GOVERNING ALGORITHMS ON THE INTERNET
APPROACHES, OPTIONS, GAPS

Florian Saurwein
Institute for Comparative Media and Communication Studies (CMC)
Austrian Academy of Sciences, Alpen-Adria-Universität Klagenfurt, Austria

Natascha Just
IPMZ – Institute of Mass Communication and Media Research
University of Zurich, Switzerland

Michael Latzer
IPMZ – Institute of Mass Communication and Media Research
University of Zurich, Switzerland

Introduction: Rise of algorithms on the Internet

The broad diffusion of algorithms has led to intensified discussions about their influence, which can be illustrated by the impact of recommendation systems on consumer choice in e-commerce, the influence of Google rankings on users' attention, and the impact of Facebook's News Feed on the news business. It is often argued that software, codes and algorithms increasingly have governing powers (Musiani 2013, Pasquale 2015, Gillespie 2014, Manovich 2013, Just & Latzer 2016), similar to regulations by law (Lessig 1999).

Observations of the power of algorithms ("governance by algorithms") are consequently followed by debates on how to govern these powers adequately ("governance of algorithms"). In particular the dominant position of Google is often criticized but the applications and risks of algorithms and applications based on algorithmic selection go far beyond Google and online search. Accordingly, the scope of analysis needs to be

extended to adequately grasp the broad spectrum of applications, attendant implications and governance options.

The paper centers on a risk-based approach and a classification of modes of governance and provides an explorative assessment of the governance of algorithms (Latzer et al. 2016; Saurwein et al. 2015). It analyses established and suggested regulations and classifies them according to risk categories and regulatory approach on the continuum between market and state (table 1). Finally, it identifies governance gaps and discusses the potential reasons for these gaps.

Approach: risk-based approach and governance options

Justifications for governance are provided by the risks that arise with the diffusion of algorithms (Latzer et al. 2016). These can be summarized as follows:
    (1) manipulation
    (2) distortions of reality by filter bubbles and biases
    (3) constraints on the freedom of expression
    (4) surveillance and threats to privacy
    (5) social discrimination
    (6) violation of intellectual property rights
    (7) abuse of market power
    (8) effects on cognitive capabilities
    (9) growing heteronomy and loss of controllability of technology

There are various governance options to reduce the above-mentioned risks of algorithmic selection. These are located on a continuum between the market and the state (Latzer et al. 2003):
    (1) market mechanisms
    (2) individual self-organization by single companies
    (3) collective self-regulation by industries
    (4) co-regulation, cooperation between state and the industry on a legal basis
    (5) state intervention, e.g., command-and-control regulation

Examples of governance opportunities

There are several governance mechanisms in place in the area of algorithmic selection. Risks may be reduced by "voluntary" changes in the market conduct. There are technical self-help solutions for consumers that reduce censorship, bias and privacy violations (e.g., anonymization by Tor or VPN). Also suppliers of algorithmic services can reduce risks by business strategies, e.g. services that do not collect user data (e.g., the search engine DuckDuckGo). Additionally, suppliers may introduce ethic boards and commit themselves to "values" (Introna and Nissenbaum 2000), such as search neutrality or the "minimum principle" of data collection (Cavoukia 2012). Sectoral initiatives of self-regulation can be found in the advertising industry (online behavioral advertising), the search-engine market, social networks and algo-trading. These

initiatives deal with violations of privacy and copyright, manipulation and controllability. The limitations of market mechanisms and self-regulation can provide justifications for state intervention. There are command-and-control regulations for manipulation (cybercrime), privacy and copyright violations, freedom of expression and fair competition. Proposals for regulations in the search market suggest increasing transparency and controllability by public authorities, the establishment of the principle of neutral search (Lao 2013) or a publicly funded "index of the web" (Lewandowski 2014).

The following section summarizes in which areas of risk and with what instruments algorithms are being governed and identifies gaps where no measures have been established thus far.

Governance of algorithms: practices and gaps

Table 1: Selected market solutions and governance measures by categories of risk

	Market solutions		Companies: Self-organization	Branches: Self-regulation	Co-regulation	State intervention
	Demand side	Supply side				
Manipulation		x	x	x		x
Bias	x	x				
Censorship	x	x	x			x
Violation of privacy rights	x	x	x	x	x	x
Social Discrimination	x		x			x
Violation of property rights		x	x	x		x
Abuse of market power			x			x
Effects on cognitive capabilities						
Heteronomy						

Saurwein et al. 2015

The overview in table 1 shows that some of the risks have already been addressed by different governance approaches (data protection), while for others no measures have been taken so far (heteronomy). Whereas some risks are almost exclusively left to market solutions (bias), for others governance is institutionalized by private and state regulation (violations of property rights). While there are several suggestions for self-organization by companies, there are hardly any co-regulatory arrangements, where state authorities and the industry collaborate on a legal basis. Altogether, the analysis reveals that there is no overall common institutional pattern for the governance of algorithmic selection, but a wide spectrum of practices as well as obvious gaps, which are addressed in the following section.

Examples of gaps and deficits

Research and politics also have to consider governance gaps regarding risks of algorithmic selection. Table 1 illustrates the current absence of governance regarding heteronomy and negative effects of algorithms on cognitive capabilities. Algorithms raise debates concerning their influence on the human brain (Carr, 2010; Sparrow et al., 2011). Additionally there is the more general discussion on the human-machine relationship, which includes the question to what extent algorithms are uncontrollable (e.g., artificial intelligence) or control human behavior (heteronomy).

The two examples illustrate that not all risks are simply addressable by governance measures. Risks such as heteronomy and cognitive effects are new, there is little experience with similar challenges and they are difficult to address by formal rules. Hence, it might be worth promoting awareness, media literacy and self-protection abilities. In order to avoid negative effects on cognitive capabilities it may be helpful to provide training and education for certain cultural techniques (e.g., search/research) that may be replaced by algorithmic services.

The analysis also shows that the risk of "bias" is almost exclusively left to market solutions and not addressed by statutory prescriptions. This example points to the lack of legitimacy and practicability of state intervention with the aim of enhancing "objectivity". Moreover, also the possibilities of co-regulation are not used comprehensively so far. Co-regulation may be appropriate for problems involving strong conflicts of interest and ethical implications that require independent control and conflict settlement.

References

Carr, N. (2010), The Shallows: What the Internet is Doing to Our Brains. New York.

Cavoukia, A. (2012), Privacy by Design: Origins, Meaning, and Prospects for Ensuring Privacy and Trust in the Information Era. Montreal.

Gillespie, T. (2014), The Relevance of Algorithms. In: Gillespie, T. / Boczkowski, P. and Foot, K. (Eds.), Media Technologies. Essays on Communication, Materiality, and Society. Cambridge, 167-194.

Introna, L. D. / Nissenbaum, H. (2000), Shaping the Web: Why the politics of search engines matters. *The Information Society 16*(3), 169-185.

Just, N. / Latzer, M. (2016), Governance by Algorithms: Reality Construction by Algorithmic Selection on the Internet. *Media, Culture & Society*, published online before print April 21, 2016.

Lao, M. (2013), 'Neutral' Search as a Basis for Antitrust Action? *Harvard Journal of Law & Technology 26*(2), 1-12.

Latzer, M. / Hollnbuchner, K. / Just, N. / Saurwein, F. (2016), The economics of algorithmic selection on the Internet. In: Bauer, J. and Latzer, M. (Eds.), Handbook on the Economics of the Internet. Cheltenham, Northampton, 395-425.

Latzer, M. / Just, N. / Saurwein, F. / Slominski, P. (2003), Regulation Remixed: Institutional Change through Self- and Co-Regulation in the Mediamatics Sector. *Communications and Strategies 50*(2), 127-157.

Lessig, L. (1999), Code and Other Laws of Cyberspace. New York.

Lewandowski, D. (2014), Why We Need an Independent Index of the Web. In: König, R. and Rasch, M. (Eds.), Society of the Query Reader. Amsterdam, 50-58.

Manovich, L. (2013), Software Takes Command, New York.

Musiani, F. (2013), Governance by algorithms, *Internet Policy Review 2*(3).

Pasquale, F. (2015), The Black Box Society. Harvard.

Saurwein, F. / Just, N. / Latzer, M. (2015), Governance of Algorithms: Options and Limitations. *Info 17*(6), 35-49.

Sparrow, B. / Liu, J. / Wegner, D.M. (2011), Google Effects on Memory: Cognitive Consequences of Having Information at Our Fingertips. *Science 333*(6043), 776-778.