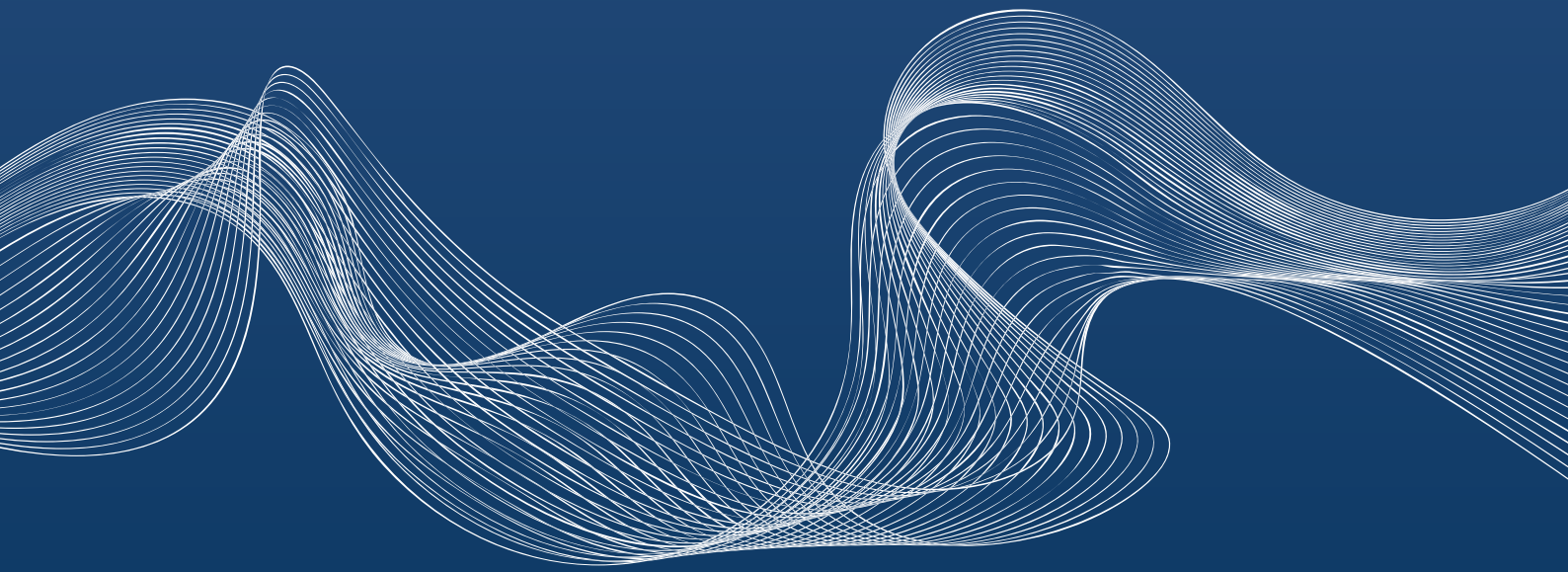
OBSERVATORY ON INFORMATION AND DEMOCRACY

INFORMATION ECOSYSTEMS AND DEMOCRACY



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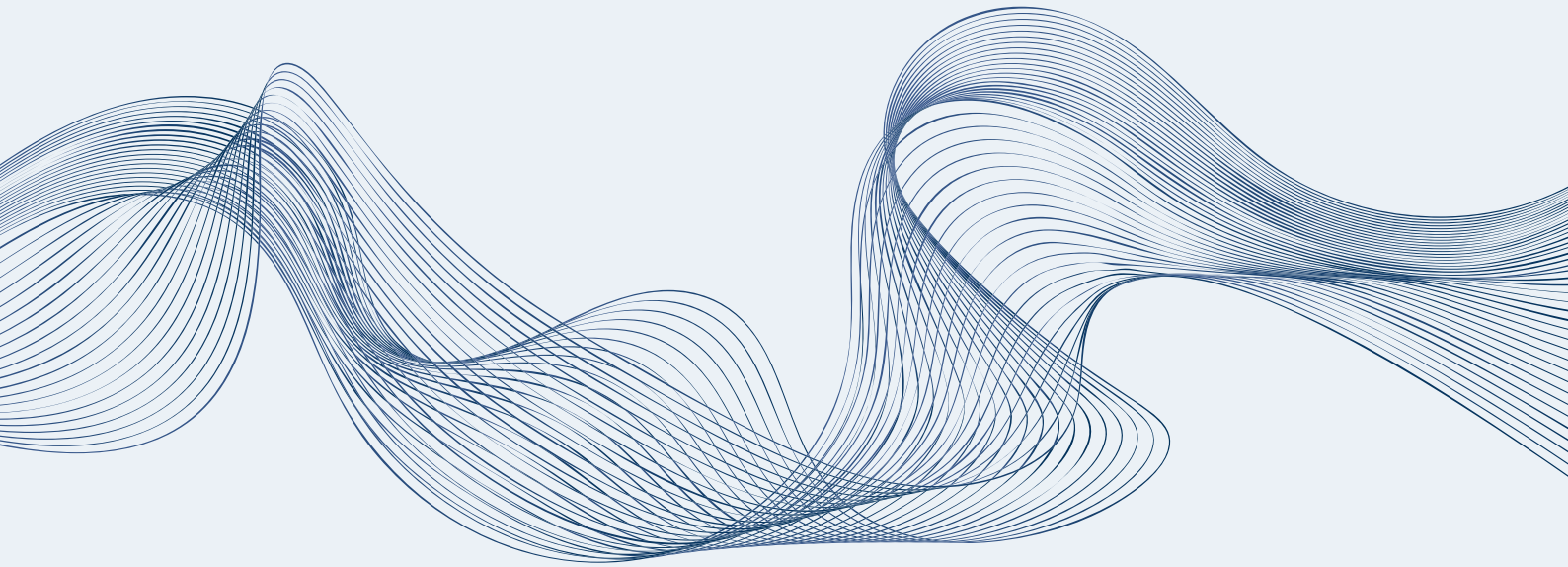

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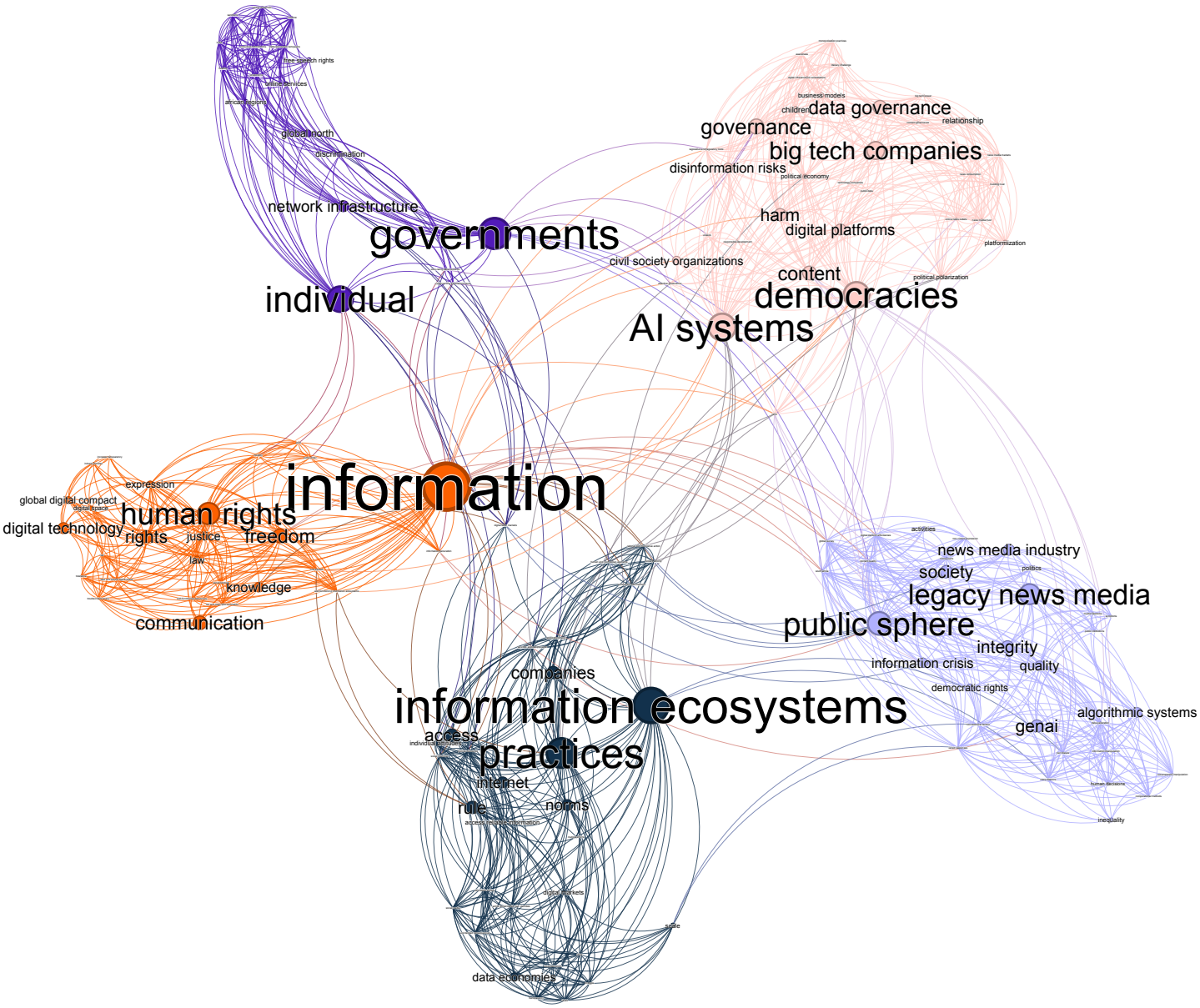


This map represents a statistical summary of the thematic content of this chapter. The network graph represents relations between the words in the chapter, placing them closer to each other the more they are related. The bigger the node, the more present the word is, signalling its role in defining what the report is about. The colors represent words that are closely related to each other and can be interpreted as a topic.

The map is generated by the OID on the basis of the chapter's text using GarganText – developed by the CNRS Institute of Complex Systems. Starting from a co-occurrence matrix generated from chapter's text, GarganText forms a network where words are connected if they are likely to occur together. Clustering is conducted based on the Louvain community detection method, and the visualization is generated using the Force Atlas 2 algorithm.

Link to the interactive map here

'The right to know is the right to live'
(Aruna Roy).[1]

1 Introduction

The United Nations' *Global Digital Compact* asserts that 'digital technologies are dramatically transforming our world'.[2] Agreed in September 2024, the text insists that human oversight of technology is needed to identify and mitigate the risks for humanity.[3] In emphasizing technology-driven transformation and human choice relating to risk mitigation, it is easy to lose sight of the fact that the design and development and the beneficial and harmful uses of technology are not dictated by technology; rather, they are the result of human decisions and action. What technology designers, corporate, government and individual decision-makers believe is appropriate technological development is not immutable: transformation depends on power relationships in societies, the presence and strength of countervailing forces, and 'whether those who are not in the corridors of power can organize and have their voices heard'.[4]

This report is a critical analysis of research in the Global North and the Global Majority World[5] that informs us about the interdependent relationships between the cultural, social, political, economic and technological components of information ecosystems.[6] It focuses on what interdependence means for the integrity of information and for informed democratic participation in the public sphere. It means understanding questions about the generation and circulation of mis- and disinformation as symptoms of broader and complex changes in society and as important amplifiers of these changes.[7] The report investigates how these reciprocal relationships are playing out in the news media industry, in the development and use of artificial intelligence (AI) systems,[8] and in the ways that data is generated, processed and controlled.

Information ecosystems are implicated in the integrity of information (the quality of public discourse), the fairness of political processes, the protection of media freedoms and the resilience of public institutions.[9] The report addresses three thematic areas with a cross-cutting theme of mis- and disinformation: **media, politics and trust; artificial Intelligence, information ecosystems and democracy; and data governance and democracy**. The analysis is based on a large collection of research sources (3,095 of which 1,664 are cited) including academic publications, reports and other materials.[10] Insight into whether changes in these areas are consistent with the protection of fundamental human rights is of special interest when democracy is troubled – not only by changes in information ecosystems, but also by multiple instances of injustice.

[1] Roy, A. (2004, n.p.), Indian social activist, professor, union organizer and former civil servant and President, National Federation of Indian Women.

[2] UN (2024b, paras 1, 7). The Compact sets out five objectives: (1) close all digital divides and accelerate progress across the Sustainable Development Goals; (2) expand inclusion in and benefits from the digital economy for all; (3) foster an inclusive, open, safe and secure digital space that respects, protects and promotes human rights; (4) advance responsible, equitable and interoperable data governance approaches; and (5) enhance international governance of artificial intelligence for the benefit of humanity. Its ambitions are discussed in Section 4 of this chapter. See also UN (2024d).

[3] UN (2024b, para. 3).

[4] Acemoglu & Johnson (2023, p. 29).

[5] See Campbell-Stephens (2021) for a discussion of naming practices. It is difficult to settle on a set of definitions for groups of people or countries. We use 'Global Majority World' (and not without criticism) as a collective reference to 85% of the world's population who live in low- and middle-income countries and who are of Indigenous, African, Asian or Latin American descent (sometimes extended to people of dual heritage, and minority ethnic groups who are racialized within countries and not classed as 'White'). 'Global North' is used to refer to those not included in the Global Majority World, generally from the wealthy, industrialized countries. Regions and countries or specific groups are discussed as appropriate. See Anthony *et al.* (2024); Lawrence (2022); Patrick & Huggins (2023).

[6] The terminology used in this report is discussed further in Section 3 of this chapter and in Appendix: Methodology.

[7] See Tay *et al.* (2024, p. 1), who note that misinformation 'depending on individual and contextual factors … can be both a symptom and a cause', and that multidimensionality is important. Our socio-technical perspective directs attention to reciprocal relationships between components of complex societal systems, combined with a political economy perspective that directs attention to power structures and relationships.

[8] Mueller (2024, p. 2) argues that the label 'AI' is unhelpful, since what we are discussing is 'digital ecosystems' including 'computing devices, digital networks, digitized data, and software programs'. He argues that references to 'AI governance' are becoming meaningless. We refer to AI systems and to specific components of AI systems whenever possible (the rationale is explained in Section 1, Chapter 3).

[9] The main focus is on the resilience of public institutions and criticisms of those institutions when they are complicit in injustice. The resilience of individuals is discussed in relation to interactions with online content (across the chapters) and self-defense measures (in Chapter 8), but the aim is not to position individuals themselves as ultimately responsible for accommodating injustices arising from datafication processes. See Banaji (2024).

[10] Of 1,664 cited sources, 65.5% classified as Global North, 22.5% Global Majority World, and 12% Global. See Appendix: Methodology.

This assessment of research is not about identifying technology or mis- and disinformation as the *principal* cause of democratic fragility. Rather, while much research is mainly concerned with the impacts of digital technology or mis- and disinformation on society or individuals, we aim to assess research findings in the context of how and why information or technology is problematic, for whom, and what is being done, or could be done, to mitigate problems. Strengths, weaknesses and gaps in research are identified to improve understanding of how democratic decision-making and justice might be achieved in data-intensive economies.

Section 2 of this chapter explains the interdependence of datafication processes and democracy, highlighting why mis- and disinformation has become a prominent focus of research. Section 3 introduces what we understand to be the principal components of an information ecosystem, and explains key concepts used in this report, including the public sphere and the international human rights commitments that are central to any assessment of information and communication. Section 4 explains how mis- and disinformation are understood in much of the policy literature, and why the norms and rules for governing the production, circulation and use of data and information are crucial issues, especially at a time when democracy itself is troubled in many countries around the world. Section 5 then explains the structure of this report, and outlines the content of the chapters that follow.

2 Setting the Context: Datafication and Democracy

Policy in multiple countries is saturated with claims about the harms of online mis- and disinformation. Warnings about an 'information crisis' are galvanizing governments, companies and civil society organizations to develop principles, guidelines and strategies for combating mis- and disinformation. The World Economic Forum's *Global Risks Report 2024* put mis- and disinformation risks at the very top of its list of perceived threats.[11] Principles are being agreed internationally for the responsible development and use of AI systems.[12] UNESCO, for example, has produced a set of guidelines for governing digital platforms.[13] Together with the *Global Digital Compact*, these aim to ensure that those who design, operate or participate in information ecosystems (including network infrastructures, data and content) adhere to international human rights commitments.[14]

A critical multidisciplinary assessment of research on the interdependence of information ecosystems, the public sphere and democracy is crucial in view of evidence that democracy is troubled by changes in information ecosystems around the world. For example, internet freedom declined globally for the 14th year in a row in 2024. In three-quarters of the 72 countries examined by the Freedom House *Freedom on the Net* report, online users were arrested for non-violent expression and people were physically attacked or killed for their online activities in at least 43 countries.[15] In addition, since 1993, 1,701 journalists have been killed, with 50% of these deaths occurring outside conflict zones.[16]

[11] WEF (2024).

[12] For example, In September 2024 at the United Nations level, the Pact for the Future, Global Digital Compact, and Declaration on Future Generations (UN, 2024b) and the Governing AI for Humanity report, which calls for 'a collaborative and learning mindset, multi-stakeholder engagement and broad-based public engagement', and acknowledges that 'whole parts of the world have been left out of international AI governance conversations' (UN, 2024a, pp. 78, 8). See also earlier statements from the G7 (2023); OECD (2022c); UK DSIT (2023).

[13] UNESCO (2023b).

[14] Including the Universal Declaration of Human Rights (UDHR) (UN, 1948) and the International Covenant on Civil and Political Rights (ICCPR) (UN, 1966).

[15] Freedom House (2024).

[16] UNESCO (2024).

Big tech company decisions influence operations and editorial choices in the news media industry, which is essential for the democratic ordering of society (our first thematic area: **media, politics and trust**). In principle, the news media industry can hold the powerful to account and facilitate the free exchange of accurate information. However, if information is wrong or inaccurate and circulates virally, the quality of public debate suffers. The commercial imperatives of algorithmic-driven and opaque advertising markets mean that political news often appears next to sensationalist content. With legacy media facing competition from podcasts and individual bloggers, the combination of and concentration in the legacy media industry, and the proliferation of online information flows, is creating a financially unstable environment for the gathering and reporting of news.

News media professionals feel pressured to make their content more attention-grabbing to adapt to digital platform affordances, sometimes sacrificing content quality.[17] Concern about what is real and what is 'fake' online news is reported to have risen to 59% globally: in the United States to 72% and in South Africa to 81%, both countries that held elections in 2024.[18] Declining trust in the news varies by country, but is concerning. In a global survey in 2024, respondents were asked whether they trusted the news most of the time. Finland recorded the highest overall trust, at 69%, the United States, 32%, France, 31%, Argentina, 30%, Greece, 23% and Hungary, 23%.[19] The contribution of news producers to the public sphere and to whether news media organizations are trusted depends on the context in which they operate – democratic or autocratic – the legal authority under which they operate, and whether pluralism and diversity are encouraged.[20] Questions about how the independence and financial viability of news organizations can be sustained are common across countries. The varied responses have substantial consequences for the independence of the news media and for the protection of democratic rights and freedoms.[21]

Mis- and disinformation circulating at scale is seen as diminishing the quality of the news media and public discourse.[22] However, research on the information crisis often neglects the role of legacy news media and the history of propaganda. Analysis focuses principally on the impacts of technological change, neglecting non-technical factors that influence information integrity.[23] In 2024 more than 80 countries and some 3 billion people were set to vote in regional or national elections.[24] Wars were being waged in Somalia, between Russia and Ukraine, and involving Israel and other territories and states. In the context of microtargeting, the use of biased AI systems, the rise of 'deep fakes', the escalation of cyberattacks and the weaponization of information, there is good reason to be concerned about the integrity of information and the problems faced by the news industry.[25]

The release to the public of generative artificial intelligence (GenAI) in 2022 means that the tools for information manipulation have become more available and less costly. Algorithmic systems, including large language models (LLMs), contain unavoidable biases that stem from data generation and collection processes that are subject to human decisions (our second thematic area: **artificial intelligence, information ecosystems and democracy**). In addition, given that people's own biases influence their online behavior and interpretations and uses of information, these are exacerbated when outputs are used to confirm preconceived notions and when AI models are trained on these outputs. In turn, this diminishes the quality of information over time,[26] leading to decisions that perpetuate inequality and increase

[17] Chadwick (2017).

[18] Newman *et al.* (2024).

[19] Newman *et al.* (2024).

[20] Hallin & Mancini (2004, 2012); Neff & Pickard (2024).

[21] Altay *et al.* (2023a); Baines & Elliott (2020); Epstein (2020); Fallis (2015); François (2019); Kapantai *et al.* (2021); milton & Mano (2022, pp. 34, 49); Ó Fathaigh *et al.* (2021); OHCHR (2021, paras 9-15); Pielemeier (2020); Willems (2014a). For a discussion on how human rights and democracy can be united in governance structures, see Besson (2011).

[22] Bennett & Kneuer (2023); Jungherr & Schroeder (2021); Schlesinger (2020); Wasserman (2020a).

[23] Benkler *et al.* (2018); Bolin & Kunelius (2023); Hyzen (2023); Tsfati *et al.* (2020).

[24] Harbath (2023) discusses the difficulties of counting elections.

[25] Craig *et al.* (2023); Holt (2023); O'Connor (2022), all Institute for Strategic Dialogue (ISD), an independent organization; see also Briant (2024); Caulfield *et al.* (2023); Forum on Information and Democracy (2023, 2024a).

[26] See Dolata *et al.* (2022); Kop (2020), and Corbett-Davies *et al.* (2017) supported in part by the John S. and James L. Knight Foundation and Hellman Fellows Fund, US.

vulnerabilities.[27] These developments can negatively influence the way citizens understand themselves as political actors, with disproportionately negative effects on marginalized people.[28]

The big tech companies use their algorithmic systems to analyze behavior and keep people engaged in interactions that generate data.[29] 'Datafication' enables companies to transform everyday actions into quantified data that is used for real-time tracking and predictive analysis.[30] The use of computational methods results in the untransparent manipulation of information and communication flows.[31] Thus, this 'platformization' of information means that the economy and multiple spheres of public and private life are influenced by the choices of these companies.[32] Although the big tech companies dominate in providing an infrastructure for information ecosystems, other digital intermediaries play an important role, for example network operators and web-hosting companies. These have the capacity to alter information ecosystems, for example by shutting down the internet or taking websites offline unilaterally or under pressure from governments.[33] The big tech companies and states aiming to be leaders in the global economy argue that their competitiveness and national (regional) economic growth depend on greater efficiencies in the collection and monetization of data, and they claim that 'technological accelerationism' is good for humanity.[34] They insist that online interaction generates 'raw' or 'neutral' data that belongs to no one (until it is appropriated by them).

This is the context in which an information crisis has come to the top of the policy agenda. The technology companies' business models and practices are implicated in what critical scholarship refers to as 'surveillance capitalism' or 'data colonialism'.[35] Individuals and societies are being comprehensively surveilled for data extraction and products, and the monopolization of information generates revenue by converting data (including public data) into private information assets (our third theme: **data governance and democracy**). Digital platforms and AI systems are opening a space for a more reciprocal dynamic between humans and technology that is potentially beneficial. However, how these components of information ecosystems operate is decided largely by these companies within the legal frameworks that are put in place by governments. These governance arrangements determine what information 'can appear, how it is organized, how it is monetized, what can be removed and why, and what the technical architecture allows and prohibits'.[36] When, for instance, someone shows interest in a type of political content, an algorithm is likely to overemphasize similar viewpoints in their feed, narrowing the range of information they see. It is broadly accepted that these practices, combined with the positioning of individual freedom as the enemy of equality and solidarity, are implicated in social and political instability.[37] The datafication practices do not fully explain political or economic divisions in society – these 'exist before and beyond' these companies' activities,[38] and online mis- and disinformation are not the only contributing factors.[39] However, when information is

[27] See, for example, Wang *et al.* (2024), on issues of vulnerability in the use of AI systems.

[28] Horowitz *et al.* (2024); Liveriero (2020, p. 787). Epistemic rights refer to the requirement that to achieve equality in decision-making, it must be guaranteed that truthful information and knowledge are available to all. 'Epistemic rights are about knowledge – not only about being informed, but also about being informed truthfully, understanding the relevance of information, and acting on its basis for the benefit of oneself and society as a whole' (Nieminen, 2024, p. 15).

[29] Nieborg & Poell (2018); Plantin *et al.* (2018); van Dijck *et al.* (2018a). The metaphor 'platform' has been criticized for giving a misleading indication of the specific transformation processes (Gillespie, 2010), although it is still used widely in the literature.

[30] Transforming offline action into online quantified data enabling tracking and predictive analysis; see Mayer-Schönberger & Cukier (2013).

[31] Gitelman (2013, p. 7).

[32] Poell *et al.* (2019, p. 1).

[33] See Bradshaw & DeNardis (2022) on infrastructure and disinformation; see also Bradshaw *et al.* (2021), supported by the European Research Council (ERC), Adessium Foundation, Civitates Initiative, Ford Foundation, Hewlett Foundation, Luminate, Newmark Philanthropies and Open Society Foundations.

[34] Caballero & Monje (2024).

[35] See Bennett & Livingston (2023); Couldry & Mejias (2019); Fendji (2024); Lee & Valenzuela (2024); Lehdonvirta (2022); Mejias & Couldry (2024); Trappel (2019); van Dijck *et al.* (2018a); Zuboff (2019). This work builds on several decades of using untransparent offline advertising techniques and now online personalization systems; see (McGuigan, 2023).

[36] Gillespie (2010, p. 359).

[37] Calhoun *et al.* (2022).

[38] Tonnies (1957, p. 140), first published as Gemeinschaft und Gesellschaft in 1887.

[39] Aruguete & Calvo (2023); Zuazo & Aruguete (2021).

inaccurate, harmful or illegal (e.g., violent, associated with nationalism, ethno-religious bigotry or misogyny), the risks to individuals and groups can multiply, especially if people cannot discriminate between accurate and inaccurate information.

With the big tech companies turning a blind eye to how they facilitate the generation and circulation of mis- and disinformation, there are multiple efforts to introduce further governance arrangements to force, or to seek a renewal and extension of, voluntary compliance in the responsible management of online services. Companies are marketing advanced digital technologies, including GenAI, as quickly as they can claim to adhere to safety standards and responsible innovation practices. The pace of these developments can sideline or overcome countervailing power mounted through regulatory or civil society action by creating internal information ecosystems governed by private rule-making embedded in automated technologies. Doing so preempts meaningful political deliberation about rights of data ownership, what role data should have in the economy and public sector, how it should inform bureaucracy, and in what contexts data production should be minimized or prohibited. That is, it contributes to the declining health of information ecosystems.

Policy makers in the Global North are developing governance frameworks with the aim of balancing national (or regional) races to achieve leadership in digital markets with commitments to securing the rights of publics by setting norms and rules aimed at improved accountability and transparency of the big tech companies. China, the European Union and the United States, for example, are putting governance arrangements in place to maximize the scale and scope of their data economies while also claiming to balance respect for international human rights law. Their approaches differ, and we need to understand better which publics and whose interests are being protected.[40]

In the Global Majority World, policy makers often confront decisions taken in the Global North and struggle to govern their information ecosystems in ways that reflect their interests. With the big tech companies monopolizing digital service and data markets, the space for imagining and experimenting with alternatives is diminishing. Other countries and regions see the rule-setting big tech companies as 'behemoths', and experience a form of 'digital imperialism'.[41] This is particularly so when the export of governance models by the big tech companies and governments is couched in the language of aid, cooperation and trade. In the case of the African Union and African countries, research indicates that 'instruments tend to emulate best practices from other regimes' with unintended consequences when they not 'suitable for, or overlook African realities'.[42]

This report focuses mainly on the experiences of those who are connected to the internet. In 2024 there were 5.4 billion individual internet users – 67% of the world's population – each of whom can be a social media viewer and potentially a 'speaker' if they have affordable access. There were an estimated 5 billion active social media user identities in 2024 (62.3% of the world's population, not necessarily unique individuals).[43] Some 2.6 billion people are not connected, and world connectivity averages tell us little about how people experience their online activity since they hide large disparities: in low-income countries, 20.9% of people use the internet; in high-income countries, the figure is 90.5%.[44] Social, political, cultural and economic factors also influence the production

[40] AI Now Institute (2024, p. 19).

[41] See Aaronson & Leblond (2018) and Chen & Gao (2022), supported by the National Social Science Fund of China (NSSFC). Examples of data localization initiatives are India's Digital Personal Data Protection Act (Government of India, 2023) and the African Union Convention on Cyber Security and Personal Data Protection (African Union, 2014). The latter promotes a unified, continent-wide approach to cybersecurity and data privacy that is said to diverge from the European Union's General Data Protection Regulation (GDPR), and represents 55 African states. Distinctive strategies are discussed in Duncan (2023) and Andere & Kathure (2024).

[42] Musoni *et al.* (2024, p. 15) supported by the European Commission.

[43] Thompson & Kemp (2024).

[44] ITU (2024b). In the Global Majority World, fixed internet connectivity is either absent or unaffordable for many, which is partly compensated for by mobile internet connectivity, which can be unreliable; see ITU (2024a, p. 13). And there are large differences – mobile broadband subscriptions per 100 inhabitants in 2024: world average 90.7, low-income country 35.3, high-income country 123.4. The cost of a mobile data and voice high consumption basket (140 min., 70 SMS, 1.5GB, 3G and above) as a percentage of Gross National Income per capita shows big disparities: world average 4.7%, low-income country 18%, high-income country 0.9%. The percentage of people who own a mobile phone: world average 82.8%, low-income country 50.4%, high-income country 95.1% (165 countries). Disparities within countries, especially rural and urban, are just as important as those between countries and regions (Strover *et al.*, 2024).

and circulation of mis- and disinformation when connectivity is achieved,[45] and information also reaches those who are unconnected, for example people share accounts, communicate in offline social networks and engage with legacy types of news. Especially in the Global Majority World, the economically disadvantaged are offered online service contracts that limit exposure to diverse sources of information. In some countries they are legally obliged to participate in political processes, even though their ability to access reliable information depends on the quality of their access to the internet, and social practices and economic policies that influence that access and political discourse. It is therefore essential to take these factors into account rather than focusing principally on the effects of mis- and disinformation on individual political attitudes and behaviors.

3 Positioning the Research Assessment: Concepts and Definitions

A critical analysis of existing research requires decisions about the terminology and concepts to use in conducting the research assessment. A vocabulary is needed to name the objects and processes that are the focus of a research assessment, and the naming itself is controversial. (We explain the choices of terminology and concepts used in this report in Appendix: Methodology.)

We focus on 'information ecosystems' that are comprised of social and material components. Specifically, we define an ecosystem as a *system of people, practices, values, and technologies in a particular environment*, embedding the public sphere within two layers of the ecosystem: a network infrastructure (hardware and software) layer and a service applications layer.[46] By network infrastructure we mean the hardware and software that supports communication, the standards and protocols, and also the actors that produce the technologies and their values and practices.[47] By service applications layer we mean the variety of services available to users and the values and practices of those who design and operate services.[48] Figure 1.1 shows the layers of these information ecosystems – infrastructure layer and services applications layer.

For the service applications layer we focus on the news media industry, which depends on services on the applications layer, the development of AI systems and on the norms and practices that govern how data is produced, processed and used. The corporate sector plays a major role in deciding how the layers are designed and operated, but other ownership alternatives are also of interest.[49] Information ecosystems are assumed to be in constant flux, and power relations and asymmetries mean that we do not expect these systems to achieve a timeless balance among competing interests; struggles among interested parties are understood to be ongoing.

[45] In this report, the large body of research on digital divides is not reviewed. Zero-rating policies for internet access are discussed in Section 4.1, Chapter 6, and how socio-economic inequalities and marginalized groups are affected by exclusions and harms on the infrastructure and service applications layers of information ecosystems is discussed in Chapter 8.

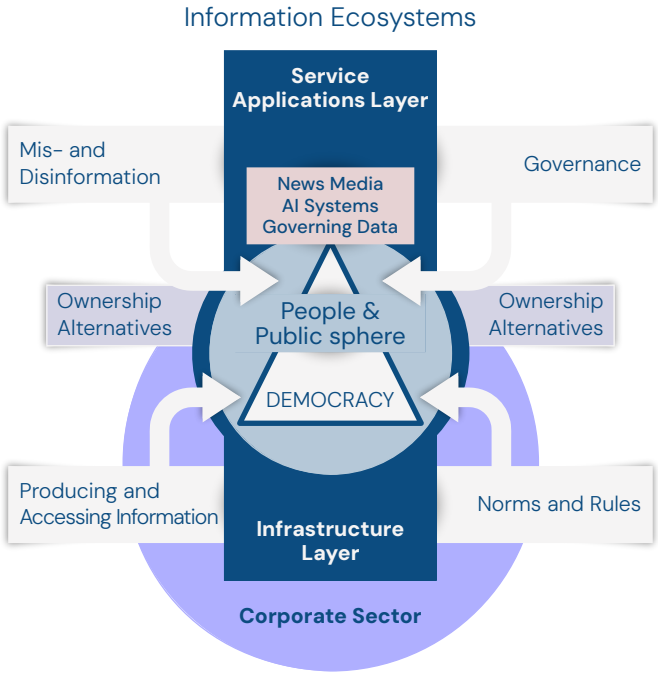
[46] Modified from Nardi & O'Day (1999, p. 49).

[47] This would include, for example, cables, data centres, semiconductors and internet access points.

[48] This would include, for example, cloud services, payment services, search engines, messaging services, app stores, social networking and e-commerce retailers.

[49] Non-corporate ownership alternatives are discussed in Chapter 8.

Figure 1.1
Information ecosystems and the public sphere



Source: Authors of the report

'Information ecosystems' terminology is present in policy debates and in some of the academic literature. Since this report aims to provide a resource for academics, researchers working with civil society organizations and policy makers and regulators, we chose to use this concept.[50] However, as shown in the center of Figure 1.1, the key emphasis of this research assessment is on how people and their communities interact with information ecosystems, and how this influences the 'public sphere', and democracy.[51] We recognize that interactions within digitalized information ecosystems and attempts to have influence in the public sphere for many occur 'during ongoing deprivation, campaigns of disinformation, police brutality and/or military atrocity'.[52]

Dependencies and interactions in information ecosystems set the conditions for whether a public sphere can flourish. The public sphere concept is often associated with Eurocentric assumptions about liberalism and an idealized conception of rational communicative action. However, it does sensitize us to how the public sphere became dominated by private interests. An historical perspective helps to shed light on contemporary inclusions and exclusions, and the need to be open to the potential for 'new forms of solidarity, new forms of intimacy, new forms of collective action, and new forms of identification – in short, new forms of being "public" with strangers'.[53]

Information ecosystem interactions occur at local, national, regional and global levels and are informed by distinctive and complex social, cultural, political and economic conditions (not shown in Figure 1.1). When the interactions of these components facilitate mis- and disinformation, they can be an impediment to democratic flourishing, and this is treated as a values-based judgment. Thus, claims in the research literature about the 'health' or otherwise of information ecosystems are treated as values-based judgments, not simply as indicative of the need to eliminate a pathogen from the system.

There are many approaches to the definition of information ecosystems. Another is a 'rhizomatic' systems approach' which embraces human and non-human elements, defining a healthy information ecosystem as:

> A balanced and well-functioning system of information creation, exchange, flow and utilization. It is characterized by the presence of diverse and pluralistic sources of information, information integrity; responsible information production, management and

[50] See Appendix: Methodology for details on the use of the term 'ecosystem' and the health of an information ecosystem. The use of the 'ecosystem' concept in this report is guided mainly by socio-technical and political economy theories. An effort is made to draw distinctions between ideal (normative) systems and values and individual and institutional practice. We are concerned with power relationships and struggles among actors over the design and operation of principally the applications layer of information ecosystems. The exercise of individual and collective power is understood to involve agency, to be values-based and to be operating at both the individual and institutional level. See Jasanoff (2015); Mansell (2012); Suchman (2023) for discussions of socio-technical and political economy traditions; see also Musiani (2022), funded by Agence nationale de la recherche (ANR); We are also informed by one branch of systems theory to explain the dynamics of changes in information ecosystems, see Radsch (2023e, p. 1) where the focus is on networks of humans and non-humans and not on the individual information consumer.

[51] See Appendix: Methodology for a discussion of the 'public sphere' concept. The coexistence of multiple public spheres where people participate in public life with unequal power is acknowledged (Fraser, 1992), especially in the Global Majority World, where those on the margins are affected by colonialism (Dutta & Pal, 2020). See Cammaerts (2024, p. 27); Ehrenfeld (2020, p. 308); Habermas (2015), first published in English in 1989, in German in 1962; Habermas (2022); Štětka & Mihelj (2024b). For criticism, see Banaji (2024); de Sousa Santos (2018); Splichal (2022b, p. 213).

[52] Banaji (2024, p. 13).

[53] Ehrenfeld (2020, p. 308).

> securitization practices; and the ability of individuals and communities to effectively access, analyze, and use information for decision-making, culture-creating, community-building, and accountability'.[54]

This approach is similarly concerned with system interconnectedness and dependencies. It conceives of an information ecosystem that is organized in non-hierarchical and non-linear ways and where there is no 'dominant power controlling the flow of information'.[55] Instead of putting individuals, citizens or community at the center of the analysis of ecosystem changes, it centers information, technologies, institutions, norms and practices.

The approach in this report seeks to encompass people's and their communities' engagement in the public sphere which is enabled or disabled by information ecosystems and institutionalized norms and practices associated with information generation, distribution and consumption as well as technologies.

The components of information ecosystems set the parameters for producing and accessing information. Interdependence among the components is governed by institutionalized norms and rules. The norms and rules are subject to international human rights agreements. For example, Article 19 of the *Universal Declaration of Human Rights* (UDHR) states that:

> The inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world… Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.[56]

Article 19 of the *International Covenant on Civil and Political Rights* (ICCPR) asserts that:

> Everyone shall have the right to hold opinions without interference. Everyone shall have the right to freedom of expression; this right shall include freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of his choice. The exercise of the rights… *carries with it special duties and responsibilities.*[57]

It is important to note that Article 29 of the UDHR also asserts that:

> In the exercise of his [sic] rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of *securing due recognition and respect for the rights and freedoms of others* and of meeting the just requirements of morality, public order and the general welfare in a democratic society.[58]

International human rights law protects the rights and freedoms of the individual. It also insists on respect and responsibility for the rights and freedoms of others, making individual rights conditional. Again, value judgments as to what constitutes 'respect and responsibility' for others create marked differences in how rights are institutionalized and practiced. These international agreements bind states and are reiterated in regional and national human rights law – within democracies and within autocracies. Embedding human rights, duties and responsibilities in information ecosystems and the public sphere has been a continuous challenge historically, but new issues are being confronted as digital technologies are used to provide novel means of creating and circulating information and speeding up communication processes.

[54] Radsch (2023e, p. 1). This definition was developed in consultation with more than 40 practitioners and experts from around the world including many from the Global Majority World.
[55] Radsch (2023e , p. 1).
[56] UN (1948, Article 19).
[57] UN (1966, Article 19; emphasis added).
[58] UN (1948, Article 29; emphasis added).

4 Troubled Democracy and Mis- and Disinformation

As indicated, this report is concerned with what changes in information ecosystems and the public sphere mean for communication, for the integrity of information (a values-based judgment) and for the future of democracy. The *Global Digital Compact* defines information integrity as 'access to relevant, reliable and accurate information and knowledge', which is essential for an inclusive, open, safe and secure digital space where there is tolerance and respect in the digital space.[59] The Compact asserts that democracy cannot thrive if information ecosystems are prone to the 'substitution of lies for factual truth'.[60]

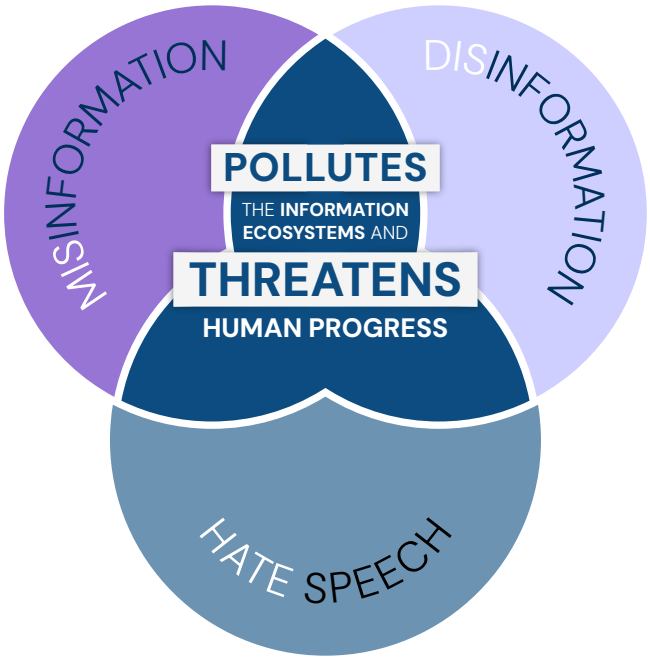
Our research assessment aims to understand how communicative processes work within information ecosystems and the public sphere. We understand *communication* to refer to the exchange of information between individuals or groups using shared concepts and signs, including direct conversations, commercial and public service media and as mediated by digital platforms. It is through communication that information is gathered and shared, voiced and heard. A well-functioning democracy needs effective communication, which depends on the availability of accurate information. As indicated, how information influences public opinion and decision-making hinges on fair and open communication within the public sphere. Some information might be helpful in contributing to knowledge that guides behavior in accordance with social norms and that upholds fundamental human rights. As mis- and disinformation have gone viral there is a risk that helpful or useful information is crowded out or drowned out, increasing the fragility of democracies, jeopardizing human rights protections – people's rights to freedom of expression, privacy, equality and justice, and compromising adherence to the rule of law.[61]

This is because democracies are based on a normative order that enables processes of societal self-determination. In democratic orders the public legitimizes complex norms and values, creating a fundamental structure for society defining how a state and its relations with other actors operates. The exercise of political authority and the distribution of goods and services depend on this ordering, which is coupled with narratives that legitimize and stabilize the normative order.[62] These narratives are based on information and develop through communication processes. In well-functioning information ecosystems, those who are impacted by decisions taken within that order are assumed to play a role in defining the rules governing which decisions are taken. When the rules for automated systems and communicative practices are set by actors that are not perceived to be legitimate, decision-making processes become destabilized or corrupted.

It is in this context that the viral spread of mis- and disinformation as well as hate speech is depicted in the policy literature as 'polluting' the information ecosystem and threatening human progress (see Figure 1.2). However, this does not address wider questions about why this speech is so prevalent or who has the power to change the societal conditions that give rise to it, or the behavior of the big tech companies that facilitate its production and circulation.

[59] UN (2024b, paras 33, 34).
[60] Arendt (1968, p. 257).
[61] Advox Team (2024), Global Voices supported by Deutsche Welle Academy (DW Akademie) and the Federal Republic of Germany through BMZ (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung); see also Wagner *et al.* (2025).
[62] Hamelink (2023); Kettemann (2022); Puppis *et al.* (2024).

Figure 1.2
Polluting the information ecosystem



Source: UN (2023a, p. 5)

Concern in policy and research communities typically centers around threats accompanying the declining 'accuracy, consistency and reliability of information'.[63] But what counts as mis- and disinformation? A distinction between mis- and disinformation that is present in many policy documents is shown in Table 1.1, indicating that it is the intent to knowingly cause harm that is used to distinguish between them.

Table 1.1
Distinguishing between mis- and disinformation

	Awareness of falsity	Underlying intent
Disinformation	Aware	"Bad"
Misinformation	Unaware ("inadvertent")	"Good / neutral"

Source: Bontcheva et al. (2020, p. 26)

In the Global North, research definitions of mis- and disinformation vary, although there is convergence around definitions in the policy literature. Definitions vary with respect to the nature and kinds of harm associated with mis- and disinformation and the level of specificity and granularity; on whether harm refers to individuals, groups, organizations or countries or to democratic processes; and on whether harm needs to be shown to have occurred.[64]

Research on mis- and disinformation often does not mention hate speech. This may be because 'hate speech' is subject to the strong protection of free speech rights in some jurisdictions,[65] and there is no definition of it under international human rights law (although 'incitement to discrimination, hostility or violence' is prohibited under Article 20(2) of the ICCPR).[66] Mis- and disinformation may take the form of state-sponsored campaigns or government, anti-government or other political propaganda, or it may manifest through individual contributions. It can appear in legacy news media, online news media or the feeds of online services, and it can make use of numerous features of the infrastructure layer of information ecosystems.[67] In African regions, in India and in other countries in the Global Majority World,

[63] UN (2023a, p. 5). Misinformation refers here to unintentionally spread inaccurate information. Disinformation refers to knowingly false and intentionally disseminated information to cause serious social harm. Hate speech is that which 'attacks or uses pejorative or discriminatory language with reference to a person or a group on the basis of who they are, in other words, based on their religion, ethnicity, nationality, race, color, descent, gender or other identity factor' (UN, 2023a, p. 5 citing UN, 2019). Hate speech is included because of the way it pollutes information ecosystems and 'threatens human progress'.

[64] Wardle & Derakhshan's (2017, p. 15) influential report, Information Disorder, distinguished between disinformation – 'information that is false and deliberately created to harm a person, social group, organization or country'; misinformation – 'information that is false, but not created with the intention of causing harm'; and malinformation – 'information that is based on reality, used to inflict harm on a person, organization or country'. The European Union defines disinformation as 'verifiably false or misleading information that is created, presented and disseminated for economic gain or to intentionally deceive the public, and may cause public harm' (EC, 2018, pp. 3-4). The concerns are about how 'waves of false or misleading content can undermine social cohesion, cast doubt on factual information, and undermine trust in public institutions' (OECD, 2024, p. 14). See also Altay *et al.* (2023a); EC (2020a); EC HLG (2018); François (2019); Kapantai *et al.* (2021); Möller *et al.* (2020); Ó Fathaigh *et al.* (2021); Wardle (2018).

[65] Gillespie (2020) for the United States, and see UN (2024e) and UN (2019, p. 2) United Nations Strategy and Plan of Action on Hate Speech which defines hate speech as 'any kind of communication in speech, writing or behaviour, that attacks or use pejorative or discriminatory language with reference to a person or a group on the basis of who they are, in other words, based on their religion, ethnicity, nationality, race, colour, descent, gender or other identity factor'.

[66] UN (1966, Article 20(2)).

[67] For a list, see Bontcheva *et al.* (2020, pp. 45-46).

mis- and disinformation definitions are sometimes aligned with Global North definitions, but they are also distinctive, including varying practice regarding the sanctions that apply when illegal or harmful information is deemed to be present.[68]

The *Global Digital Compact* calls on its member states to 'commit to respect, protect and promote human rights in the digital space' and to uphold international human rights law.[69] By 2030 the United Nations aims to:

> Promote diverse and resilient information ecosystems, including by strengthening independent and public media and supporting journalists and media workers… Provide, promote and facilitate access to and dissemination of independent, fact-based, timely, targeted, clear, accessible, multilingual and science-based information to counter misinformation and disinformation… [and] Promote access to relevant, reliable and accurate information in crisis situations, to protect and empower those in vulnerable situations.

The Compact states that:

> We must urgently counter and address all forms of violence, including sexual and gender-based violence, which occurs through or is amplified by the use of technology, all forms of hate speech and discrimination, misinformation and disinformation, cyberbullying and child sexual exploitation and abuse. We will establish and maintain robust risk mitigation and redress measures that also protect privacy and freedom of expression… [protecting] the rights of the child in the digital space, in line with international human rights law, including the Convention on the Rights of the Child.

It calls on the digital technology companies and developers to 'co-develop industry accountability frameworks… that increase transparency around their systems and processes, define responsibilities and commit to standards as well as auditable public reports', including by providing researchers access to data:

> To build an evidence base on how to address misinformation and disinformation and hate speech that can inform government and industry policies, standards and best practices… [including incorporating] safeguards into artificial intelligence model training processes, identification of artificial intelligence-generated material, authenticity certification for content and origins, labelling, watermarking and other techniques.

And it recognizes 'the urgent need for strengthened data governance cooperation at all levels with the effective, equitable and meaningful participation of all countries and in consultation with relevant stakeholders to unlock the full potential of digital and emerging technologies'. It calls for 'a balanced, inclusive and risk-based approach to the governance of artificial intelligence (AI)'.

There is clearly much to be done. As one participant in deliberations leading to the *Global Digital Compact* writes:

> Although the final version of the *Global Digital Compact* saw a significant erosion of principles of equity, redress and commitments to international solidarity funding beyond AI, it is perhaps a triumph that sufficient consensus was reached with current geopolitical tensions and political polarisation to have anything to take forward at all.[70]

There are scholars who argue that mis- and disinformation are not significant problems because the causal impact of these kinds of information on individuals is hard to demonstrate. It is also argued that mis- and disinformation is a small proportion of the information that people engage with. Others

[68] Africa Center for Strategic Studies (2024); Madan (2021).
[69] All quotes are from UN (2024b, paras 22, 32b, 35b, c, d, 31b, 32b, 36a, b, c, 38).
[70] Gillwald (2024).

argue that mis- and disinformation can 'causally and adversely influence people's beliefs, decisions, and behaviors'.[71] The critical assessment of research in this report focuses on a range of approaches to the study of the threats and harms associated with information ecosystems, that is, those that consider the context and those concerned with identifying causal effects of mis- and disinformation on individual attitudes and behavior. We also attend to research on governance institutions and the practices on individuals and collective groups.

5 Limitations of the Report

This critical analysis of state-of-the-art of research on important components of information ecosystems is limited in several ways.

First, the analysis is structured principally around the three themes – news media, AI systems and data governance. It is limited in what it can reveal about the unequal material conditions of people's lives and by the questions used to structure the analysis that focused on these three areas and on mis- and disinformation. Where research that is included highlights factors such as poverty and unequal socio-economic conditions leading to exclusions and discrimination, the report does discuss these issues as important contextual factors, but this is not the principal focus.

Second, this report focuses mainly on research on information and communication circulating within the upper service applications layer of information ecosystems, and not the network infrastructure layer. This layer is important in structuring information ecosystems. Although some attention is given to controversy about network neutrality policies and zero-rating data contracts, and to the capacities of governments and internet service providers to shut down or block the internet, this report does not seek to address the substantial literature on internet governance.

Third, societies experience the 'information crisis' differently depending on their social, cultural, political and economic circumstances. The analysis in this report is limited by an imbalance in Global North and Global Majority World research sources that favors the Global North (as indicated in Section 1 of this chapter; see also Appendix: Methodology). This imbalance limits our analysis, and it is undoubtedly the case that we have tended to privilege Global North experience, and especially knowledge about the United States and Europe, notwithstanding our efforts to reach out to be more inclusive.[72]

Fourth, this report was not designed to encompass the substantial field of research on 'digital divides'. An effort was made to emphasize the distinctive experiences of information ecosystems in different parts of the world, and we acknowledge huge variations in the availability of meaningful internet connectivity and access as well the presence of restrictions on access to information.

Fifth, several other large bodies of research make only an occasional appearance in this analysis. This includes substantial research on cybersecurity, securitization, geopolitics and 'digital sovereignty' and the fields of the economic geography of digital labor markets or the (micro)economic analysis of digital markets.

Sixth, in attempting to cover broad fields of research, observations are made about 'country'-level experience and institutional practices. The analysis was not designed to capture research on the micro level or specific sectoral experiences of information ecosystems. We do not include technology 'use cases' or detailed case studies of experience and practice.

[71] Ecker *et al.* (2024b, p. 1), supported in part by the Australian Research Council (ARC), British Academy, UK Government, American Psychological Association (APA)/Centers for Disease Control and Prevention (CDC), Google and Google Jigsaw, European Research Council (ERC) and the European Commission Horizon project, Humboldt Foundation and Volkswagen Foundation.

[72] A survey of research on digital platforms, for example, published in each of the years 2018 and 2021, confirms this bias in research in this area: countries in the lead were the United States, China and the United Kingdom; as a region the European Union had the largest proportion of papers (Ha *et al.* 2023), funded by the Ministry of Education, National Research Foundation and Ministry of Science and ICT (MSIT), South Korea.

Finally, the analysis in this report is inevitably limited by the fact that all research is guided by research questions selected for investigation by research communities, the funding available to do research, and the researchers' access to data.

6 Chapter Summary and Report Outline

It is important to acknowledge that 'scientific knowledge cannot be understood as absolute'.[73] This does not mean that uncertainty must lead to the conclusion that findings are arbitrary or unreliable. In the absence of certainty, a critical analysis of state-of-the-art research assessment can tell us what we can be reasonably confident about, what is controversial, and what the priorities should be for future research and policy action. The absence of certainty can create dilemmas for policy makers looking for ways to combat mis- and disinformation without abridging human rights commitments.[74] The chapters in this report yield an insight into why there is an information crisis, and what is or could be done to mitigate threats and harms associated with mis- and disinformation.

This report is structured to introduce readers to research on the integrity of information in the public sphere within the context of information ecosystems. Chapter 2 looks at how this is influenced by the news media industry's structure, its increasing dependence on digital platforms, and how declining trust in the news and practices that weaponize information are associated with political polarization. Chapter 3 tackles the way the integrity of information is influenced by AI systems developments and the implications for the protection of human rights and for democracy. Chapter 4 turns to how these developments – captured by the term 'datafication' – are seen from a political economy research perspective that focuses directly on the exercise of power by the big tech companies and the incentives they have in deciding how data is collected and used.

Chapters 5 to 8 then turn to what is or could be done to address the information crisis. Chapter 5 is concerned with public and policy makers' understanding of how information ecosystems are contributing to the crisis, and with an important response – literacy training. Here the focus is principally on research on measures to enable adults and children to protect themselves from harms associated with datafication and mis- and disinformation. Chapter 6 provides insights into the legislative and regulatory measures that are being taken to set rules and norms of behavior to change the strategies and practices of big tech companies when their business practices are misaligned with rights protections. Chapter 7 zeros in on a range of measures, from fact-checking to self-regulation to co-regulation, which are specifically intended to mitigate the harms of mis- and disinformation. In Chapter 8 the assessment turns to the steps being taken by a variety of individuals and groups to imagine and practice data governance in ways that are consistent with just outcomes for all. Chapter 9 concludes by summarizing key insights for researchers and lessons for both big tech companies and governments.

Here is a guide to the questions and research areas addressed in each chapter.

Chapter 2: *News Media, Information Integrity and the Public Sphere.* This chapter examines what research tells us about changes in legacy and online news media, and what can be done to promote information integrity and a democratic public sphere. *What are the market structures in the news media industry, and the power relations between news media organizations and digital platforms? What is the relationship between news media, a healthy public sphere and democracy? What strategies are available to the journalism profession to work towards building trust in the news media?* The analysis includes research on the structural characteristics of news media markets and platformization,

[73] This does not mean there are no valid standards for making judgments about scientific evidence (Ecker *et al.*, 2024a, p. 30).
[74] Radsch (2022).

motivations to produce and consume mis- and disinformation and resilience, news media trust and distrust, the trustworthiness of legacy and online news outlets, news consumption and avoidance habits, the weaponization of information and political polarization.

Chapter 3: *Artificial Intelligence, Information Ecosystems and Democracy.* This chapter examines research on the properties of AI systems (specifically machine learning algorithms) and their embeddedness in online content governance systems. *How is 'artificial intelligence' (AI) defined, and what are the relationships between AI systems development and internationally protected human rights? What are the interdependencies between AI systems development, the use of automated tools and democratic processes?* The analysis includes research on the relationships between AI systems and human rights, AI systems use and content governance (generation and moderation), and how these developments are related to changes in democracy, societal resilience and cohesion.

Chapter 4: *Big Tech Power and Governing Uses of Data.* This chapter examines the relationships between the power of big tech companies and approaches to governing practices of data extraction and use – the processes of datafication. *What is the appropriate role of data and digital infrastructures within political communities? How are data aggregation and AI systems changing the way people build, share and receive information and knowledge? How do these big tech strategies and practices interfere with political deliberation, which is essential for the survival of participatory democracy?* The chapter provides an assessment of research in these areas and the political economy of datafication processes. This includes research on digital infrastructure contestations, monopolization practices and business models, and the need to work towards democratic forms of data governance.

Chapter 5: *Awareness of Mis- and Disinformation and the Literacy Challenge.* This chapter focuses on people's knowledge about the presence of mis- and disinformation in information ecosystems and literacy training initiatives enabling children and adults to identify these types of information and to protect themselves from their harmful consequences. *How aware are the public and policy makers of the risks and harms of mis- and disinformation? What are the approaches to media and information literacy, and AI literacy, and what is the evidence on their effectiveness?* This chapter provides an assessment of research in the context of the need to protect the fundamental human rights of both adults and children.

Chapter 6: *Governing Information Ecosystems: Legislation and Regulation.* This chapter provides an account of selected legislative and regulatory tools that are available to governments to mitigate the harms of mis- and disinformation, and to govern the way mainly big tech companies operate. *What types of governance approaches are available? What approaches to information ecosystem governance are being promoted at the global level? What are some of the legislative, regulatory and judicial approaches to governing information ecosystems?* This chapter emphasizes normative goals and rules embodied in governance approaches, providing an insight into tensions between these goals and rules and their implementation, as reflected by the experience and interests of different actors. The analysis

focuses on principles and guidelines reflected in legislation and regulations with respect to network infrastructure, privacy and data protection, digital platforms, AI systems and news media.

Chapter 7: *Combating Mis- and Disinformation in Practice.* This chapter looks in detail at specific governance measures to combat mis- and disinformation by civil society organizations and governments. *What content governance efforts are being made to combat mis- and disinformation? What are the challenges in achieving effective governance of information ecosystems? In what ways are human rights protections jeopardized by governance aimed at curtailing online mis- and disinformation? What is known about the public's appetite for interventions to moderate online mis- and disinformation?* The analysis emphasizes the need to differentiate between the stated aims of governance and its consequences when practice falls short of normative expectations. It focuses on fact-checking, industry self-regulation, co-regulatory approaches and what views are expressed by the public about how mis- and disinformation issues should be addressed.

Chapter 8: *Towards Data Justice in Information Ecosystems.* This chapter examines how the monopolistic power of big tech companies creates biases and harmful discrimination and exclusions, and infringes on people's human rights in a data economy that thrives on data extraction and monetization. *Why do corporate incentives, strategies and practices involved in designing, developing, selling and controlling data lead to epistemic injustice? What strategies and tactics are individuals and communities developing to resist the extractive features of the data economy?* This chapter emphasizes the individual and collective dependencies and inequities resulting from datafication, and how datafication practices can be reimagined to empower individuals and communities and contribute to data justice. It focuses on the consequences of biased AI systems for human rights guarantees and democratic decision-making, and individual and group (local, municipal and national) resistance strategies.

Chapter 9: *Conclusion – Information Ecosystems and Troubled Democracy.* This chapter provides a discussion of the principal thematic insights that emerged from our assessment of state-of-the-art research, comments on key characteristics of the research we reviewed, a summary of each of the preceding chapters with key insights, and a brief account of the limitations of the report as well as a final word on what next. (See also the Executive Summary.)

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