

Ecosystemic AI

Local media systems and the challenge of artificial intelligence

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ABSTRACT

In this chapter, we propose a theoretical perspective on the implications of artificial intelligence (AI) for local news media systems in Europe. As the technical protocols shaping web platformisation evolve into communication infrastructures in their own right, we ask: What dependencies does AI create for local news production? Drawing on previous literature, we contextualise AI adoption within local journalism as an ecosystem in which key civic and democratic infrastructures are subject to various forms of capture, specifically technological capture. Our primarily conceptual findings highlight the ecosystemic impact of AI on the political economy of local news structures in Europe. We conclude that the dominance of US-driven AI developments puts local European news media at risk of technological capture as they increasingly outsource production, management, dissemination, and audience relations to capitalise on AI, posing new challenges for regulators seeking to protect the autonomy of European news media.

KEYWORDS: artificial intelligence, ecosystemic AI, journalism, local news media, technological capture

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Introduction

The accelerating trend of artificial intelligence (AI) is thought to hold a certain promise for journalism (Chan-Olmsted, 2019; Lin & Lewis, 2022), “as a form of technological assistance for editorial activities, decision-making, and boosting human intelligence” (Graßl et al., 2022: 6). At the same time, there are fears that journalists will be made obsolete by AI (Jamil, 2021). Ethical concerns have also been raised about the impact of AI on journalistic practices and audience news consumption (Helberger & Diakopoulos, 2023). In this shift towards AI, research tends to overlook two things in particular: the impact of AI on dispersed news structures where many smaller newsrooms generally lack the skills and resources to capitalise on these technological advancements, and the political-economic ramifications of introducing automation processes designed by large US-based technology companies into particular news cultures, such as the ones found in Europe. The ability of AI technologies to personalise content, target reach, and datafy editorial processes furthermore reflects the extent to which platform logics (van Dijck & Poell, 2013) are engendered by platformisation, or how the infrastructures, economics, and governance frameworks of platforms penetrate and reorganise different spheres of life (Poell et al., 2019) to make news organisations “platform ready” (Helmond, 2015). To that end, AI could be seen to shift the entire journalistic ecosystem, whereby news organisations outsource more and more of their data processing, content management, and audience relations to automation-driven technologies, putting local news media at risk of technological capture, a process whereby tech companies and their AI solutions become involved in every aspect of journalism to the point where it becomes impossible to operate sustainably without them (Nechushtai, 2018). The question we address is what kinds of dependencies AI creates for local news production. These dependencies include increasing reliance on AI across all aspects of news production, both accelerating existing reliance in content distribution to retain audience reach and creating new dependencies in news creation (Simon, 2024). Beyond this, we argue, AI also introduces dependencies at the level of data management and storage, further strengthening infrastructural control. Our discussion thus mobilises ecosystem theory to understand the ecosystemic impact of AI on journalism in general, and local media systems in particular.

News production, platformisation, and ecosystemic AI

The concept we refer to as ecosystemic AI describes a level of dependency whereby the entire news production chain – from information retrieval and research through organisational management to content production and dissemination – becomes ingrained in such technologies to the point where journalism cannot operate sustainably without them (e.g., Nechushtai,

2018; Simon, 2024). We argue that such a level of dependency entails a particular challenge to the sustainability of local news production, especially in the European context where local journalism constitutes a cornerstone of civic and democratic life (Firmstone & Coleman, 2014). Moreover, local journalism is already vulnerable to various forms of political and ideological capture (e.g., Ferruchi & Nelson, 2019) due to their precarious economic realities (Sjøvaag, 2022). Their entanglement with social media platforms for monetisation and audience reach (Cornia et al., 2018) furthermore speaks to how local media organisations are locked into the logic and economics of third-party providers of analytics and distribution (Nielsen & Ganter, 2022). As platformisation centralises the technological foundations of the news value chain (Helmond, 2015; Nieborg et al., 2022), AI-driven processes contribute to further concentrate technological power away from media organisations and towards the global platforms, raising questions concerning the autonomy and independence of European local media systems to operate sustainably without the technological infrastructures provided by commercially driven, US-based technology companies.

Given that the terminology AI itself has been met with some criticism and is accompanied by the significant misunderstanding that AI-based technologies are truly intelligent (Jordan, 2019; König et al., 2022: 23–25), we describe AI as a multifaceted umbrella term for a range of technologies (Deuze & Beckett, 2022: 1914). Suchman (2023: 2) defined AI as “a label for currently dominant computational techniques and technologies that extract statistical correlations (designated as patterns) from large datasets, based on the adjustment of relevant parameters according to either internally or externally generated feedback”, relevant for understanding how AI tools are appropriated in news organisations and in journalistic work, as the progress of machine learning and natural language generation makes the automatic production of content from digitally structured data one of the most frequently used application areas for AI (Anantrasirichai & Bull, 2022; Diakopolous et al., 2024; Newman, 2024; Rinehart & Kung, 2022).

Against this background, a growing number of studies have assessed the use of a wide range of potential applications in (local) media organisations for automation and optimisation (Sirén-Heikel et al., 2023: 355). The literature indicates three general application areas of AI throughout the journalistic production process (Shi & Sun, 2024), including for information research, in the production and preparation of content, and to support content distribution and engagement analysis. Hence, AI is thought to hold promise for journalism in the preparation, production, and dissemination stages of news production. AI could also be used to support editorial organisation and workflows or to verify non-journalistic text, image, and video content (Graßl et al., 2022). Furthermore, AI might also affect journalists’ work directly, as the application of AI tools could require more active participation by journalists in identifying

news stories and encourage further contribution to AI-generated content (Túñez-López et al., 2021). However, the rise of AI and its subsequent normalisation in journalism present several challenges related to ethical and privacy concerns, both from technological and audience perspectives. To produce journalistic content and train algorithms, vast amounts of digital data are required. The use of AI and algorithms to better target the individual user for commercial and news consumption purposes is thus intertwined with concerns about privacy and data issues regarding the news platforms themselves or third parties (Monzer et al., 2020; Nielsen, 2016; Sehl & Eder, 2023). Hence, AI poses a risk of technological capture across the entire line of journalistic production – from business model development to content creation, facilitating personalisation and reach as well as data structuring and analytics, involving ethical concerns throughout every process where data management is involved. Here, deployment of AI systems in journalism entails the inclusion of AI technologies across the stack of infrastructure components (Kitchin & Lauriault, 2018; van Dijck, 2020), reflecting the extent to which journalism grows more dependent on these data infrastructure providers.

The actors involved in the research, development, and deployment of AI for media and journalism are primarily owned and operated by American technology companies such as Amazon, Google, and Microsoft. They have both the financial and technical capabilities to provide media organisations with large, scalable AI systems. The fact that news media have been shown to lack financial resources to develop and maintain such technologies on their own, not least because they can hardly afford the financial risk of innovation failure (Simon, 2024), leads them to collaborate with such platform companies. Concerns have been raised about systematic biases due to this dominance of technologies developed in the US, not least in the portrayal of gender, racial, and cultural stereotypes (Broussard et al., 2019). EU policies (e.g., the Data Act and the AI Act) emphasise ethics and responsibility in AI development, procurement, and deployment of these technologies – also in journalism (e.g., CDMSI, 2023) – and raise concerns over the competitiveness in European innovation capabilities at a market level due to competition from American technology companies. The dominance with which American platform players operate at the communication infrastructure level in Europe thus suggests that European media are also at risk of technological capture by AI developed in the US.

Overall, the issue of capture relates to concerns over the various forms of pressure that journalism is subject to in different contexts, from political and ideological capture that can impact the freedom of the press (e.g., Dragomir, 2018; Ferruchi & Nelson, 2019; Milosavljević & Poler, 2018), to how digital platforms, tools, and infrastructures tie journalism to specific technologies (Kristensen & Møller Hartley, 2023; Partin, 2020; Pickard, 2022), and how social media like Facebook make news media dependent on third-

party distribution to reach audiences (Nechushtai, 2018; Nielsen & Ganter, 2022). From a political-economic perspective, scholars have also asked how journalism's technological dependencies challenge the jurisdiction of states to ensure that citizens have access to news and information (Pickard, 2020). This strand of research acknowledges that technological infrastructures have the power to shape the conditions of communication systems (Winseck, 2017). As certain protocols, applications, and software become standardised in the industry, they create path dependencies that influence norms and practices (Edwards et al., 2007; Simon, 2022). Hence, technological infrastructures have the power to set the conditions under which others operate (Winseck, 2017) and to implement actions across territories (Munn, 2023), resulting in technological enclosure (Sadowski, 2020). While AI may hold certain promises in making news organisations more efficient, the dependencies that follow from such "enclosures" also suggest that AI may shift the news ecosystem towards more locked-in technological solutions, from which it may be difficult to retract, challenge, or oppose inherent cultural and operational biases embedded in technology (e.g., Constantinides et al., 2018; Jurgherr & Schroeder, 2023). It is from this position that we propose the concept of ecosystemic AI – a technological shift that impacts the entire news value chain, with particular risks to the sustainability of local news organisations across Europe. As technologies become embedded in production through path-dependent decision-making, the ubiquity that the ecosystem concept affords (Ruotsalainen & Heinonen, 2015) thus suggests that technologies are influential beyond their immediate use, whereby their ubiquity can afford contexts of capture (Nechushtai, 2018).

Media systems, path dependency, and the ecosystem of news production

Our theoretical framework integrates media systems theory with a wider ecosystem perspective, intending to substantiate the need to consider how technologies create dependencies with local media systems in Europe (Sjøvaag et al., 2019a). Combining the two allows us to consider the political-economic frameworks under which journalism operates as well as the processes of platformisation (Nielsen & Fletcher, 2023; Poell et al., 2019) that highlight the material conditions of technology within media systems.

Media systems theories are theories of dependent relationships (Hardy, 2008). While criticised for being too deterministic about these dependencies (Flew & Waisboard, 2015), media systems also provide entry points to discover the factors that shape developments and the features that produce differences within and across these systems. Media systems are about the flow of power, typically from the state to the press (Ostini & Ostini, 2002), but dependencies also extend beyond the political realm. Few media system

theories consider the extent to which technologies and technological actors create dependencies. In general, path dependency connects decisions made through time, emphasised as how “the network externalities, the learning process of organizations, and the historically derived subjective modelling of the issues reinforce the course” (North, 1990: 99). However, path dependency theory tends to focus more on the path than on the dependencies. We thus aim to contribute to the application of path dependency theory by operationalising what these dependencies constitute when AI is introduced to local news processes.

Path dependency is furthermore relevant to media systems theory because it explains how dominant beliefs are largely defined by key actors in the field, influencing the norms that shape ideas about economic performance (North, 1990). While local news media systems can be said to constitute “microcosmos” expressions of dependencies (Guimerà et al., 2018), actors in local news media ecosystems are influenced by overall industry developments, also in technology acquisition and procurement, not least because local news media tend to be part of larger corporations or chains owned by a national player (Sjøvaag, 2022). Local news media are thought to be important in sustaining local democratic structures (Firmstone & Coleman, 2014; Hess & Waller, 2016), often referred to as “keystone media” (Nielsen, 2015) that connect people to political information. However, the financial strain on local news media, as they struggle to retain revenue in increasingly volatile markets (e.g., Neff & Pickard, 2023), has led to concerns over the ability of local news organisations to survive unless they can reduce costs and develop new revenue streams. As AI is seen to hold some promise in this regard (Beckett & Yaseen, 2023: 28), journalism seems to be moving onto a path of new dependencies on AI technology. While journalism has always been quick to embrace new technologies (Posetti, 2018; Nielsen & Ganter, 2018), and seems to do so in pack-like behaviour (Chyi, 2013), AI and generative AI, in particular, can be seen to create an ecosystemic shift that creates new dependencies, outsourcing data management, distribution, and production to technologies that are themselves highly data-dependent, capitalising on the production of news to feed its large language models (LLMs) and further fuelling the platformisation of the web (Poell et al., 2019).

Whereas media systems theory is largely about the relationship between the political system and the media system (Hallin & Mancini, 2004), an ecosystem refers to the overall conditions or environment under which the media operates (Postman, 1970). Deeply embedded in this understanding is the role of technology in communication (McLuhan, 1967) and its impact on society (Wiard, 2019). Often used in reference to a digital or new media environment (e.g., Gibson et al., 2016; Kosterich & Weber, 2018), an ecosystem is a relatively flexible concept (Kostovska et al., 2021) that can refer to both processes and networks of actors. Media ecosystems are shaped

in particular by networked relationships and conditions (e.g., Robinson & Anderson, 2020; Sjøvaag et al., 2019b) that influence how media evolve and survive (Scolari, 2012), how various actors relate to the media (Poell, 2014; Treré & Mattoni, 2016), and how different media sectors change and adapt as a result (Burgess & Bruns, 2012; Widholm et al., 2021). Capacities and values are thus created collectively as ecosystems coevolve, whereby large numbers of stakeholders act interdependently (e.g., Friederichs, 1958). Scholarship has, however, tended to limit consideration for the media ecosystem to its more or less immediate surroundings, for example, the professional workforce (e.g., Hatcher & Thayer, 2017) and their practices (Lowrey, 2012), communities and audiences (e.g., Arriagada & Ibáñez, 2020; Nygren, 2019), locations (e.g., Anderson, 2010), and more recently, social media platforms (Rosa & Hauge, 2022).

While ecosystem perspectives have helped to expand the structural scope within which media is understood, scholarship has not yet considered the impact of AI on media systems. It is readily acknowledged that Internet technology has created an “ecosystemic society” (Ruotsalainen & Heinonen, 2015), whereby the Internet has become ubiquitous in all areas of life. However, the impact of AI on media and communication extends well beyond the web or platform level, and into the very data fabrics that travel through the digital communication infrastructure (see Andreassen et al., 2021). AI infrastructures entail interdependent networks of modular architectures where services are offered by a variety of actors (Sjøvaag & Ferrer-Conill, 2024; Star & Ruhleder, 1996), referred to as an ecosystem, for instance, by the Body of European Regulators for Electronic Communications (BEREC, 2022). Infrastructures constitute forms of power and authority (Winner, 1988) that shape autonomy within the system (Huang & Mayer, 2023) through regulatory control, embedded in governance rules that regulate how data is accessed and processed. Communication ecosystems are thus shaped by complex interdependencies that connect AI ecosystem enablers, regulatory frameworks, and platform owners (e.g., Robinson & Anderson, 2020). Hence, while ecosystem perspectives have helped to expand the structural scope within which news organisations are understood, the full range of technologies involved in the political economy of communication in the “ecosystemic society” (Ruotsalainen & Heinonen, 2015) has yet to be considered. Mobilising the ecosystem framework thus requires that we consider how technology organises communication at the level at which journalism is produced and distributed. As AI moves into all facets of news production, we thus apply the “intraorganizational technical perspectives on digital platforms and the inter-organizational economic, business, and social perspectives on ecosystems” (Hein et al., 2020: 89) to analyse the dependencies brought on by ecosystemic AI.

AI dependencies in news production

We operationalise ecosystemic AI as a dependency in data management, production, and news dissemination. The Internet consists of material and physical infrastructure, protocols, and applications (see Crawford, 2006; Hesmondhalgh et al., 2023), much of which is organised by AI. Automated systems shift data around – often across borders – based on capacity and scale considerations, thus triggering jurisdictional issues, particularly regarding data surveillance (see Constantinides et al., 2018). Cloud services for the news industry constitute a relatively concentrated market, dominated by Amazon Web Services, Google Cloud, and Microsoft Azure (Sjøvaag et al., 2025), which host the applications used in news production (e.g., Kristensen & Hartley, 2023). Content Delivery Networks (CDNs) that distribute audio, video, and dynamic web content for news organisations also route traffic automatically (Sjøvaag et al., 2024). Cloud services and CDNs furthermore provide most of the analytics capacities needed for audience personalisation, programmatic advertising, and dynamic pricing that news organisations rely on for their digital business models. Hence, AI technologies are involved not only in data management processes but also in automating decision-making that impacts revenue strategies and agenda-setting through personalisation. Generative AI and LLMs that move in to shape news production (Ross Arguedas & Simon, 2023) are dominated by tools such as US-based OpenAI's ChatGPT and DALL-E. Finally, the social media platforms that help news media reach audiences are steered by popularity algorithms (Klinger & Svensson, 2015), generating fears of polarisation across European democracies (Helberger & Diakopoulos, 2023; Jungherr & Schroeder, 2023; Trattner et al., 2022).

AI technologies are thus involved in the storage, access, and management of data for the news industries. Dependencies here amount not only to the black-boxed protocols that these outsourced services put on media data; the cloud services that news media rely on are also housed in data centres that remain unregulated and are thus non-transparent about their customers and data practices (Velkova, 2023). The threat of capture here amounts to outsourcing the storage of vast amounts of cultural heritage – constituting years of publicly funded media production within the film and broadcasting industries – to global cloud infrastructures owned by Google, Amazon, and Microsoft. While cloud storage is, of course, subject to data management contracts protecting news media's archives, and these services have systems of redundancy and backup, few media companies have full knowledge of where exactly their data is stored. As these networks are global, data is shifted around the globe automatically for efficiency reasons (Constantinides et al., 2018). Different states have different surveillance policies regarding data crossing borders. Hence, storage location is important for data protection (e.g., Determann, 2020). One example is Norway, where key actors in the news media industries in 2024 launched a lawsuit against the state over the

Data Surveillance Act, where the police security services have jurisdiction to survey data using AI, the moment it crosses borders (Bergens Tidende, 2023). News media are particularly concerned about how this may threaten journalism's right to protect its sources in cases of whistleblowing. Most of the American technology companies operating in the Nordics are based in the capital of Sweden, meaning most of the Norwegian news data stored by Google, Amazon, and Microsoft likely crosses borders. The same would apply to the rest of Europe, where Amsterdam is the main hub for data-centre capacity. By themselves, local news organisations rarely have the resources or capacity to mount such large-scale legal challenges, leaving them vulnerable to capture.

AI tools are also involved in the production of news, in analysing data, translating and transcribing audio, and generating text and images. In practice, this is perhaps the part of the news generation that is at least risk of capture – much of journalism still being contingent on old-school reporting techniques such as actually talking to sources. At this level, local news organisations without the resources to procure custom solutions are reliant on off-the-shelf AI tools such as ChatGPT. However, leading news organisations like *The Guardian* and *The New York Times* have refused OpenAI to crawl their news stories to power their AI, or demand payment from OpenAI for using their archives to improve their LLMs (Milmo, 2023; Stempel, 2023). Furthermore, there are limitations to the efficacy of such tools in certain languages, as most LLMs are developed in either English or Chinese. Dependencies here relate to the efficiency and cost savings provided by these tools for journalistic production, as the promise of AI may shift managerial strategies toward measures that automate more aspects of journalism. Capture can occur when procurement decisions made at the corporate level affect entire newspaper chains, resulting in local news media becoming subject to corporate-wide strategies that may not suit their specific needs for local news provision. The inherent biases and potential hallucinations of LLMs (Hicks et al., 2024) furthermore risk capture at a sociocultural level, shifting discourses towards ingrained historical preconceptions that may limit the diversity of perspectives in journalistic production.

In terms of distribution, news organisations are dependent on AI in the automation of content delivery, particularly through CDNs – important for video and dynamic web page delivery, particularly during peak events such as elections or major sporting events that require streaming and scaling capacities beyond what the origin servers of news media can handle on their own. CDNs are essentially scalable architectures with servers close to the end users that host copies of the most popular content that streaming audiences demand directly from the CDN (Benghozi & Simon, 2016; Stocker et al., 2017). This is particularly important for broadcasters and streaming platforms that do not have in-house CDNs of their own, which is most of

them (EBU, 2022). US-based companies Akamai, Lumen, and CloudFront are the market leaders in this domain, responsible for delivering an estimated 70 per cent of web content globally (Ghaznavi et al., 2021). CDNs also provide analytics to media organisations in terms of audience data and in facilitating dynamic and programmatic advertising (e.g., Ishmael, 2021). Furthermore, news media are also reliant on social media (e.g., Facebook, Instagram, and TikTok), with their algorithmic selection and AI-automated content delivery through CDNs, to reach audiences and ensure quality of service. While algorithmic selection is about filtering content in distribution (Peterson-Salahuddin & Diakopoulos, 2020), automation in content delivery is about scaling and optimisation of resources (Stocker et al., 2017). For public service broadcasters in particular, who are responsible for ensuring quality information and cultural heritage, their universal service provision is thus subject to capture by a delivery technology beyond the reach of must-carry obligations from national regulators (Sjøvaag et al., 2024).

News organisations are thus dependent on AI technologies in the production and dissemination of news, and in the management of their data. It is safe to say that news media are on “the path” of AI, as core functions of the news industries are automated, not least beyond what we think of as journalistic production. Most of these services are designed, owned and operated by American technology companies. While this may constitute merely technology in the eyes of media managers (Sjøvaag et al., 2024), capture can occur when there is a lack of alternatives, when the threat of exit is strong, and when no regulation is present to hold actors accountable. While there are national and even public alternatives in some of these services (e.g., in the cloud market), in most cases, the default option among news media organisations seems to be Amazon Web Services, Google, and Microsoft for cloud storage, Akamai or Lumen for content delivery, and Facebook and Instagram (Meta) for audience reach. In particular, Meta has tested the reach of regulation in different parts of the world, threatening to leave Canada, Australia, and Europe when regulators have mounted challenges to their business model (Meta, 2023). CDNs like Akamai are exempt from regulation beyond general competition law, relieving them of the must-carry obligations that ensure that cable companies and digital terrestrial transmission operators are obligated to deliver public service media content universally. News media are thus bound to the services that these sectors offer, with few alternatives should they refuse service, leave the market, or exercise their power in some other way. The political economy of communication thus extends well beyond the national context to include major US-based companies whose technologies not only capitalise on the data that they store and process, but whose business models also shape the conditions under which information freedom is secured.

Technological capture by AI is thus manifested through the protocols that manage data, automation in the analysis and surveillance of data, and

in the application of generative AI in news production. All these processes are outsourced to US-based technology companies, without whose services it would be difficult for media companies to operate sustainably. Technology capture thus operates much like other forms of capture, with embedded assumptions, expectations, and pressures to conform to certain standards, protocols, and policies that, to some extent, also challenge democratic values such as inclusion, diversity, ethics, and transparency. AI thus creates new dependencies whereby news media become subject to increasing infrastructural control by the companies that host, manage, distribute, and surveil their data. The centralisation of technological capacity is furthermore a result of this outsourcing of essential functions in news production to third-party technology providers, enabled by the platformisation of the web. From here, AI assumes ubiquitous ecosystemic properties that influence the political economy of journalism towards new forms of power and authority, where new dependencies are likely to emerge unless they are sufficiently managed through ethical standards and regulations.

The political economy of ecosystemic AI for local journalism

Capture describes the various forms of power that journalism may be subjected to. In a political-economic context, power can amount to ideological pressures or influences as well as financial necessities or attractions that can shape action (see Dragomir, 2018; Ferruchi & Nelson, 2019; Milosavljević & Poler, 2018). When AI promises to improve efficiency, this amounts to economic power in the sense that AI tools could be perceived to lower the need for editorial, managerial, or journalistic resources needed to produce the news, and in turn lower the cost of news production. For local news organisations, AI tools may help to improve editorial processes by personalising content, increasing output, and facilitating data analysis and investigation. However, tool procurement can be costly, as can improving skills within the newsroom to use these tools responsibly and efficiently. For independent local news organisations, the legal, technical, and innovation requirements of using AI in journalism might be too steep, leaving them behind in the adoption of AI tools altogether. As of yet, local journalism seems to be less dependent on AI than larger news organisations. However, the bar for AI utilisation might be lower for corporately owned local news organisations, as news chains may have training programmes and centralised resources that facilitate innovation in local newsrooms. Corporatised news organisations are also subject to centralised decision-making, whereby decisions about AI for personalisation, dynamic pricing, programmatic advertising, data management and storage, as well as audience analytics, are made at the corporate level, removing local autonomy over many technical and economic decisions. In addition to an

economic logic shaping the rate of AI adoption in journalism, local news media are nevertheless subject to a technological logic (Hadida et al., 2021) whereby AI can be seen to influence institutional goals (Constantinides et al., 2018), shaping the overall conditions of the communications system (Winseck, 2017).

The dependent relationships that shape media systems (Hardy, 2008) thus extend beyond politics and economics and involve technologies that influence media industries and journalistic practices beyond the nation state. AI thus introduces a new form of power flow surpassing the state (Ostini & Ostini, 2002) and threatening to increase differences within national media systems. The media's ability to capitalise on AI depends on organisational resources, leaving local news organisations potentially lagging. Power is also exerted through the path-dependent properties of technology adoption. Once a technology is implemented, organisational adjustments to technology tend to ensure that practices remain bound to certain technologies. Just as the move to online publication, streaming, and social media has reinforced the path of further outsourcing of news distribution to third-party platforms (Sjøvaag, 2022), the shift to AI will embed journalism further with the processes of automation that chip away at the autonomy with which news media make editorial decisions and engage with audiences. Journalism thus not only becomes dependent on the path of AI, but dependencies on AI also reinforce the path. Media systems theory should thus lend more considerations to the dependencies created by technology in general and AI in particular, not least because the legacy, analogue media systems that Hallin and Mancini (2004) talked about had almost full national autonomy, as well as legal jurisdiction, over media distribution technologies, whether it refers to broadcasting transmission systems or postal delivery of local newspapers. Automation in data management, delivery, and audience reach facilitated by American technology companies challenges national sovereignty over media systems in a very real sense – as data storage, social media personalisation, and generative AI are difficult to locate. AI thus suggests a shift in infrastructural power, whereby the power to set the conditions under which others operate (Winseck, 2017) and the power to act across territories (Munn, 2023) result in technological enclosure (Sadowski, 2020).

The dependencies that shape media systems thus include technology. The global reach of AI suggests that journalism operates under an ecosystem (see BEREK, 2022; Postman, 1970) influenced by coevolving networked relationships (Robinson & Anderson, 2020) where independent stakeholders act interdependently (Friederichs, 1958), creating values collectively. How regulators act to safeguard AI, what journalists do in their use of AI, and how developers compete for market shares together shape the ecosystem (Robinson & Anderson, 2020), creating new dependencies (see Hein et al., 2020). The news media ecosystem thus extends beyond the immediate surroundings of

the newsroom (Arriaganda & Ibáñez, 2020; Anderson, 2010) to include the technologies that organise communication on the level at which news is produced and disseminated (Huang & Mayer, 2023).

To suggest that AI is *ecosystemic* is thus to suggest that it becomes ubiquitous (see Ruotsalainen & Heinonen, 2015) in all areas of news production. How subsequent stakeholders in the ecosystem react to this ecosystemic shift will not necessarily change the path-dependent nature of AI in the organisation of news, but regulators should at least consider how automated technologies in data management and distribution of news impact the principles of universalism, information freedom, and democracy that support diverse European media systems. Local media systems are crucial in this regard, as they constitute the core infrastructural element of information and deliberation in European democracies. Local news media are arguably already in a precarious position, subject to the economic power of owners, the volatility of advertising markets, and the threat of ideological capture by political interests (Dragomir, 2018). Regulators must acknowledge that AI is more than ChatGPT. Automation is becoming key to every part of journalistic production, the protocols for which are designed by computer engineers working for major American companies competing for global market shares. To protect local media systems in Europe, regulators should consider how the ecosystemic power of these AI actors influences the communication system in Europe at large.

We recommend two concrete measures in this regard. The first is to ensure that the surveillance jurisdiction of states enables news organisations to protect their data. The second and related recommendation is to ensure that there are public alternatives in the cloud and content delivery sectors that safeguard national jurisdiction over communication infrastructures. Here, regulators should continue to follow established legacy regulatory principles whereby communication infrastructures have been bound to universalist principles to ensure citizens' access to information.

Concluding remarks

In this chapter, we have proposed the concept of ecosystemic AI as a framework to understand the potentially ubiquitous impact of AI on journalism, particularly focusing on how it impacts local media systems as keystone media of European communities. We have argued that the dependencies uncovered by the media systems approach extend to the ecosystem level, whereby technology should be considered as a key component in creating path dependencies. We have described these dependencies as forms of capture at the data management, production, and distribution levels of journalism's organisation. As ecological systems carry with them an association of natural order, we have argued that we should consider how AI emerges as an ordering

principle that shapes the ecology at large. Finally, we suggest two measures that regulators should consider to ensure the infrastructure for communication in local media systems in Europe, safeguarding data from private as well as state surveillance and protecting universalist principles in media distribution.

News media should strengthen their capacities in this regard as critical institutions safeguarding democracy and citizen rights and consider technology owners and developers as powerholders in their own right. Likewise, they should stay aware of the ecosystemic impact of AI on all areas of life to increase citizen awareness of how technology shapes societies. Perhaps most importantly, while citizens are stakeholders in this context, they should not be held solely responsible for safeguarding their rights to a pluralistic and diverse media system. Too often, regulators put the burden of information freedom on the users, encouraging them to assume diverse media diets and undertake literacy programmes to boost their resilience against misinformation and polarisation. Safeguarding democratic media systems is the government's responsibility. The power to hold technology companies accountable is in their hands. They should regulate AI and the platform ecosystem accordingly.

Further research should consider more thoroughly the role of technology in shaping media systems at an ecosystemic level, analysing the impact of AI and the global platforms on media systems properties and the conditions for independent journalism across diverse settings. One key question in this regard is the extent to which ecosystemic AI contributes to increasing or decreasing differences between media systems, both at the national and local levels, how and to what extent platformisation processes create path dependencies, and how these dependencies manifest across different media systems contexts.

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