

**Opening the Black Box:  
In Search of Algorithmic Transparency**

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<sup>1</sup> The ideas and opinions expressed in this paper are those of the author and do not necessarily represent the view of any institution with which she is affiliated.

## **Abstract**

Given the importance of search engines for public access to knowledge and questions over their neutrality, there have been many theoretical debates about the regulation of the search market and the transparency of search algorithms. However, there is little research on how such debates have played out empirically in the policy sphere. This paper aims to map how key actors in Europe and North America have positioned themselves in regard to transparency of search engine algorithms and the underlying political and economic ideas and interests that explain these positions. It also discusses the strategies actors have used to advocate for their positions and the likely impact of their efforts for or against greater transparency on the regulation of search engines. Using a range of qualitative research methods, including analysis of textual material and elite interviews with a wide range of stakeholders, this paper concludes that while discussions around algorithmic transparency will likely appear in future policy proposals, it is highly unlikely that search engines will ever be legally required to share their algorithms due to a confluence of interests shared by Google and its competitors. It ends with recommendations for how algorithmic transparency could be enhanced through qualified transparency, consumer choice, and education.

## INTRODUCTION

Search engines play an increasingly central role in modern societies as gateways to information and knowledge at a massive scale: the search giant Google processes more than 40,000 search queries per second and 3.5 billion searches per day ("Google Search Statistics," 2012). Considered the 'secret sauce' of search engines, complex algorithms determine the rank order of websites in search results. Given the impact of search engines and their algorithms on public access to knowledge and questions over their neutrality, some have called for greater regulation of the search market, including through more transparency of search algorithms. However, others counter that disclosing the search algorithm would violate companies' commercial trade secrets, potentially presenting a disincentive to innovate, and risk opening up vulnerabilities to spammers. Moreover, the complexity of search algorithms renders them mysterious even to their creators and hardly understandable to regulators, let alone the general public. The recent anecdote of a British grandmother who typed 'please' and 'thank you' into her search queries, believing that being polite would expedite service from an individual reading her requests, illustrates an extreme example of the public's general ignorance as to how Google's search algorithm works (Ellis, 2016).

This paper looks at the intersection of two areas, search engines and algorithmic transparency, as a lens through which to explore broader questions concerning the regulation of algorithms used by online platforms more generally. This topic comes as part of a large and important academic and regulatory debate that has centered on the role of search engines in modern societies and economies, with questions related to their market dominance, fairness and neutrality. More recently, a great deal of interest has emerged around the idea of algorithmic 'black boxes' that require greater transparency and accountability, including search but extending to areas from mortgage loans, to health insurance to social media news feeds.

The academic debate on the desirability of algorithmic transparency in search engines has remained largely theoretical and disconnected from an examination of actual proposals for putting such transparency into practice. The contribution of this paper is twofold. First, it fills an important gap in the literature by examining how positions on the transparency of search engine algorithms long discussed in academic

circles have played out among industry and policy practitioners. Second, this paper examines the underlying ideas and interests that have driven these debates and their outcomes, revealing surprising points of agreement in a nonetheless polarized sphere. These insights shed light on the likely outcomes of continuing debates on the regulation of search engines, as well as larger questions around the role of algorithmic decision-making in society.

The topic of algorithmic transparency in search engines transcends geographic boundaries. The scope of this paper is limited to Europe and North America, and largely to developments in Brussels and in Paris, for two reasons. First, these are regions with strong traditions in data protection and competition policy in which many of the policy and legal debates related to search engines have started first and advanced the furthest. In some areas, such as the right to be forgotten, a principle adopted in Europe has begun to spread to other regions, while in areas such as ‘platform fairness’ (a new French legal concept), no other such laws yet exist anywhere else in the world. Secondly, limiting the scope to Europe and North America allows for studying the research questions in a context of relatively similar economic and political systems.

This paper aims to answer the following three research questions:

*RQ1. How have key actors in Europe and North America positioned themselves in regard to transparency of search engine algorithms?*

*RQ2. What underlying political and economic ideas and interests can explain these positions?*

*RQ3. What strategies have actors used to promote their positions, and what is the likely impact of efforts for or against greater transparency on current and future regulation of search engine algorithms?*

In order to answer these questions, the paper begins with a presentation of the background and academic literature on search engines and algorithms from across disciplines, indicating key areas of debate and interest. It follows with a brief discussion of the methodology, outlining a range of qualitative research methods and sources that include primary data collected from parliamentary transcripts and media coverage and semi-structured elite interviews with experts from Google, other companies in the search sector, data protection authorities, intergovernmental

organizations and civil society organizations. This qualitative data is then examined with insights drawn from thematic analysis and discourse analysis.

Next comes the presentation of the findings, divided into sections responding to the three research questions. The first question is addressed through an actor mapping of positions on the question of search algorithm transparency, which reveals desire for greater transparency balanced by widespread agreement on the need for search engines to retain some level of confidentiality. The ideas and interests behind these actors' position are next analyzed, in response to the second research question. This reveals varieties of opinions concerning democracy and individual rights; the dominance of American technology companies; intellectual property; and the sufficiency of existing laws and regulations. In order to answer the third research question, on strategies and effects, a discussion of the methods of influencing policy follows, suggesting that they primarily take the form of lobbying with information and ideas drawn from a disparate group of experts. The effect on regulation until now has been a lack of legal requirements for search algorithmic transparency.

The paper concludes by suggesting that total algorithmic transparency in search remains unlikely to be implemented given the confluence of interests and ideas among various actors to oppose the disclosure of search algorithms. However, search engines are likely to be regulated in Europe to preclude certain behaviors deemed anti-competitive. A wider discussion of algorithmic accountability and transparency will continue to take place in many different venues, which could lead to new legal precedents and the development of more extensive self-regulatory practices.

## **BACKGROUND AND LITERATURE REVIEW**

The following section reviews the related background and academic literature needed to understand the debate on the transparency of search algorithms. It first covers search engines, their importance and their regulation, followed by a discussion of the critical study of algorithms and their transparency.

### **Search Engines and their Regulation**

As 'the epicenter of the early web' (Halavais, 2009), search has had an 'extraordinarily far reaching' impact on modern culture (Battelle, 2005, p. 8) and has become 'deeply embedded in everyday life' (Schroeder, 2014, p. 10). Search engines

are argued to play a role similar to that of libraries in that ‘both may include the pursuit of research, knowledge, and intellectual enrichment’ (Nissenbaum, 2011, p. 41). Through its popular search service, Google has become so much a fabric of Western societies that the verb ‘to Google’ has entered the lexicon. Google has now branched into a dozen or so services, ranging from email, to maps, translation, mobile devices and more in what Vaidhyanathan (2011) has called the ‘Googlization of everything’. Yet search and its related advertisements remain the largest source of Google’s revenue.

Some argue that search engines now play the ‘gatekeeping’ role traditionally exercised by news media, either through their selection function, central to the concept of gatekeeping in media studies (Shoemaker & Vos, 2009), or through their ‘channeling mechanisms’, as identified in the network gatekeeping model (Barzilai-Nahon, 2008). Sunstein (2007) has warned of the Internet leading to increased polarization and a shrinking public sphere, through the creation of ‘information cocoons’. The personalization of search engine results and social media newsfeeds has been thought to reinforce a ‘filter bubble’, in which individuals are shown results consistent with their past search and click-through history (Pariser, 2011). Such an outcome could be especially pernicious because people have typically been unaware of personalization and unskilled in search. Early empirical studies indicate that some personalization of search results does occur, most often based on geographic location and less often for information related to health and science (Hannak et al., 2013). A more recent synthesis of the extent and effects of personalization, both personalization that is self-selected by individuals’ active choice and that which is pre-selected by algorithms, found that ‘at present, there is no empirical evidence that warrants any strong worries about filter bubbles’ (Zuiderveen Borgesius et al., 2016, p. 10). However, as the authors note, this situation could change as personalization improves and more people consume news online, and may differ in countries with alternative political systems to that of the United States, where most existing studies have been conducted.

The call for greater transparency in search engines can be traced back to Introna & Nissenbaum’s groundbreaking paper ‘Shaping the Web: Why the Politics of Search Engines Matters’ (2000), in which they argue that search engines systemically exclude certain websites and types of websites. Even Google’s founders recognized the potential bias of search engines in their seminal paper on the

PageRank algorithm, observing that ‘since it is very difficult even for experts to evaluate search engines, search engine bias is particularly insidious’ and that ‘we believe the issue of advertising causes enough mixed incentives that it is crucial to have a competitive search engine that is transparent and in the academic realm (Page, Brin, Motwani, & Winograd, 1999, Appendix 8).

Introna & Nissenbaum (2000) present a number of policy recommendations, beginning with the assertion that, ‘As a first step we would demand full and truthful disclosure of the underlying rules (or algorithms) governing indexing, searching, and prioritizing, stated in a way that is meaningful to the majority of Web users’ (p. 181). Several years later, and in recognizing the legitimate need for some level of secrecy, Bracha and Pasquale (2008, pp. 1204-1205) argued that it is necessary to allow regulators, if not the general public, to ‘peer into the black box of search’:

If search engines are to be accountable to all, if their interest is to be balanced against those of the various other claimants involved in search-related disputes, and if social values are to be given any weight, some governmental agent should be able to peer into the black box of search and determine whether or not illegitimate manipulation has occurred.

They point to methods developed for national security and copyright enforcement as proven tools for sharing information while minimizing the risk of public disclosure.

In response to such arguments, Granka (2010) states that while it would have some benefits, transparency of search algorithms could hurt both search quality and competition. She argues that regulation should instead focus on potential abuses of power rather than on transparency as a principle in its own right. In addition to these reasons, Grimmelmann (2010) sees search algorithm transparency as impossible to regulate in practice given Google PageRank algorithm’s complexity in receiving more than 200 different ‘signals’ and about 500 adjustments per year.

Google’s industry competitors have also had a strong voice in this debate. In 2007, Google launched ‘universal search’, in which it began to blend the results of its web search service, or ‘horizontal’ search, with that of ‘vertical’ search results in specific areas, such as Google News and Google Maps. In November 2009, the British price comparison website Foundem filed an antitrust complaint with the European Commission charging that Google had abused its market dominance by applying ‘penalty algorithms’ against their website, a vertical search service. The founders of Foundem campaigned for this position through a call to extend the principles of network neutrality to *search neutrality*, defined as ‘the principle that

search engines should have no editorial policies other than that their results be comprehensive, impartial and based solely on relevance’ (Raff, 2009). They argue that this is especially important in light of Google’s gatekeeping role and dominance in search, which they say makes it ‘probably the most important monopoly in history’ (Raff & Raff, 2012b) with the potential to dominate competitors in other markets. The concept of ‘search neutrality’ has been criticized by Grimmelmann (2010) and others as infeasible and misguided.

In terms of legal responsibility for algorithmically generated search results and auto-completion suggestions, individuals’ fundamental rights can conflict; courts in the United States have ruled in favor search companies by treating search results as constitutionally-protected free speech (Wu, 2013), while the recent Google Spain case in Europe on the ‘right to be forgotten’ gives greater weight to individuals’ right to informational self-determination (Karapapa & Borghi, 2015). In this debate, implicit or explicit distinctions are often made as to whether search engines should be understood as neutral ‘conduits’ that ‘exist to carry the speech of others’; “‘media companies” that make “editorial choices” about what to publish’ or a ‘helpful, trustworthy *advisor*’ (Grimmelmann, 2014, pp. 881, 885, 895), or rather as a ‘highly advanced and powerful index’ (Wu, 2013, pp. 1529-1530).

As Gasser notes, certain forms of search engine behavior ‘have been the subject of legal regulation—using the term regulation in its broad sense—since the early days when web search became a mass phenomenon’ (Gasser, 2006, p. 220). These debates largely centered on trademark disputes, privacy, content regulation and consumer protection. Across Europe and North America, Google has been accused of abusing its dominance in the search market to give unfair advantage to its other services. The European Commission and some governmental agencies have opened antitrust investigations, alongside lawsuits filed by competitors claiming unfair treatment by Google search or its mobile app store, Google Play.

### **Algorithms, Opacity and Transparency**

As observed by the organizers of the 2013 conference at New York University on Governing Algorithms, there has been a ‘recent rise of algorithms as an object of interest in research, policy, and practice’ (Barocas, Hood, & Ziewitz, 2013, p. 1). Setting aside the mystique around the term ‘algorithm’ following the so-called ‘algorithmic turn’, an algorithm can be simply defined as ‘a process or set of rules to

be followed in calculations or other problem-solving operations, especially by a computer' ("Oxford Dictionaries," n.d.) or as 'a set of steps that are followed in order to solve a mathematical problem or to complete a computer process' ("Merriam-Webster," n.d.). Algorithms are commonly understood as analogous to a cooking recipe, with inputs that follow steps to produce outputs. However, computer scientist Suresh Venkatasubramanian (2015) explains that when applied to machine learning algorithms, this analogy is 'dead wrong'; a better analogy would be that an algorithm is 'a procedure for constructing a recipe' or 'a game of roulette on a 50 dimensional wheel that lands on a particular spot (a recipe) based completely on how it was trained, what examples it saw, and how long it took to search'.

More than 15 years ago, Ford (2000) predicted the expansion of data collection and commercial profiling into the development of personal 'cyber doppelgangers' and 'cyber butlers'. He argued that in order to prevent this Orwellian future, 'we need to choose our future now' and act through legislative and mass boycotts at the collective level and 'quiet refusal and vigilance' at the individual level (p. 1583). In the last few years, much of his predictions have come to pass, as profiling and personalization have mushroomed along with the proliferation of algorithmic decision-making. Recent literature has used social and political philosophy to critically examine the role of algorithms in society (Cardon, 2015; Crawford, 2016). It has been argued that 'algorithms, driven by vast troves of data, are the new power brokers in society' that can be assessed through the 'atomic decisions that algorithms make, including *prioritization*, *classification*, *association*, and *filtering*' (Diakopoulos, 2013, pp. 2-3).

In understanding the role of algorithms in society, the metaphor of the black box frequently appears as a representation of the inexplicable process of inputs and outputs (Pasquale, 2015). As Burrell (2016, p. 1) has noted, 'opacity seems to be at the very heart of new concerns about "algorithms" among legal scholars and social scientists'; she identifies three distinct forms of opacity: '(1) opacity as intentional corporate or state secrecy, (2) opacity as technical illiteracy, and (3) an opacity that arises from the characteristics of machine learning algorithms and the scale required to apply them usefully'. When it comes to search ranking algorithms, all three forms of opacity appear.

The call for algorithmic transparency can be seen as the latest extension of a decades-long move towards greater transparency in what Michael Schudson (2015)

has described in *The Rise of the Right to Know*. Within the technology industry, greater transparency has been introduced into decisions regarding the takedown of content and the handling of user data that increasingly happens at the hands of private sector platforms. In 2010 Google released its first ‘transparency report’; more than a dozen large technology companies, including Facebook, Microsoft and Yahoo, now publish similar reports. This practice has been further strengthened with the civil society-led development of the Manila Principles on Intermediary Liability, which calls for greater transparency both on the part of government and private sector actors (“Manila Principles on Intermediary Liability,” 2015). While such ‘transparency reports’ do offer an overview of the aggregate numbers of external requests received for user data and content removal, they give little insight into the internal processes taken to handle such requests and no information about the decisions taken as a result of algorithms.

Some researchers argue that the opacity vs. transparency distinction should not be the exclusive principle shaping research on algorithms. They propose shifting the research focus away from the potential benefits or drawbacks of opacity to instead seeking to understand the ways in which users perceive and interact with algorithms (Hamilton, Karahalios, Sandvig, & Eslami, 2014). Others contend that transparency alone cannot achieve the more important need for algorithmic accountability and ethics. According to Ananny (2016, p. 109), ‘Seeing inside a black box is sometimes necessary, but never sufficient, for holding an algorithmic assemblage accountable.’

Alternative solutions to transparency have appeared from a range of disciplines. A group of American computer science and legal scholars have recently countered the legal literature in favor of algorithmic transparency in a forthcoming article (Kroll et al., 2017) in which they argue that ‘disclosure of source code is often neither necessary (because of alternative techniques from computer science) nor sufficient (because of the complexity of code) to demonstrate the fairness of a process’ (p. 1). Transparency, they argue, may actually be undesirable by facilitating gaming the system, defeating legitimate protection of trade secrets, or disclosing private or sensitive data (p. 6). Kroll and his colleagues propose a number of technological tools that can better ensure that algorithmic decisions align with legal and policy objectives. Recognizing the difficulties associated with transparency, journalism scholar Diakopolous (2013) suggests that journalists practice ‘algorithmic accountability reporting’ through reverse engineering algorithms, while Perel and

Elkin-Koren (2016) recommend that the public use this ‘black box tinkering’ as a way to engage in checking the enforcement of automated systems.

## **METHODOLOGY**

As demonstrated in the above literature review, the topic of transparency of search engine algorithms transcends disciplinary boundaries, addressing questions from communication and information sciences, computer science, economics, law, political science, sociology and beyond. In this paper, I draw on a range of sources and qualitative methods. I aimed to map the positions of actors from government, the private sector, civil society and academia, and to determine whether these groups are in fact represented in discussions.

As this research was completed as part of a Master’s thesis at the Oxford Internet Institute, the project received clearance from the University of Oxford’s Central University Research Ethics Committee. The primary data collection method took the form of elite interviews conducted with actors from a range of groups, including Google and its competitors, as well as members of regulatory bodies, intergovernmental institutions, civil society and academia. I conducted semi-structured interviews with 17 individuals in person or by Skype (and once by email) with actors from Canada, Germany, Sweden, the United Kingdom and the United States. Unless otherwise indicated, all quotes included in the findings below originate from the interviews conducted for this paper. Translations from French in documents and interviews, absent an official translation, are my own.

In order to prepare for and supplement the interviews, I gathered a large collection of primary textual sources. The first were found through searching the online archives of leading American, French and European newspapers and technology blogs for stories related to Google, search engines, algorithms, anti-trust and data protection. Articles published online typically included links to other news articles that led to the collection of further relevant materials. Secondly, I examined official government and intergovernmental documents. These included proposed and adopted laws, amendments and regulations; transcripts of French Senate debates; thematic and annual reports; and documents related to the debates on the European General Data Protection Regulation published on the website ‘LobbyPlag’.

The findings and analysis that follow therefore are derived largely from interviews and written materials, and completed with a theoretical understanding of lobbying strategies and their influence. While only a few highly illustrative quotes have been used in the following sections, much more of the rich material gathered in the interviews has helped to inform the accounts and argument.

## FINDINGS AND DISCUSSION

### Actor Mapping

Answering the first research question – *How have key actors in Europe and North America positioned themselves in regard to transparency of search engine algorithms?* – lends itself to an actor mapping aimed to capture the range of perspectives of those who have either made public statements on this issue or have clear interests, such as Google and its competitors in the search market. In this wide and diverse field, some individuals and groups important in this debate have undoubtedly been left out, but the positions of the major actors can be found here.

Before beginning the research process, it was expected that: 1) European regulators and civil society actors push for greater transparency in search algorithms while American companies resist them; and 2) Actors advocate for positions in line with their own missions, economic interests, legal traditions and ideologies. Indeed, while some of these expectations were borne out by the research, they did not fully capture the range of perspectives and strategies. Some regulatory and civil societies do push for more transparency, with some of the strongest calls coming from the United States rather than Europe. But many recognize that a degree of secrecy surrounding search engine algorithms is necessary and beneficial for search companies to protect their intellectual property and fight spam. While Google has resisted revealing its search algorithms, the company itself speaks a great deal about transparency, highlighting the efforts it has taken to explain how search works and major updates to the algorithm (in general terms) to webmasters, regulators and users. It is evident that many actors across the board agree on the importance of transparency in search as a principle, but have divergent views on what that means in practice.

### *Civil Society*

As discussed above, academics such as Helen Nissenbaum and Frank Pasquale, among others, have written in favor of greater algorithmic transparency. Such thinking has influenced non-governmental organizations (NGOs) in North America and Europe. In the United States, the Electronic Information Privacy Center (EPIC) has led a campaign for algorithmic transparency since early 2015 with slogans to ‘end secret profiling’, ‘stop discrimination by computer’ and ‘open the code’ (“Algorithmic Transparency: End Secret Profiling,” n.d.). Identifying algorithmic transparency as the next stage in transparency law, Internet law and privacy law, EPIC’s director Marc Rotenberg argues that ‘at the intersection of law and technology—knowledge of the algorithm is a fundamental right, a human right’ (Hu, 2015, para. 1).

In Europe, a group of journalists, entrepreneurs and researchers in Germany launched the website ‘Algorithm Watch’ in May 2016 as platform for publishing papers and news related to algorithmic decision making (ADM) and algorithmic accountability. Defining algorithmic decision making as processes designed to gather data and algorithms to analyze, interpret and act automatically based on that interpretation, their ‘ADM Manifesto’ calls for the end of black box algorithmic processes. The members of Algorithm Watch argue that it is algorithmic *intelligibility* that matters, rather than *transparency*, as the code alone cannot be interpreted without additional information about the context and data inputs (Spielkamp, 2016). Gus Hosein, Executive Director of the London-based Privacy International, has similarly signaled the need to hold complex technological systems using algorithms accountable in the areas of criminal justice, welfare and national security (Hosein, 2016, p. 28).

Separately, some computer scientists advocate algorithmic transparency. American software developer Rachel Shadoan considers algorithmic transparency ‘vital to the future of thinking’ and is most concerned about the opacity of search engines given their importance for accessing knowledge (Shadoan, 2014). She writes that ‘what I want for all of us is a free and open index of the internet on which we can run many different transparent search algorithms, optimized for different purpose’ (para. 29).

## *Google*

Debates about search engines in Europe and North America largely focus on one company, Google, which has an estimated 70% of the US search market and 90% in Europe. Given this market dominance, the company's claim that the 'competition is only a click away' therefore seems exaggerated, although Google officials point out that these figures represent only general search, while increasingly users go directly to vertical search engines such as flight or hotel comparison sites. Google's stance on the transparency of its search algorithm can be summarized as asserting the right to keep confidential its intellectual property, or 'secret sauce', and to prevent spammers from trying to 'game the system'. Company employees recount how after the publication of the original PageRank paper, webmasters and search engine optimization specialists learned to game the system. Since then, they say, Google has learned not to reveal too much about the algorithm.

At the same time, Google highlights the voluntary efforts that it has taken to explain how its search engine works to users and webmasters. A section on Google's company website devoted to explaining search, called Inside Search, provides simplified descriptions of Google's search engine services and practices. Among general categories such as 'Access to Information Comes First' and 'Fighting Spam and Malware' on the webpage, appears a paragraph on 'Algorithms Over Manual Action' that includes a justification for the need for algorithms: 'We prefer machine solutions to manually organizing information. Algorithms are scalable, so when we make an improvement, it makes things better not just for one search results page, but for thousands or millions' (Google, n.d.). In addition, Google publishes academic articles related to search and biannual Transparency Reports.

Former Principal Engineer in Google's Search Quality Team, Matt Cutts, responded to the opening of the European Commission antitrust investigation in 2010 with a blog post outlining Google's various actions to enhance transparency. He emphasized how Google had published the original PageRank algorithm and subsequently hundreds of research papers, to participating in conferences, blogging, producing a webmaster video channel, and introducing the Google Webmaster Tools website. Cutts therefore expressed some annoyance at the demand that the company be more transparent about its search algorithms:

Ultimately, criticizing Google for its "secret formula" is an easy claim to make, but it just isn't true. Google has worked day after day for years to be open, to educate

publishers about how we rank sites, and to answer questions from both publishers and our users. So if that's how people choose to define "secret," then ours must be the worst kept secret in the world of search (Cutts, 2010, para. 15)

Regarding proposed legislation that would require Google to be more transparent with regard to its algorithm or to display at least a number of competitors, Google's response has been to portray these proposals to be uninformed and politically motivated. As discussed in the following section, the company rejects the idea of ex-ante remedies and the need for a separate category of regulation of platforms.

### *Industry competitors*

One may initially believe that Google's competitors in horizontal and vertical search services, such as Microsoft Bing and Yelp respectively, would advocate for greater transparency in Google's search algorithm. Yet industry coalitions formed to oppose what they consider Google's anti-competitive practices, such as 'FairSearch' and 'Focus on the User', in fact do not call for algorithmic transparency as a remedy for perceived search bias, largely because doing so could open up demand for their own algorithms to be disclosed.

'Focus on the User', created by Yelp and TripAdvisor, criticizes the prominent placement of results from Google+, Google's social network, above 'local services' such as their own, which they contend would appear higher if Google relied only on its page ranking relevance algorithm. Rather than asking that Google be more transparent in its algorithm, Focus on the User calls for the Google to use its 'own general search algorithm to show consumers the best results sourced from the whole web and not just Google+' ("Focus on the User," n.d.). Similarly, in France, a group called the Open Internet Project, formed in May 2014, advocates 'banning the practices of Google in favoring its own services and content'. Among its 20 organizational members count the French search engine company Qwant and the Germany-based digital publishing house Axel Springer.

Meanwhile, a representative of the group FairSearch, which is made up of 10 companies including TripAdvisor and Expedia, clarified in an email to the author their position towards the transparency of Google's algorithms: 'FairSearch does not advocate opening up algorithms; we believe other remedies are available and more appropriate for halting Google's anti-competitive behavior' (Lawsky, 2016). One of the key members of FairSearch is Foundem, the price comparison site that has led the 'search neutrality' campaign discussed earlier. They have put forward more than a

dozen remedies to solve ‘Google’s self-preferencing’ and ‘Google’s penalties/demotions of other sites’ (Raff & Raff, 2012a, pp. 3, 6), which can be summarized by the principle that: ‘Google must be even-handed. It must hold all services, including its own, to exactly the same standards, using exactly the same crawling, indexing, ranking, display, and penalty algorithms’ (Raff & Raff, 2013, p. 1).

Foundem’s remedies proposal emphasizes that this transparency ‘will not require the publication of Google’s algorithms or business secrets’ (Raff & Raff, 2012a, p. 3) and that providing more transparency about the rationale behind penalties and demotions ‘does not require Google to publish its algorithms or provide any kind of recipe for spammers to follow in order to avoid penalties’ (p. 6).

### *Governments*

First it is helpful to briefly recall the situation in the United States, which is where many, though not all, legal questions related to the regulation of search engines have first taken shape. It is only very briefly sketched here, given that much has already been written about the American regulation of search engines (Gasser, 2006). The Federal Trade Commission (FTC) concluded its antitrust investigation of Google in 2013 by determining that the search engine giant had not engaged in anti-competitive behavior. However, in 2015 the *Wall Street Journal* reported on an inadvertently released FTC report from 2012 in which the consumer protection agency’s staff had found that by favoring its own services, Google’s ‘conduct has resulted—and will result—in real harm to consumers and to innovation in the online search and advertising markets’ (Mullins, Winkler, & Kendall, 2015).

A different 2014 FTC report on data brokers called for greater transparency and accountability in the industry through both legislative and best practice recommendations (Ramirez, Brill, Ohlhausen, Wright, & McSweeney, 2014). Yet the report went short of calling for algorithmic transparency; in relation to a recommendation for proposed legislation that would require data brokers to disclose to consumers that they use raw data to make inferences on consumers’ interests, the report notes that ‘this recommendation is not intended to require data brokers to disclose their proprietary algorithms’ (p. 52). The FTC has continued its works in this area, with the launch of a new Office of Technology Research and Investigation in

March 2015 that includes algorithmic transparency as one of its areas of work (Soltani, 2015).

In Europe, some government officials have spoken about the need for greater transparency by search engines. For example, German Minister of Justice Heiko Maas made headlines in September 2014 when he called for Google to make its search engine algorithm public, in an interview with Fortune magazine. Two years later, in October 2016, German Chancellor Angela Merkel commented at a media conference in Munich about the need for large Internet platforms to make their algorithms public, commenting that ‘algorithms, when they are not transparent, can lead to a distortion of our perception, they can shrink our expanse of information’ and that these platforms’ ‘algorithms must be made more transparent’ (Connolly, 2016).

Within the wider context of legal and political debates Internet intermediaries in general, and Google in particular, France has led the way within Europe in moves towards more extensive regulation. In spring 2015, a group of centrist French Senators led by Senator Catherine Morin-Desailly introduced an amendment related to search engines to the draft bill for economic growth, activity and equal opportunity (Morin-Desailly, Retailleau, Bizet, Lenoir, & Juoanno, 2015). Dubbed by the media as the ‘anti-Google amendment’, the amendment would have required a search engine to:

- 1° Provide on its homepage a way for users to consult at least three other search engines without any legal connection to the operator;
- 2° Provide users with information on the general principles of proposed rankings;
- 3° Ensure that the concerned search engine functions in a fair and non-discriminatory manner, without favoring its own services or those of any other entity with a legal connection to it;
- 4° Not oblige a third-party offering software solutions or electronic communication devices, to use, exclusively, the above-mentioned search engine to access the Internet.

While the amendment itself did not contain language specifically requiring the disclosure of search algorithms, it was portrayed this way by some media (Lomas, 2015). The amendment was unanimously approved by the French Senate in its first reading, but received an unfavorable recommendation from both the executive branch and a Senate special commission. Ultimately, the amendment did not make it into the final version adopted by the National Assembly.

Another recent legal development in France has been the ongoing discussion around the digital republic bill (*loi pour une République numérique*), which contains two provisions relevant to this paper: transparency of public algorithms (though with some limits) and the concept of ‘platform fairness’ (*loyauté des plateformes*) (Dulong de Rosnay, 2016). The French data protection authority, the *Commission nationale de l’informatique et des libertés* (CNIL), which has charged Google with three cases of violating data protection in the last few years, has not taken a public position on the question of algorithmic transparency in search engines.

### *Intergovernmental*

In relation to search engine algorithms, the two main types of regulators at the European level are data protection and competition authorities. Google has been under investigation by the European Commission’s Competition Directorate since 2010. A proposed settlement in 2013 fell apart after sharp criticism from many competitors and some governments, such as France and Germany. In April 2016, the European Commission charged Google with new antitrust violations for imposing restrictions on Android device manufacturers and mobile network operators ("Antitrust: Commission sends Statement of Objections to Google on Android operating system and applications," 2016), with further charges added in July 2016.

In relation to data protection, it has been suggested that the new European General Data Protection Regulation, which was adopted in May 2016 and will go into effect in 2018, may give rise to a new ‘right to explanation’, for individuals to be able to understand how their personal data is being processed in algorithmic decision-making (Goodman & Flaxman, 2016). This is based on language in the Regulation’s preamble that the data subject has the right ‘to obtain an explanation of the decision reached after such assessment [based solely on automated processing] and to challenge the decision’ ("EU General Data Protection Regulation," 2016, para. 71). According to a senior official from the European Commission, issues around algorithmic transparency were brought to their attention in part thanks to advocacy from Stephan Noller, a German advertising executive and former Chair of the Policy Committee of the Interactive Advertising Bureau (IAB) Europe, whose editorial calling for an ‘algorithmic ethic’ was published in the *Frankfurter Allgemeine Zeitung* and on the Media Network blog of *The Guardian* in January 2013 (Noller, 2013).

Noller argues that ‘transparency is one of the most important principles when it comes to throwing light on the chaos’ of personalized websites; such transparency, he says, could be implemented by requiring websites to publish their algorithms’ source code and acknowledging their use of algorithms.

It appears unlikely, however, that the Regulation will require companies to reveal the algorithm itself based on the language in the original proposal from the European Commission and records of the debates. The 2012 proposal for the new Regulation from the European Commission stated that the right to know the logic underlying data processing ‘should not adversely affect the rights and freedoms of others, including trade secrets or intellectual property and in particular the copyright protecting the software’ (“Proposal for a General Data Protection Regulation,” 2012, p. 25). Within the Council of the European Union, the Polish delegation repeatedly expressed reservation towards the reference to the data subject’s right to knowledge of the ‘logic’ involved in any automated data processing in Article 15, asserting that ‘the underlying algorithm should not be disclosed’ (*Note from the Presidency of the Council of the European Union to the Working Party on Data Protection and Exchange of Information*, 2013, pp. 45, 67, 89, 93).

The Council of Europe has also begun to approach the question of regulating algorithms from the perspective of data protection, privacy and freedom of expression. The Council’s Ad Hoc Committee on Data Protection has worked to modernize Convention 108 on the protection of individuals with regard to automatic processing of personal data, with new challenges emerging related to big data. At the same time, the Council of Europe’s Committee of experts on Internet Intermediaries (MSI-NET) has prepared a draft study on the human rights dimensions of algorithms, which explores ‘search algorithms and search functionality more generally’ as one of its 10 areas of exploration (Wagner, 2016).

### **Ideas and Interests**

After mapping the position of key actors towards the transparency of search algorithms, the next question becomes: *What underlying political and economic ideas and interests can explain these positions?* Here, common themes emerged from the qualitative material gathered through official records, media coverage and interviews.

The underlying ideas and interests supporting actors' positions on search algorithmic transparency can thus be understood as falling into the broad categories of concerns over fundamental freedoms and democracy, anxiety over the power of large American technology companies, concern for protection of intellectual property, and views on the sufficiency of existing laws and regulations. These ideas often correspond to what one would expect based on the actors' economic interests and missions, but also intersect and diverge in unexpected ways.

### *Fundamental rights and democracy*

As evidenced in the actor mapping, the most visible academics and civil society groups pushing for algorithmic transparency do so from the perspective of privacy and data protection, namely an individual data subject's right to know how their personal data is being processed, as well as from the point of view of democracy and individual freedom. Canadian privacy expert Stephanie Perrin underlined the importance of understanding algorithmic decision-making from the perspective of democracy:

What does it do to your democracy if you're sorting people? What does it do to their privacy rights? How do you have an educated and freethinking population if they don't understand the basic engines that are used to parse them? (Stephanie Perrin, personal interview, July 2016).

The members of the German group Algorithm Watch also point to the implications for democracy in their 'Algorithmic Decision-Making (ADM) manifesto', writing that 'ADM has to be intelligible in order to be held accountable to democratic control' and that 'democratic societies have the duty to achieve intelligibility of ADM with a mix of technologies, regulation, and suitable oversight institutions'. Similarly, a high level official at the Europe Commission stated that the issue of transparency of search engine algorithms is 'not only an issue of individual interest and commercial interest. It's a huge issue of democracy' (European Commission official, personal interview, June 2016). The Council of Europe's Committee of Experts on Internet Intermediaries has similarly discussed the implications of algorithms for democracy from the perspective of media pluralism and filter bubbles.

In France, Senator Morin-Desailly, author of the so-called 'anti-Google' amendment, stated in an interview with the program *#DirectPolitique* in April 2015 that 'Google's dominant character must be addressed' because 'letting a major actor abuse its position can only be harmful for democracy' (Morin-Desailly, 2015).

Foundem and other critics of Google's practices also speak about Google's role as a 'gatekeeper' to the Internet, making a claim for neutrality that extends beyond competition issues.

### *Fear of American technology giants*

European critiques of Google have been portrayed in English-speaking media outlets as the results of resistance to American cultural and economic dominance. A *Financial Times* columnist suggested that the European Commission's antitrust investigation into Google was due to 'continental jealousy' (Gapper, 2014) and the *New York Times* reported that 'Google, fairly or not, has become a glaring proxy for criticism of an intrusive American government and concern over America's unmatched technology dominance' (Hakim, 2014).

While much oversimplified, this does seem to be an element driving at least some policymakers, especially in France, where politicians warn of France becoming a 'digital colony' (Bon, 2014). French media tend to lump together the large American technology companies into one group, the 'GAFA', standing for Google, Apple, Facebook and Amazon. The attempts to reign in Google in France must therefore be understood in this context.

### *Protecting the proprietary 'secret sauce'*

A key argument used by Google and widely acknowledged by most actors is that Google's search algorithm is the company's intellectual property and fundamental to its business model. The media and Google itself often describe discussions to reveal or modify its algorithm as attempts to divulge its 'secret sauce'. Google's industry competitors in vertical search services, such as a European e-commerce company, which operates a price-comparison website in direct competition with Google Shopping and is a member of FairSearch, reveal a self-interested argument for not asking Google to disclose its algorithm:

We certainly have algorithms of our own, right? All of our services have algorithms of our own, which present items, listings, on our pages, in a particular order for a particular reason. We wouldn't want to disclose those either. We are as sensitive as Google is to protecting the algorithm and the technology behind it and the intelligence behind it. We're absolutely not interested in messing with the algorithm. What we want is for the algorithm to be applied to Google services (personal interview, July 2016).

The solution proposed FairSearch and similar industry associations such as Focus on the User, is not for Google to reveal its algorithm, but instead to apply the same search algorithm on its own services as it does to those of competitors.

While most actors do recognize intellectual property protection as important, EPIC's director Marc Rotenberg argues that it should take the back seat if it comes into conflict with transparency:

I fully respect the competing claims of intellectual property, national security, and also cyber security. But my contention is that algorithmic transparency is a fundamental right and when this claim collides with others, it is the claim of transparency that must prevail. This suggests that we most focus on the goal of achieving algorithmic transparency while respecting these other rights (personal email, July 2016).

In the same vein, a European Commission official stated that, 'As far as individuals are concerned, [there should be] total transparency. I don't think the business interest should dominate as far as the individual's right to know what has happened with their data' (personal interview, June 2016). These views of the ultimate importance of transparency over intellectual property represent a minority perspective even among data protection experts, many of whom assert that an individual's right to information about their personal data is not an absolute right and can indeed be restricted by legitimate limitations, including those of national security and economic interest. According to one European data protection expert, it would be illegitimate to ask companies to reveal their algorithms, which are their 'biggest secret' and 'biggest asset'. Instead, the expert points to alternatives such as privacy by design and privacy impact assessments as a way to introduce more transparency and openness.

#### *Sufficiency of existing laws and protections*

From across a range of perspectives, actors expressed doubt on the necessity or usefulness of creating new regulations specific to algorithms or to online platforms. As mentioned above, France's new Digital Republic bill contains a section related to a new legal responsibility for 'platform fairness' (Bonnet, 2015; "Pour une république numérique," 2016). While Google's public policy managers in France say that the new Digital Republic bill is on the whole quite balanced, they express skepticism on the need for sectoral regulation of platforms.

Other actors agree on the lack of need for new regulation, such as Fair Search spokesperson who stated, ‘We really believe that if competition policy were effectively enforced, you would not need specific platform [regulation]’ (personal interview, July 2016). The European Commission, meanwhile, conducted a one-year assessment of online platforms that concluded in May 2016 that ‘a “one-size-fits-all” approach was not appropriate for consumers to benefit from the opportunities and for the rules to meet the different challenges posed by the very diverse types of online platforms’, effectively deciding against sectoral platform regulation (Vandystadt & Frenay, 2016). More generally, several interview subjects expressed a critical view of ex-ante regulations.

Another argument against the development of a new regulation comes from the perspective of maintaining existing rights and freedoms. Arguing that the new General Data Protection Regulation contains ‘all the tools’ to push for transparency and general ‘concepts that evolve with the challenges’, a high level official in the European Commission contends that it is best to let the courts establish transparency requirements through their judicial interpretations. A new law, he said, would offer ‘a great opportunity to water down things’, leading the official to conclude that, ‘from a public interest point of view, I would not start a new law on algorithms’ (personal interview, June 2016).

### **Lobbying strategies and their effect**

The third research question asked: *What strategies have actors used to promote these positions, and what is the likely impact of efforts for or against greater transparency on current and future regulation of search engine algorithms?*

Based on the literature on advocacy coalitions and lobbying (Sabatier & Jenkins-Smith, 1993), it was expected that actors would engage in both ‘inside’ and ‘outside’ strategies to influence policymakers, from direct calls and meetings to public media campaigns. Indeed, a range of strategies can be observed, above all informational lobbying, in the form of organizations commissioning expert reports to seek arguments and evidence that can bolster their positions and raise awareness with policymakers, regulators and the public. It is notable that the actors tend to rely on different experts from different disciplines on the same topics, suggesting different frames of reference. Another strategy has been a legal one, such as the antitrust campaign launched by Google’s vertical search competitors in Europe.

As digital technologies have taken an increasing share of economies, their regulation has similarly become the focus of intense lobbying. The debate on adoption of the European General Data Protection Regulation (GDPR), for example, has been said to be one of the largest lobbying efforts in EU history. Uncovering the full extent of lobbying in the GDPR would represent a tremendous challenge, both due to the vast number of actors and a lack of transparency of their actions. The European Transparency Register does provide some helpful information of ballpark amounts, for example that FairSearch spent between 200,000 and 300,000 Euros on lobbying in Brussels between February 2015 and February 2016, while Google spent more than 10 times that amount, or between 3.5 and 3.75 million Euros, in 2014 when they last reported ("European Transparency Register," 2016). The Open Internet Project, primarily focused on France, spent less than 10,000 Euros in Brussels in 2015. Some civil society initiatives have helped to shed additional light: the French Quadrature du Net gathered the documents submitted by 50 corporate associations, companies and others ("Lobbies on dataprotection," n.d.), and the project 'Lobby Plag' compiles the amendments proposed and votes made by Members of the European Parliament in the course of the GDPR debates. However, these sites are incomplete and difficult to search, precluding a clear analysis of direct lines of influence. While the full picture of lobbying expenditures will be clearer over time, it can be said that generally, industry vastly outspends civil society, and when it comes to search, Google spends far more than its competitors.

A former employee of the CNIL described Google's lobbying efforts as 'very effective', explaining that the market capitalization of Google's parent company, Alphabet, is:

... higher than the GDP of a country like the Netherlands, much higher than Greece... Google's force, in financial and monetary terms, thus in terms of power, is much greater than that of many states. When a regulator like the CNIL summons Google for a meeting, Google will look for the best lawyers in the world. Their budgets seem unlimited and they will come with a ton of arguments. For a regulator with limited resources, confronting such a company can be a challenge (personal interview, July 2016).

This perspective expresses a sentiment of unmatched resources shared by many in Europe, where Google has reportedly earmarked about \$450 million for 'soft lobbying' initiatives between 2015 and 2017 (Scott, 2016b).

### *Lobbying with ideas and information*

In this debate, organizations attempt to influence policymakers and regulators largely through *informational lobbying*, which can be defined as ‘the use by interest groups of their (alleged) expertise or private information on matters of importance for policymakers in an attempt to persuade them to implement particular policies’ (Potters & van Winden, 1992, p. 269). As previously observed by Chalmers (2013) in his study of lobbying the European Union, interest groups use a variety of information types and tactics in order to gain access to policymakers.

An organization’s ideas and interests of course play an important role in how its members view an issue such as transparency of search algorithms. As expected, data protection authorities think in terms of data protection law, companies in terms of serving their customers and protecting their bottom lines. Yet understanding how a new technological development, such as search algorithms, fits into existing frameworks often requires the advice and interpretation of specialists.

When speaking with actors from various organizations, it is striking to note that each recommends a different authority on the subject of algorithmic transparency and search, which varies between and within actor groups, countries and organizations. The various experts often do not cite each other’s work, or sometimes even know about the other experts influencing actors in this area, even those from within their own countries. The relationship between an organization and its selected experts varies. In some cases, experts explicitly lobby the decision-makers; at other times, they are commissioned by an organization to produce a report; and still at others they write books aimed for a public audience, condensing and simplifying their arguments into language that the public and politicians can digest. The relative influence of each of these experts varies, as does their independence from the organization that has commissioned them.

One consequence of this fragmented landscape of expertise is a lack of shared understanding of the key concerns and interests of other actors. While real differences in interests do exist, often they are exaggerated to defend against the other side’s position, rather than seeking shared positions and compromise. Companies like Google commission research aimed to convince policymakers that they contribute more than they take from the economy, with papers on platforms and the digital economy by the consultancies Oxera and Roland Berger (Oxera, 2015; Teisseyre et

al., 2014). Other types of papers commissioned by Google include a white paper (Volokh & Falk, 2012) which argued that search results constituted constitutionally-protected speech and persuaded judges in at least one case in the United States ("S. Louis Martin vs. Google, Inc," 2014). In intergovernmental and regulatory bodies still exploring their positions on these questions, the studies presented to them come from a small number of experts. The result of this disparate web of experts is differences in frames of reference, leading parties to talk over each other rather than engage in real dialogue.

It is worth noting that while informational lobbying has been the primary method deployed, it is not the only one. In addition to public campaigns and drawing on academic expertise, groups such as EPIC have begun to 'aggressively seek litigation opportunities' to introduce algorithmic transparency through legal precedents (Rotenberg, 2015, slide 13).

#### *Effects on regulation*

Due to the convergence of these interests and ideologies among many actors, no legal measures have succeeded directly requiring the transparency of search engine algorithms. In other related areas, however, significant developments have occurred in the last six months in Europe that could have an impact on this question. The European antitrust case against Google Shopping may lead the European Union to adopt proposed remedies to prohibit universal search and algorithmic penalties. While not likely to lead Google to publish its algorithm, it may need to provide greater transparency to webmasters and regulators and grant access to an appointed auditor when needed. The new European General Data Protection Regulation, too, may lead to greater transparency standards depending on its judicial interpretation.

In many areas of regulation, ranging from product safety to data protection, Europe is now seen as being at the forefront of global regulation. As Sherwood put it, 'We've seen a shift over the last generation from the US being the world's regulator, to now the European Union being the world's regulator.' Given that the United States Federal Trade Commission decided against Google's antitrust violations while the European Commission went forward with similar charges, US Senator Elizabeth Warren warned that 'Europeans may soon enjoy better protections than U.S. consumers (Warren, 2016, p. 2). It is therefore in Europe where we must look to see where new developments in the regulation of search engine algorithms will arise.

## CONCLUSION

In the last 15 years, the interest of academics and policymakers in the role of search engines in modern societies and economies has dramatically grown. A recent debate has emerged around the idea of algorithmic ‘black boxes’ that require greater transparency and accountability, including search but extending to areas from mortgage loans, to health insurance and to social media news feeds. The present paper looked at the intersection of the two areas of search engines and algorithmic transparency as a lens through which to explore broader questions concerning the regulation of algorithms used by online platforms more generally. The major contribution of this paper has been to use interview data, news media and other materials to shed light on this topic, which has previously been limited in the academic literature to rather theoretical and abstract discussions rather than being based on available empirical evidence.

### *Main findings*

This paper has examined various positions related to the transparency of search engine algorithms, explored the underlying ideas and interests that drive these positions, and looked at the lobbying and other strategies that have been used to promote them and their regulatory effects. Through interviews conducted with key actors in the private sector, civil society, government and intergovernmental organizations across Europe and North America, and consultation of media and official documents, the picture that has emerged is one of fragmentation. It may therefore appear that little has changed since Gasser observed in 2006 that ‘the law and policy discourse on search engines is still fairly fragmented’ (p. 223). Yet some surprising points of convergence can be found, suggesting that reframing the debate may allow for new understanding and compromise.

On the question of algorithmic transparency, many actors recognize its importance, but few go further in articulating how this can be achieved in practice. The interests and ideas underlying these positions relate to actors’ attitudes towards other issues, such as the impact of search engine algorithms on democracy and human rights, fear of American technology companies, protection of intellectual property and the perceived sufficiency or otherwise of existing laws. The third area of findings related to lobbying and other strategies and their effects, found to be primarily

informational lobbying consisting of providing research and ideas to policymakers to reinforce a particular view on the question.

This study has revealed the gap and misperceptions that exist between the various groups of actors. In the examples studied, regulations have been proposed that technology companies find unreasonable or uninformed, while public figures contend that these same companies disregard the rule of law and individual rights. Financial and intellectual resources are spent to build cases to undermine the other side through legal or policy battles. It is clear that actors are not talking about the same issues in the same ways. Google is focused on the transparency that it offers to webmasters, but that is not the concern of civil society groups and policymakers who instead want to help ordinary citizens understand how their data is being processed and information presented to them. Google's competitors and websites are not asking for access to the algorithm, but rather for equal treatment. The disparate expertise and imbalance in resources has led to lack of shared understanding and dialogue about these fundamental concepts that will not be resolved until actors engage in real dialogue.

#### *Looking forward and recommendations*

In the months and years to come, Google will likely continue to face regulatory scrutiny from competition and regulatory authorities. Given the confluence of interests shared by Google and its competitors, it is highly unlikely that search engines will be legally required by elected bodies to disclose their algorithms any time soon. However, this requirement could someday come to pass in an individual legal case, which would establish judicial precedent that could then be applied elsewhere. Such a ruling would be ill advised. While individuals should have access to both the data kept about them and general principles driving automated decision-making, access to the lengthy code of search algorithms would be both meaningless to most and ultimately detrimental to search quality.

Part of the difficulty in developing and enforcing regulation in this area is due to the fast-moving nature of online services. A proposed solution for one set of circumstances may quickly become outdated with new technical innovations, and it is difficult to develop 'future-proof' regulations. Regulators have difficulty understanding and keeping up with the latest developments. The move in policy discussions towards regulating specific types of online services or platforms mirrors

the attention in the academic literature. Yet, as emerged in many of the interviews, these new technologies present challenges that differ in scale and form, not substance.

As former FTC Commissioner Julie Brill has stated, a ‘scalable approach’ to bringing greater transparency and accountability to the use of algorithms requires companies, technologists, consumers and policymakers each to play a role (Brill, 2015). As discussed above, for both reasons of intellectual property and product service, total transparency of search algorithms to the public would be problematic. Potential areas for enhancing algorithmic transparency in search do exist, however, through self-regulation in the broad categories of qualified transparency, consumer choice and education.

First, a properly established and financed a self-regulatory body could achieve a good balance between protecting confidentiality and quickly obtaining information. One model could be seen in Pasquale’s proposal for ‘qualified transparency’ through a self-regulatory ‘Internet Intermediary Regulatory Council’ made up of lawyers, engineers and programmers that would investigate claims and provide advice to regulators (Pasquale, 2010, pp. 168-169). Second, users should be given ways to express their preferences in search. Following from the partial success of the ‘do not track’ movement to allow consumers to opt out of tracking cookies, search companies should give users the option to not receive personalized results and for their searches to not be tracked. Google is already doing this and has recently expanded by offering the ‘My Activity’ space to see what information is being tracked and select preferences. These positive steps could be further strengthened through adoption of a self-regulatory code that could then be enforced by a consumer protection agency as part of fair and non-deceptive commercial practices. Third, public awareness and understanding of the issues surrounding algorithmic decision-making must be improved. This education should start at an early age as part of the critical thinking skills taught in ‘digital literacy’ or ‘media and information literacy’ curricula. In order for individuals to make informed choices about how they would like to share their personal data and access information in the age of big data, they must be equipped with a basic understanding of the political and social aspects of algorithms.

Stepping back from the debate on algorithmic transparency, it is clear that rapidly changing digital environments require constant efforts for law and regulation to move in lockstep with new challenges, in this case ways of targeting citizens and consumers. Social scientists in this field inevitably insert themselves into the fray of

contending positions, in an area in which positions are at times mischaracterized and where there may be more scope for compromise and self-regulation than might initially be expected. By seeking to provide analytical clarity and fresh insights, this paper has tried to take a step in the direction of greater understanding.

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