital single-market strategy for Europe (COM(2015) 192 final). The digital single market of course means a substantially broader approach than the case of the collaborative economy, to include also aspects such as telecom rules, VAT burdens across borders and geoblocking obstacles. However, and importantly, *the online platforms* – widely exemplified as search engines, social media, e-commerce platforms, app stores, and price-comparison websites – are also addressed in the strategy. They are described positively, in that they “enable consumers to find online information and businesses to exploit the advantages of e-commerce”, and have come to play a fundamental role in the digital economy. They are, furthermore, heavily dependent on data, they “generate, accumulate and control an enormous amount of data about their customers and use algorithms to turn this into usable information”. The growth of such data is exponential, the commission claims – “90% of all data circulating on the internet were created less than 2 years ago” (COM(2015) 192 final, section 3.3.1).

The Commission argues that the new platforms have rapidly and profoundly challenged traditional business models and that, “the rise of the sharing economy also offers opportunities for increased efficiency, growth and jobs, through improved consumer choice, but also potentially raises new regulatory questions” (COM(2015) 192 final, section 3.3.1). Which, again, is expressed in terms of what this platform-based control of access to online markets means and concerns over the growing market power of some platforms.

“These include a lack of transparency as to how they use the information they acquire, their strong bargaining power compared to that of their clients, which may be reflected in their terms and conditions (particularly for SMEs), promotion of their own services to the disadvantage of competitors, and non-transparent pricing policies, or restrictions on pricing and sale conditions (COM(2015) 192 final, section 3.1.1).”

The main points addressed by the EU commission regard both the balancing of powers between the data-driven platform giants and other companies, relating to the gatekeepers of market access these platforms have become, as well as the relationship between commercial data-collecting entities and individual consumers. The latter is also echoed by the European Data Protection Supervisor (EDPS), which emphasises the importance of rising up to the challenges of consumer privacy that have emerged from the combination of “Big Data” and data analysis. EDPS (2015) points out the importance of (1.) Transparency, (2.) the user’s codetermination, (3.) data protection, and (4.) accountability. There are arguably a number of potential problems arising from lack of insight into how consumer data is used and where it travels. The notion that more transparency is the way forward is also supported by law professor Frank Pasquale in “The Black Box Society”:

“If we’re not going to be able to stop the flow of data, therefore, we need to become more knowledgeable about the entities behind it and learn to control their use of it. We need to hold business and government to the same standard of openness that they impose upon us – and complement their scrutiny with new forms of accountability (2015, p. 57).”

Arguably, the data-driven market development in recent years has led to what Christl in a recent report has described as that “pre-existing practices of commercial consumer data collection have rapidly evolved into

pervasive networks of digital tracking and profiling. Today, a vast and complex landscape of corporate players continuously monitors the lives of billions" (2017, p. 65). Interestingly, the online advertising industry can be seen as a "pioneering force" (Christl, 2017, p. 67) in developing sophisticated technologies that combine and link digital profiles across different companies such as data brokers and data aggregators. It has created a sort of data-driven infrastructure for consumer profiling that are spreading to other types of industries as well (cf. Larsson 2017b), discussed in "Infoglut" by media scholar Mark Andrejevic as "the spreading of prediction markets" (2013, p. 68–70). What broadly started as means to make profit for free services through ads has now developed into the sophistication of personalised services in more sectors, developing insights through collection and trade of big data, as well as utilization of improved analytics and machine learning.

Below, I mainly discuss the issue of power struggles between commercial entities in terms of monopolistic tendencies and market dominance, and I mainly address the consumer issue in terms of information asymmetry, lack of transparency and the complexities of the "data ecosystem".

REGULATORY QUESTIONS OF DIGITAL DISRUPTION

THE SHARING ECONOMY

A sort of conceptual struggle of great legal and political importance can be witnessed with regards to the sharing or collaborative economy, for which the EU Commission presented an agenda in June 2016 (COM(2016) 356). Uber, for example, reportedly had 50 lawsuits filed against it during 2015 in the U.S. federal court alone.¹ Many of the cases regard the extent to which Uber drivers should be seen as independent contractors or employees. Apart from the employment regulatory issues, the tax issue is a concern for many states around the world. Uber, and other representatives of the sharing economy, simply challenges some of the notions under which these markets traditionally have been regulated. The key is how to conceptualise these new ventures – what they are understood to be.²

The Commission sees great potential in the collaborative economy in that it "creates new opportunities for consumers and entrepreneurs" and can "make an important contribution to jobs and growth in the European Union" (COM(2016) 356, p. 2).³ At the same time, the Commission states that the collaborative economy raises issues with regard to the application of existing legal frameworks, such as "blurring established lines between consumer and provider, employee and self-employed, or the professional and non-professional provision of services" (p. 2). The sharing economy is debated, both as a practice and as a concept, as recently underlined by digital business scholars Erickson & Sørensen:

1 Brown, Kristen V. (16 June 2016) "Here's what's going on with all of those Uber lawsuits", Fusion. <http://fusion.net/story/315350/uber-class-action-lawsuit-settlement/>

2 For more on how the metaphorical understanding of digital phenomena is relevant for the regulation of these phenomena, see Larsson (2017a) "Conceptions in the Code: How Metaphors Explain Legal Challenges in Digital Times."

3 For an account on the nature and significance of recent technological change and its impact on European companies and labour markets, see Bergström & Wennberg (2016) "Machines, Jobs and Equality".

“Yet, as ongoing and numerous legal actions and injunctions against companies like Uber and Airbnb across the world demonstrate, opinion differs on the extent to which the sharing economy should be regulated, resisted or embraced (Erickson & Sørensen, 2016, p. 2)”

This is also acknowledged by Erickson & Sørensen in terms of that “[t]he way that society and policymakers define the sharing economy will influence how we choose to regulate its activities” (p. 2). The platform based economy is arguably a key challenge for the assessment and regulation of dominant market positions in terms of competition and antitrust. Particularly when a platform becomes so dominant that it essentially becomes an infrastructure for newcomers, a sort of superstructure that operates as a gatekeeper for new ventures.

ANTITRUST AND INFOGLUT

When it comes to the relationship between the relatively few data giants and smaller newcomers, the trend has for a while been agglomeration through acquisition into more or less monopolistic or oligopolistic markets (cf. Dolata, 2017). This is also underlined by media researcher Andersson Schwarz:

“The present tech economy seems beset by market concentration, which is being harnessed by a handful of actors with the financial muscle to either outperform budding market entrants through pricing suppression, automation, and efficiency-maximization – or to simply buy them. (Andersson Schwarz, 2017, p. 7)”

Much of the coming policy challenges in the data-driven markets will unavoidably have to deal with how to translate antitrust issues into the practices of the giants in the digital economy, a fact increasingly voiced by critics.⁴ According to Andersson Schwarz, actors like Google explicitly admits that the massive data collection infrastructure it holds is key to its market dominance (2017, p. 16), and Andersson Schwarz exemplifies that arguing that by Google holding behavioural mobile internet user data, it can excel in seemingly unrelated sectors, like urban and traffic planning.

“This means that undisclosed steps can be taken toward rapid intrusion into unexpected sectors, only knowable ‘ex post facto’. While it would be preposterous that regulators should have knowledge of business strategies in advance, the radically altered conditions for this kind of market entry begs new questions as to how antitrust/competition legislation should be formulated and implemented in the digital era (Andersson Schwarz, 2017, p. 16).”

This means that the traditional notion of sector-dependent antitrust likely needs to be adapted and rethought, to enable an assessment of contemporary cross-sector outcomes of massive data aggregation by singular corporate entities. An example from legal practice would be the recent case where the European Commission fined Google €2.42 billion for breaching EU antitrust rules, under claims that Google had abused its market dominance as a search engine by giving an illegal advantage to another Google product, its comparison shopping service. According to Commissioner Margrethe Vestager, Google abused its market dominance as a search engine by promoting its own comparison shopping service in its search results, and demoting those of

⁴ The Economist, Leaders section, 6 May 2017. “The world’s most valuable resource is no longer oil, but data. The data economy demands a new approach to antitrust rules”. <https://www.economist.com/news/leaders/21721656-data-economy-demands-new-approach-antitrust-rules-worlds-most-valuable-resource>

competitors.⁵ The case is very much debated and will be so for a long time (cf. Day, 2017). Commentators, like Adam Davidson in *The New Yorker*, state the discrepancies between the US and EU when it comes to antitrust regulation, and notes that the “perhaps most striking about the European Union’s decision is that many of the complaints were from big, U.S.-based firms: not only TripAdvisor and Yelp but also Microsoft, Oracle, and others. They had pursued Google through the U.S. Federal Trade Commission, to no avail”.⁶

The non-transparent aspects of automation in combination with market dominance is also of importance in the relationship between mega-platforms, on the one hand, and smaller companies or new ventures as well as consumers, on the other. For example, both Google’s search engine and the Facebook feed algorithmically moderate the blending of paid and organic editorial content. The design of these algorithms, under constant development and tuning, are both hidden for external scrutiny as well as affecting which sites being promoted over others, making this design crucial for smaller ventures of all sorts, having a consumer orientation. Given the key online gatekeeping position of these dominant platforms – Google holding over 90% of the search market globally⁷ and Facebook roughly 2 billion active users⁸ – any other consumer-oriented company will unavoidably be dependent on the workings of these algorithms.

This gatekeeping aspect is also seen in corporate policy-making in the ways in which Apple implements its App Store usage policy (a “macro-level platform superstructure”, in the words of Andersson Schwarz, 2017). For example, in June 2016, a change in how Apple implements its App Store usage policy suddenly threatened to kill off an entire e-identification system used by millions of Swedes for transferring money to friends, paying bills or being in contact over a personal matter with governmental authorities. After what Andersson Schwarz describes as “a brief furore in the Swedish tech community”, Apple’s head office ultimately granted an exception to the identification app regarding this fundamental rule (2017, p. 18).

THE ‘MIXED MOTIVES’ OF ONLINE SEARCH

Internet search – to return to Google – are also of interest from a consumer-needs perspective, constantly negotiating between striving to offer results of greatest personal relevance and a business model that includes paid content. An interesting paper from 1998 on the “anatomy of a large-scale hypertextual web search engine” states that “advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers” (1998, p. 18). While this bias needs to be assessed from both an antitrust as well as a consumer perspective, the perhaps most interesting aspect with this paper is that it is written by Sergey Brin and Larry Page, the founders of Google, in 1998, the same year the google search engine was launched (without a working business model). Today, Google has created perhaps the most pervasive and significant data-collection infrastructure ever known to man, serving its ad sales. In this early paper, Brin and Page, emphasise the problems of “mixed motives” resulting in search engine bias: “Since it is

5 European Commission – Press release 27 June 2017. Antitrust: Commission fines Google €2.42 billion for abusing dominance as search engine by giving illegal advantage to own comparison shopping service. Brussels. http://europa.eu/rapid/press-release_IP-17-1784_en.htm

6 The New Yorker, 28 June 2017 “Teddy Roosevelt wouldn’t understand the EU’s antitrust fine against Google”, by Adam Davidson. <http://www.newyorker.com/business/adam-davidson/teddy-roosevelt-wouldnt-understand-the-eus-antitrust-fine-against-google>

7 As of July 2017, according to <http://gs.statcounter.com/search-engine-market-share>.

8 Announced by Facebook in June 2017. And, as James Titcomb of the Telegraph points out, at least two in every three people who could use Facebook every month do so, given that around 3.7 billion people around the world have access to internet connections, and around 700 millions of those are in China, where Facebook is banned (The Telegraph, 27 June 2017).

very difficult even for experts to evaluate search engines, search engine bias is particularly insidious” (Brin & Page, 1998, p. 18).

While Google is clearly dominant in the search market, future challenges will regard other translations of antitrust into settings where market dominance is even harder to define. And, from a strict jurisdictional perspective, the question of how to regulate corporations active on a global arena based on rules set in singular countries or the EU will continue to be a challenge.

INFORMATION ASYMMETRIES ON CONSUMER DATA MARKETS

The basic tenets of much consumer policy deals with enabling consumers to be able to make informed decisions. However, several surveys carried out in recent years indicate that users are becoming increasingly concerned about their lack of control of the use and dissemination of their personal data (Lilley et al., 2012; Pew, 2014). Some are particularly worried about having no control over their internet-generated personal data and the possibility of it being used in ways other than they originally intended when sharing it (Kshetri, 2014; Narayanaswamy & McGrath, 2014). This could, in theory, lead to new services that offer the data handling and level of privacy that is demanded from these worried groups (cf. Larsson, 2017c). However, research also shows that many users often continue to use services that can be very intrusive, while at the same time stating that they are concerned about data being collected from their use of online products and services (Bechmann, 2014; Light & McGrath, 2010). This mismatch, sometimes called a “privacy paradox” (cf. Larsson, 2017c; Larsson, 2017d), is likely depending on a lack of transparency of how data is collected, handled and used by the service providers.

In 2015, the Norwegian Data Protection Authority, Datatilsynet, undertook a study on commercial data collection in Norway (Datatilsynet, 2015; cf. Larsson & Ledendal, 2017 for a Swedish account). This study, too, confirms the incentive of aggressive data collection on non-transparent data markets:

“When consumers have no knowledge or understanding about what is going on, they cannot demand services that provide better privacy. This results in the sector having no incentives to provide services that are more privacy-friendly. The winner in the market is the company who has the most data, and future developments will therefore be characterised by increasingly intensive harvesting of personal data (Datatilsynet, 2015, p. 47).”

WHEN INTERNET GIVES YOU LEMONS

The problem with information asymmetries in markets is a basic theoretical concern within economics, too, e.g. early noted by Nobel laureate George Akerlof in “The Market for Lemons” (1970) in terms of quality and uncertainties. Akerlof’s market theorising sought to provide structure to determine “the economic costs of dishonesty” (1970, p. 488). In short, Akerlof’s article shows how markets in which consumers cannot distinguish between good quality and poor quality (he uses the car market, with “lemon” as slang for a bad car) leads to a median pricing. This in turn leads to incentives for sellers of good-quality products not to participate in the

market and to sellers of poor-quality products to do so. This information asymmetry, according to Akerlof, is likely to cause the market to move towards collapse, thus forming an argument for regulation.

The article has contributed to both economic theory and contract theory, but has also been criticised based on the fact that the lack of consumer insight leads to new markets aimed at remedying the information asymmetries (cf. William L. Anderson). The counter-argument is not without merits in relation to price comparisons and product reviews, which – indeed – have democratised markets and strengthened consumers in many cases. However, the market for contractual comparisons and data collection practices do not appear to have had the same growth or operate according to such principles, making the implications of the General Data Protection Regulation (GDPR) – that becomes enforceable from 25 May, 2018 – of particular interest. The GDPR is intended to develop existing legal framework by strengthening and unifying data protection for all individuals within the EU, and to give control back to citizens and residents over their personal data. For example, this includes that automated individual decision-making, including profiling, is made contestable (Article 22), and that the concept of *Privacy by Design* is formalised into the regulation (Article 25). Furthermore, valid consent must be explicit for data collected and the purposes it is used for, and stressing the right to withdraw consent at any time (Article 7; defined in Article 4).

NON-INFORMED CONSENT?

Importantly, from a consumer perspective, a strongly information-asymmetric market can be seen as a dysfunctional consumer market in which consumers cannot make informed choices. When consumers have little knowledge, or do not understand how and when their data is collected, how it is handled, by what party and where it travels, they cannot require services that provide better privacy or for other reasons data practices that would be perceived as more legitimate. This information asymmetry is an indication of a market development with weak incentives to provide services that are more privacy-friendly, which in turn leads to the fact that the winner in the market is the company with the most data, not necessarily the most legitimate collection.

Returning to Akerlof's notion of information asymmetry in the data-driven markets, in relation to contemporary data-driven markets: arguably, consumers cannot distinguish between good quality and poor quality in terms of how fair the data collection is, where the information travels and its use. The development will therefore be characterised by increasingly intensive collection, analysis and trade in personal data, unless consumer transparency is increased. This, of course, too includes a development of a multitude of data-driven consumer services that will be very much sought and utilised by consumers, but it also means that much of the balancing of powers in markets and their regulation will have to be debated on a level above consumers' (non-)informed choices. The notion of informed consumers controlling the data-driven markets is not working in practice. One of the constituting aspects of this lack of control, in addition to the lack of incentives for transparency, regards an increasing complexity of the data markets, which I term the "data ecosystem", also creates a structural obstruction for transparency.

THE COMPLEXITIES OF THE DATA ECOSYSTEM

A challenge from the perspective of co-determination and transparency of data practices is that many different types of data from a variety of sources, both of digital as well as analogue, is used for consumer-profiling purposes (Larsson, 2017b). King & Forder (2016) points out, for example, that privacy protection is often based on an underlying assumption that data is collected directly from the (individual) data subject and that data practices should be limited to the primary purpose of the collection. In fact, many of the actors who handle consumer data do not have any direct relation to the specific consumers, such as the so-called data brokers. Many of the actors dealing with consumer personal data prepare access through secondary sources and use the data for purposes not known at the time of original collection (King & Forder, 2016), mentioned by Pasquale as that we are in an “era of runaway data” (2015, p. 19). This contributes to the lack of transparency, which makes it more difficult for consumers to oppose the use, e.g. by opting out, and for authorities or other parties to carry out supervision.

DATA BROKERAGE

The data ecosystem is thereby a challenge for traditional regulation of personal data and for consumer protection. The data brokers play an interesting role in the midst of this development, motivating a specific focus here. The data broker is a type of market operator who focuses on collecting consumer information from many sources and whose underlying business model is to offer customer profiles to business partners. The U.S. Federal Trade Commission (FTC) concludes that data brokers are important operators in the “Big-Data economy” and include giants such as Acxiom, which reported over \$1 billion in net revenue in 2015 (FTC, 2014). Data brokers are relevant from a consumer perspective, not only as an entity in themselves, but also with regards to how consumer profiling is used, i.e., who their customers are. For example, Acxiom has among its customers the majority of American credit card providers, healthcare insurance companies and domestic airline corporations (note the spreading of prediction markets, mentioned above), according to a report from the US Senate Commerce Committee (2013).

Christl (2017), in a report on how companies collect, combine, analyse, trade and use personal data, shows how data brokers like Acxiom and also the database and software corporation Oracle have developed into sophisticated dealers of consumer data on a global scale. Reportedly, Acxiom manages 15,000 customer databases and 2.5 billion customer relationships for 7,000 clients, including 47 of the Fortune 100 companies. Acxiom also partners with platforms such as Facebook, Google and Twitter in several ways. For example, the company helps improve the tracking and categorisation of their users, based on data collected from beyond these platforms (Christl, 2017, pp. 58–59).

Similarly, Oracle – as one of the world’s largest business software and database vendors – has become one of the largest consumer-data brokers as well. It has acquired several data companies, including Datalogix (tracks purchase transactions from grocery chains), AddThis (tracks 900 million users across 15 million websites, as well as 1 billion mobile users), Crosswise (collects activity data across billions of devices and identifies which PCs, phones, tablets, and TVs are being used by an individual consumer), and BlueKai (collects PC & smartphone users’ data), in order to develop their data brokerage (Christl, 2017, p. 59). In addition, Oracle aggregates and analyses “700 million social messages daily” from social media networks, message boards,

blogs, consumer review sites, and video platforms, according to their own account.⁹ Oracle also partners with Facebook, in order to provide data to help the platform to better sort and categorise its users, with data collected from beyond Facebook, and to track its users' purchases in stores. Oracle also provides data about its clients' customers to Facebook in order to find and target these customers on Facebook (Christl, 2017, p. 61).

This indicates that a large amount of individual consumer information is a component of a data-mediated market into which they have little insight, and that part of the problem concerning data brokers is the lack of transparency and accountability, for example emphasised by the Federal Trade Commission in the US as "a fundamental lack of transparency about data broker industry practices" (FTC, 2014, p. vii). Similarly, a Dutch study found that data brokers often lack legal grounds for managing the vast amounts of data they handle and generally do not respect purpose limitations (Kreiken, 2016). This leads to fewer opportunities for individuals to find out how their information is handled by third parties, since it becomes increasingly complicated for users to control their data once it has been forwarded.


CONCLUSIONS

The regulatory challenges briefly discussed in this chapter in relation to data-driven markets relate to three central regulatory bodies: antitrust/competition law, consumer protection and data protection. The main argument deals with the importance of handling and finding balances with regard to the information asymmetries between individuals and data collecting, analysing and brokering platform parties.

Firstly, regarding competition, as developed above, the issue of competition on data-driven markets is a central one for innovation in the years to come, where a few corporations have become very dominant over the course of just a decade in setting the playing field for SMEs or newcomers. However, how to translate the notion of antitrust into a data-driven economy with a few mega-platforms dominating much of the setting is far from clear and marks a legal and political challenge for years to come.

Secondly, with regards to the lack of transparency in the complexities of data-collection markets, the consumer-protection authorities, in addition to data-protection authorities, could be more active players, particularly given the lack of incentives for most market players to be more transparent. The consumers themselves are seemingly too weak and too ill-informed to become a true balancing force. This is a point raised also elsewhere (Rhoen, 2016; for the case of Sweden, see Larsson & Ledendal, 2017) and discussed by Pasquale in terms of "qualified transparency" (2015, p. 160–165), which calls for a "need to equalize the surveillance that is now being aimed disproportionately at the vulnerable" (2015, p. 57). This would require both regulatory approaches for reaching more transparency in the data-driven handling, in order to enable supervision, but also likely data-driven and digital methods developed by the entities implementing supervision. In order to study the outcomes of automated services based on pattern recognition and address accountability for these outcomes likely requires combinations of legal and data expertise. This could, at best, stimulate better competition in the markets where more players offer tools and services that more clearly address the flaws of the "non-informed consent" cultures (Bechmann, 2014) on digital consumer markets.

9 [accessed 25 October 2017].




However, **thirdly**, there are also concerns relating to accountability over algorithmic and automated services that require much further study to be adequately understood (cf., Zarsky, 2016), e.g. how to redress phenomena like predictive privacy harms (cf. Crawford & Schultz, 2014), a point also raised in socio-legal studies (Larsson & Svensson, 2017). The more autonomous agencies and artificial intelligence that are developed within data-driven platforms and applications with legal, cultural and social effects, the more important the question of how to understand algorithmic accountability arguably becomes.

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