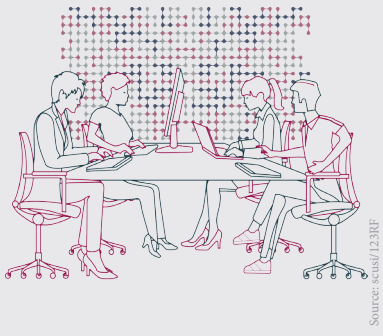
TAB OFFICE OF TECHNOLOGY ASSESSMENT AT THE GERMAN BUNDESTAG

Algorithms in digital media and their influence on opinion formation



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Summary

- Search engines, social media and video platforms collect, process and disseminate large volumes of information from different sources. They are also referred to as information intermediaries.
- The operators of these online platforms develop and use algorithms to decide which messages are displayed to which people and in which order.
- In contrast to journalistic procedures in newsrooms, these selection decisions are predominantly profit-oriented and not based on journalistic criteria, but on operator interests.
- The significance of algorithms in digital media for forming individual and public opinions has become the focus of political and social interests, mainly due to undesirable developments such as the spread of fake news or the use of personalised advertising for political campaigns.
- So far, a few studies are available regarding the influence of digital media on opinion formation in Germany. Measures to regulate algorithms are being discussed or are already in the process of legislative implementation.

What is involved

Media not only influence how people communicate or act. They also shape social structures, social exchange and social interaction in specific ways. In the past already, the opportunities and risks of media that were new at that time – for example radio and television – were discussed. Today, this applies to both the Internet and the diverse digital and social media based on the Internet, such as search engines, social media or video platforms.

In recent years, the use of digital media for news purposes has increased continuously. Thus, their significance for forming individual and public opinions has also increased. So far, traditional (linear) television is still Germany's most widespread news source. However, media use is shifting away from broadcasting and the printed press towards a balance with those formats accessed via the Internet and distributed via search engines and social media. The content displayed there is often tailored to the respective users. In these digital information services, algorithms determine the selected or personalised content covered and how it is structured.

Complex algorithmic processes and decisions are increasingly based on artificial intelligence (AI) or machine learning techniques to analyse and classify large data volumes. In terms of their objectives, procedural models, the data used and even their results, algorithmic processes are neither transparent nor comprehensible about how they find the respective results – even for experts.

Freedom of opinion is a pillar of democracy. The term opinion includes value judgements, appraisals, views, notions, beliefs and other statements that comprise a comment. Unrestricted formation of individual and public opinion, but also that news is (can be) freely disseminated and checked for correctness are prerequisites for democratic societies. The question of whether this is the case with digital media and algorithmic processes is the focus of this study.

There is a reciprocal effect between the formation of individual opinion and that of public opinion. Individual opinion formation refers to the formation of political attitudes among people who at the same time influence the shaping of society in their role as citizens. Public opinion formation, on the other hand, refers to the emergence of public opinion on a controversial issue.

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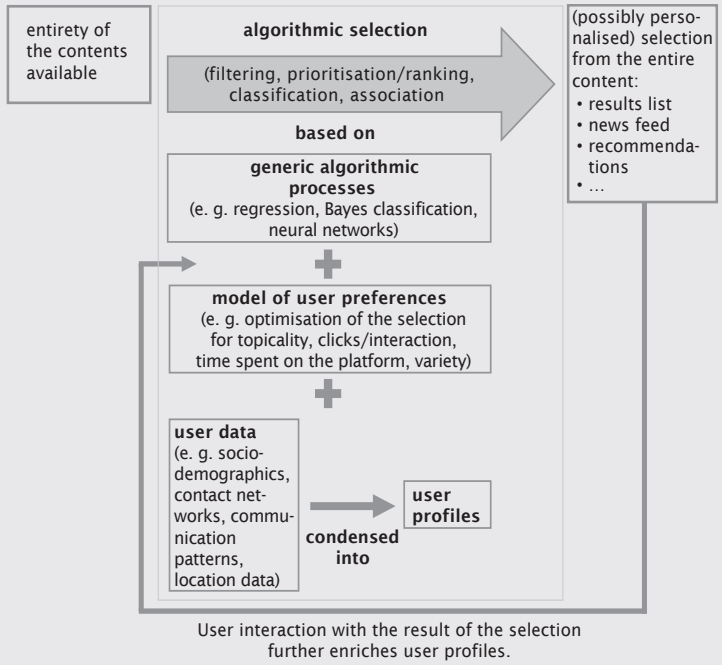
Upheavals in the mediation of news

From the public's point of view, television, radio and the press have been the only gatekeepers in recent decades. They determined what news the public got to see or hear. Now, this role is assumed by information intermediaries as well. In contrast to the information intermediaries serving their business, broadcasting and the press in Germany are guided by principles for ensuring information to the public. In a democracy, they exercise functions of (political) control. Freedom of the press is enshrined in the German Basic Law. It's the aim of professional journalists to communicate transparently and on a well-founded basis. They not only ensure that relevant topics reach the public, but also that the different views of the actors relevant to a topic are taken into account in the reporting. In principle, journalistic-editorial news is accessible to all members of society. Thus, they differ from messages posted nowadays by private individuals or groups on social media, often only in closed groups.

Fig. 1 System of algorithmic personalisation



Source: HBI (2018): Auswirkungen auf die individuelle Meinungsbildung bei Nutzenden. Hamburg

From the point of view of the internationally operating information intermediaries, the provision of personalised online news or even advertising messages is associated with opportunities to expand their business field and earn money. For this purpose, these companies encourage their users to stay on the online platform. This is most likely to be achieved using attention-grabbing news. In this respect, the logic of algorithmic mediation follows the profit-oriented business models of information intermediaries – gearing towards advertising revenues – and not necessarily the principle of providing the public with well-founded and diverse information in the sense of forming opinions on socially important topics.

Implications of algorithmic systems for the formation of individual opinions

In the public and scientific discussion, there is a high level of agreement that, in general, algorithmic systems have an influence on opinion formation. This already results from the frequent use of information intermediaries in many people's everyday life, e. g. also via smartphones.

Communication scientists distinguish between three modes of action in which the media affect processes of individual opinion formation: the frequency with which the media take up a topic (agenda setting), the communication of factual knowledge about actual current events (knowledge acquisition) and the communication of opinions as an overview of different (societal) positions about a topic (opinion communication).

The effects of algorithmic systems in digital media on individual opinion formation can be examined and described along these three modes of action. The main interest about algorithmic selection is which content users get to see or hear and in what order. The selection using algorithmic personalisation is made for individuals, groups or generally for all users. On the one hand, the algorithmically personalised selection influences which topics and opinions the public or part of the public perceive. For example, it determines the visibility of a post in Facebook's News Feed and thus influences whether users ever learn about a specific topic or an attitude towards this topic. For this, the objectives of the operators of the information intermediaries are relevant. Using their specifications for the algorithms, they essentially decide which messages are displayed to individual users and which are not – despite the automatic process.

At present, there are only a few reliable scientific findings on how algorithmically personalised information offers affect individual opinion formation.

Fake news in digital media

Due to their functions based on personalised algorithmic selection, online platforms such as Facebook or Twitter offer opportunities for large-scale disinformation and manipulation campaigns. In public discussion, disinforming content is briefly referred to as fake news. The term covers manipulative, misleading or (demonstrably) false news deliberately disseminated for economic, ideological or political reasons. Satire or parodies with no misleading intentions do not

count as disinformation. Targeted disinformation in information intermediaries is considered a significant challenge for society, because it can be used to manipulate opinion formation and political decisions. Although algorithmic processes do not create fake news, it can be spread more widely by algorithmic decision-making systems, for example, if it is accessed and shared more frequently due to its sensational character, or if it is displayed more often in the news feeds of social network users. Thus, the users' attention is drawn to it in a targeted way.

Disinforming content is often geared towards the algorithmic systems of the information intermediaries in terms of its subject matter and content design (using headlines and visuals). It is intended to attract a high level of user interaction and go viral. Indeed, while the algorithmic selection systems typically do not assess the trustworthiness of a source, content with a high sensational potential is usually prioritised more strongly. If this is the case, disinforming content develops a strong momentum.

Due to a lack of sufficient studies, it is impossible to precisely quantify the extent of disinforming information disseminated by information intermediaries in Germany. However, there are assessments by experts on which forms of disinformation are rather or very widespread in Germany. In this context, distorted representations, assertions without a factual basis, and suggestive interpretations are frequently named.

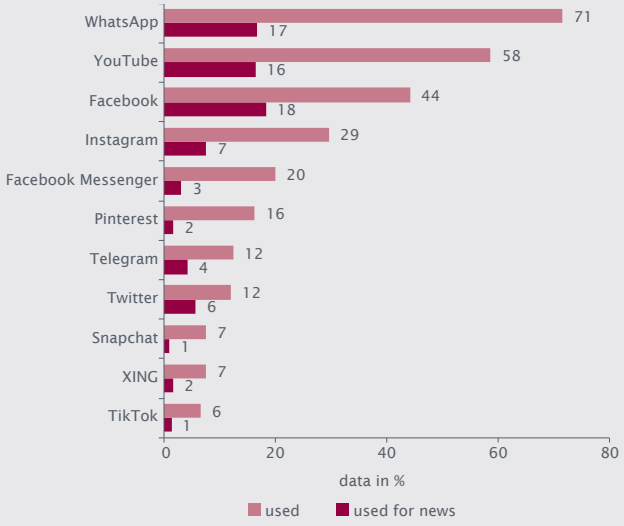
Filter bubbles and echo chambers

Filter bubbles and echo chambers are discussed in the context of algorithmic systems. While there is a theory that filter bubbles are formed when users prefer to communicate within a group, echo chambers emerge when users with the same opinions only follow each other and exclude other communication partners – thus also excluding different views. Both concepts receive much attention in the mass media and politics as a metaphor for highly individualised information spaces in which the opinions of the actors there are always confirmed and not questioned, taken up or discussed.

Many scientists, however, do not consider filter bubbles to be significant – at least with regard to search engine ads. Regarding social media, the assessments are inconsistent, but predominantly sceptical – especially in the publications relating to Europe – as to whether filter bubbles and echo chambers are a significant phenomenon for opinion formation. The findings of previous publications are difficult to compare because of the divergent definitions on which they are based. However, filter bubble effects tend to be observed among people close to politically extreme groups. The same applies to people believing in conspiracy theories. For example, an experiment on the video platform YouTube showed that users might get into a filter bubble if they consistently follow the recommendations of the information intermediary.

Indications that the processes of the information intermediaries facilitate the emergence of echo chambers – within which particular world views or ideologies are represented and which seal themselves off from conflicting information – are only available for relatively small groups of people. In the case of YouTube, for example, it has been shown for radical right-wing movements in Germany and the USA how recommendation systems based on similarities facilitate the emergence of echo chambers. However, the vast majority of social media users regularly come into contact with conflicting opinions.

Fig. 2 Social media used (for news)



Based on Internet users aged 18 years and over; n = 2.011

Source: Hölig, S.; Hasebrink, U.; Behre, J. (2021): Reuters Institute Digital News Report 2021. Ergebnisse für Deutschland. Leibniz-Institut für Medienforschung/ HBI, Arbeitspapiere 58, Hamburg, p. 49

Robot journalism

Robot journalism is the creation of journalistic-editorial content using automated processes. These involve algorithmic processes that transform structured data into narrative news texts. Only the initial programming is done by humans. The texts themselves are created on a current basis from the underlying data (e. g. on sporting events). These automatically generated news texts are used by more and more editorial offices, e. g. to create weather and financial reports. Thus, updates can be published in digital media at short intervals. Due to the frequent updates, automatically produced texts or even videos, for example, are categorised to be more relevant in search engines and are displayed as the top rankings of the results lists. Election results can also be reported automatically, for example broken down by district,

as can environmental data on concentrations of particulate matter or sports results.

Automatic generation of news items is one of many fields of application of algorithmic systems in journalism. For example, algorithms are also used to test which headlines are most likely to be clicked on by users. Editors of news magazines or newspapers use such systems to generate higher advertising revenues from online ads through appealing headlines.

Technical progress is being made in the field of automatic speech, text and video generation. So, an increase in automated journalism is expected in the coming years. The readers of automatically generated texts cannot easily distinguish them from manually created news items, at least if they briefly reproduce results from databases. The generation of texts and videos dealing with complex content and evaluating facts is still a vision of the future. If algorithmic systems can do this one day, questions will arise as to whether these news texts should then always be marked as algorithmically generated, how the role of journalists changes and whether ethical standards for journalism (press code) should be adapted.

Current legislative developments

In December 2020, the European Commission proposed two new legislative initiatives for digital platforms – the Digital Services Act and the Digital Markets Act. The aim is to create more security in the EU's digital space, protect users' fundamental rights and promote a level playing field for companies. The Digital Services Act (DSA) was adopted by the European Parliament and the Council in April 2022. It entered into force in November 2022 and will apply in all EU countries as of 17 February 2024. The Digital Markets Act (DMA) was adopted by the European Parliament and the Council in September 2022. In November 2022, it entered into force and will apply as of 2 May 2023.

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Algorithmen in digitalen Medien und ihr Einfluss auf die Meinungsbildung

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In particular, the Digital Services Act aims to counteract risks and dangers that arise for individuals and society as a whole from the use of – but also the dependence on – large online platforms. The transparency measures also concern the algorithmic systems of the principal online platforms to show how algorithmic decisions are made and what effects these decisions have on society. In the future, this will result in further findings on the significance of algorithmic systems of large online platforms for opinion formation – while at the same time research activities about the topic will be increasing.

The Office of Technology Assessment at the German Bundestag (TAB) advises the German Bundestag and its committees on questions of scientific and technological change. TAB has been operated by the Institute for Technology Assessment and Systems Analysis (ITAS) of the Karlsruhe Institute of Technology (KIT) since 1990. It has been cooperating with the IZT – Institute for Futures Studies and Technology Assessment and VDI/VDE Innovation + Technik GmbH since September 2013. The Committee for Education, Research and Technology Assessment decides on TAB's work programme, which also includes subjects proposed by other parliamentary committees. The standing »TA Rapporteur Group« consists of the Chairman of the Committee Kai Gehring (Bündnis 90/Die Grünen), and one member from each of the parliamentary parties: Dr. Holger Becker (SPD), Lars Rohwer (CDU/CSU), Laura Kraft (Bündnis 90/Die Grünen), Prof. Dr. Stephan Seiter (FDP), Prof. Dr. Michael Kaufmann (AfD), Ralph Lenkert (Die Linke).