

Chapter 16

Innovation in journalism

How technology affects the news media, publication formats, and the journalist profession

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Abstract

This chapter takes as its starting point an indicator for the diversity of news formats from the 2021 Media for Democracy Monitor (MDM) project as an important feature for plurality of information. A wide range of news formats through different types of newspapers, television, radio, and online media is seen as a positive characteristic of media systems, especially since ownership diversity does not automatically translate into news format diversity. We make a connection between diversity of news formats and innovation in journalism: As news media seek to develop new news formats and solutions, broadcasters and news editors are setting up “news labs” to meet the expectations of their audiences. New storytelling methods and algorithms are being experimented with. This chapter collects examples of good practices of innovation in journalism in the countries participating in the 2021 MDM, but it also offers the opportunity to look elsewhere. It becomes clear that output is changing and diversifying thanks to innovation, and that innovation shapes newsroom culture as well as the journalist profession.

Keywords: technology and journalism, innovations in journalism, best journalistic practices, independence of news, news distribution platforms

Introduction

There are several dimensions to the phenomenon of technological innovation in journalism. In addition to the technological innovations which let journalists and users determine journalistic innovation through their technological skills and media platforms, there are the *audience-led* innovations which contribute to news content and promote the diversification of news formats, as well as *organisational* innovation that includes the possibilities and resources made available by media companies, leading to the specialisation of staff and more structural complexity (Young & Hermida, 2015). These innovations are also interdependent, as pointed out by Boczkowski (2004), who argued that techno-

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logical innovation triggers the adoption processes of multimedia and interactivity, which are in turn shaped by organisational structures (Hollifield, 2011).

Social and political factors also have an impact at the meta-level on context-related innovations in journalism. According to Posetti (2018), journalism innovation recognises the importance of integrating new ways of doing things with foundational practices and core values. Innovative journalistic formats are characterised by interactivity and immersion. The notion of interactivity is usually associated with today's huge social media platforms, which are interactive by design, using "likes", "comments", and "shares" for interaction among users. Twitter is used by journalists as a tool to interact with media audiences, for example, but also as an interpretation platform to supplement regular journalistic products. Indeed, journalists intent on reaching a diverse audience can use the great innovation potential of the various social media platforms and formats: WhatsApp, Instagram, Facebook, and so forth –including live blogging, Stories, Instagram surveys, and 360° images (Casero-Ripollés et al., 2020).

Utilising, among other sources, the data and results of the 2021 Media for Democracy Monitor (MDM) research project (see Trappel & Tomaz, 2021b, 2021c), comparing leading news media across several countries, we address the issue of technological innovation within the journalism realm and how it impacts the journalistic formats and methods, news production, and distribution. Data come from secondary sources and interviews with stakeholders. Relying on data provided in the 2021 MDM project complemented with other sources, this chapter on the use of technology and technological innovation in the news media is organised in three parts. First, we present a narrative of technological innovation in journalism and the media business helping journalists do their job and illustrate innovative news formats and content adapted to the affordances of the platform used. Second, we analyse how technology may help news outlets and media organisations produce, edit, and promote content, while exploring innovative strategies to finance journalistic content. Third, we discuss public-led technological innovation and how it can empower audiences.

MDM Indicator and related research question addressed in this chapter:

(E3) Diversity of news formats

How diverse are the formats for news presentation? (Trappel & Tomaz, 2021a: 34)

The benefit of technology for journalists

This chapter takes as its starting point the indicator regarding the diversity of news formats (E3) from the MDM research project as a characteristic for

plurality of information. The chapter builds on diversity of news formats as one of several manifestations of the concept of journalism innovation, which is related to technological innovation, funding and revenue development, and creativity toward an audience with ever-increasing expectations. Journalism innovation – in all its facets, of which diversity in news formats is one – is essential both to the survival of the news industry and to enable journalism to perform its democratic functions. We bring many examples of good practices of innovation in journalism in the countries participating in the 2021 MDM project, but also from beyond, and we discuss the role technology plays for journalists, media companies, and different ways of revenue development. Technology has always been a driver for change in journalistic methods, news production, and distribution, but the last few years have seen a sharp rise in innovation and experimentation. This is due in part to the emergence of new sources of funding – mostly major technology platforms such as Google – but also to the growing recognition that technology is needed to cope with the surfeit of digital media content and data. For journalists, the shift from a world of information scarcity to one of information abundance has been difficult to navigate. How can any one journalist or team of journalists sift through the vast quantities of video, audio, images, and text that are published every minute of every day online, and identify what is salient and newsworthy? Or keep track of claims and assess their accuracy? Or spot patterns or anomalies across voluminous quantities of data? Doing any of this in a virtual environment, in real time, would be almost impossible without the help of technology.

This is why journalists rely on software to filter user-generated-content, to automatically tag content with metadata, and to do preliminary analyses. Journalists use natural language processing tools, artificial intelligence, and machine-learning to curate data, monitor organisations and public figures, and power investigations (Beckett, 2019). In Spain, for example, journalists at *Diario AS* have access to a “Football Data Suite” that lets them analyse football statistics (Prisa, 2016). “Read the Game” performs a similar function for journalists at *Spiegel Online* in Germany (Der Spiegel, 2016). In Romania, the *Buletin de Bucuresti* analyses large volumes of public data to scrutinise government spending – for example, expenditure on personal protective equipment during the Covid-19 pandemic (Buletin de Bucuresti, 2020). Similarly, *Bellingcat* (in the United Kingdom) reviews multiple open data sources as part of its investigations and has recently used these to track and map French, British, and American government financial support to businesses closed due to Covid-19 (Williams, 2020). Innovations like *Bellingcat* have helped maintain the United Kingdom’s wide diversity of news formats and maintain its score for indicator E3 at 3 points (Moore & Ramsay, 2021).

Technology is also being integrated into journalists’ workflows in order to alert them to unexpected events (natural disasters, accidents, etc.) or sto-

ries that are about to go viral. Applications are numerous: In Germany, the *Rheinische Post* has developed a suite of tools called Listening-Center to keep track of trending and emerging stories on social media and across the web. *The Post* was thus able to discover – and then report – that the head of the AfD in North Rhine-Westphalia was about to be toppled (Rügheimer, 2018). *La Voz de Galicia* took a similar approach in Spain to develop a Hyperlocal Listener and Community Manager to monitor its community's interests and discussion topics (Google News Initiative, 2020b). Technology lets teams of journalists collaborate and find patterns in large corpora of text or data; 108 different partners in 88 different countries around the world collaborated over 16 months to investigate over USD 2 trillion worth of transactions found in the FinCEN files, an investigation coordinated by the International Consortium of Investigative Journalists (ICIJ) and led by BuzzFeed news (ICIJ, 2020). Using tools like the graph database platform Neo4J, journalists were able to analyse hundreds of spreadsheets and thousands of financial transactions and then visualise the resulting data (Hunger et al., 2020). Digging through vast sums of leaked data (*Panama Papers*, *Paradise Papers*, *FinCEN files*, etc.) requires such transnational collaboration between media outlets, but also the use of multiple machine-learning techniques largely based on new technology (Carvajal, 2018).

Increasingly, technology also helps journalists verify stories and claims. Full Fact in the United Kingdom uses artificial intelligence to identify claims by public figures and then correlate them with openly available statistical evidence to check their validity (Full Fact, 2019). In Lithuania, Debunk EU uses a combination of artificial intelligence, journalists, and civil society volunteers (or “elves”) to spot and debunk disinformation almost in real time (Debunk.eu, n.d.). Much of the fact-checking has so far focused on content, though attention is now turning to identifying fake or manufactured sources, especially those engaged in coordinated disinformation on social media.

For news outlets, technology supports the production, editing, and promotion of news. RADAR (Reporters And Data And Robots) uses artificial intelligence to generate news stories for local outlets across the United Kingdom. Its owner (Press Association) reported that in RADAR's first 18 months of existence, its five computer-assisted reporters had produced 250,000 stories (RADAR, 2020). In Belgium, *The Echo* developed the Quotebot service that produces text-based business and finance briefings using financial data (Becquet, 2019), bringing greater innovative diversity to a country otherwise dominated by traditional news formats (leading Belgium to score 2 points out of 3 for indicator E3). Finnish public broadcaster Yle has created the Voitto bot, which writes reports on ice hockey games in the Finnish and Swedish languages. The organisation has open-sourced the bot's code so that other news organisations can use it (Yle, 2018). Finland scores 3 points for indicator E3 in the 2021 MDM in part due to Yle's leading stance amongst European public service broadcasters in

adapting to the digital and mobile environments (Ala-Fossi et al., 2021). Belgian news industry body *La Presse* has been developing technology to translate text into audio via smartphone, so newsreaders can listen to stories on their phones (Baldrige, 2018). Each of these innovations is in addition to the online data analytics used by almost all European news outlets – either off-the-shelf services such as “Chartbeat” or a bespoke one such as *The Guardian’s* “Ophan”. At the same time, more and more concerns arise around news automation and robot journalism. In 2019, for example, the Council for Mass Media in Finland proactively issued a recommendation for transparency when publishing robot material (Haapanen, 2020). The Online News Association (a non-profit membership organisation for digital journalists connecting journalism, technology, and innovation) also advocates a code of digital journalism ethics.

Diversity of news formats and content adapted to the affordances of media platforms

In the 2021 MDM scoring (on a scale of 0–3 points), countries where news dissemination is based on a variety of mobile and digital tools score high on the indicator for diversity of news formats (E3). Nordic countries such as Finland (Ala-Fossi et al., 2021), Denmark (Blach-Ørsten et al., 2021), Iceland (Jóhannsdóttir et al., 2021), and Sweden (Nord & von Krogh, 2021), together with Austria (Grünangerl et al., 2021), Germany (Horz-Ishak & Thomass, 2021), and the Netherlands (Vandenberghe & d’Haenens, 2021) score highest (with 3 points) because local, national, and international news is disseminated through different platforms there. These include traditional news media, television, radio, and print, but also digital formats such as podcasts, news feeds on social media, short videos, and data visualisations. In Europe, southern European countries Greece (Papathanasopoulos et al., 2021) and Portugal (Fidalgo, 2021) score lowest (with 1 point) in terms of diversity of news formats: In both countries there is more homogenisation than diversification owing to declining investment in journalism. Outside Europe, Canada (Taylor & De Cillia, 2021) and Hong Kong (Lo & Wong, 2021) also score highest in terms of diversity of news formats, while Chile (Núñez-Mussa, 2021) is still at an early stage in terms of variety and consolidation of news formats, scoring 2 points. In Australia, scoring 2 points (Dwyer et al., 2021), the diversity of news formats is also under pressure. In South Korea, news innovation is mainly situated on visual formats catering to the mobile smartphone generation with “card news”, a news format based on “cards” that feature both text and images, contributing to its upper-middle score of 2 points (Kim & Lee, 2021; Newman et al., 2020).

Looking at the world scene, Silva and colleagues (2020) show that media content is increasingly being adapted based on the technology used. For instance,

for any one application, there are web versions and mobile versions, in which content is adapted to the affordances of the media platform. The omnipresence of smartphones and other mobile devices is giving rise to new forms of visual communication, including infographics that visually support data on online media channels. Tools such as Infogram and Tableau help journalists visualise data to complement their stories. The “explanatory” journalistic approach – which frames the relevance of news stories in narrative depth and contextual description – is, among other things, a consequence of the emergence of Big Data and the large amounts of information journalists must contend with nowadays (e.g., Posetti et al., 2019). van Dijck, Poell, and de Waal (2018) speak of the “datafication” of journalism, characterised, among other things, by interactive visualisations of quantitative data.

And there are other techniques through which news reporting takes place in an interactive way: Interactive documentaries (or web documentaries), gamification, and podcasts are some examples of narrative transmedia formats (e.g., Casero-Ripollés et al., 2020). An example of an interactive documentary (Vázquez Herrero & López García, 2016) is *Alma*, which lets the user follow various storylines. This gives a new perspective to the “prosumer” concept, according to which users co-produce content by following their own path within the news story (Löwgren & Reimer, 2013). Journalists can also go for a “game thinking” approach (or “gamification”). For instance, the iReporter game lets the user act as a BBC journalist and fact-checker based on real-world images rather than animations. It includes elements that allow the player to interact with other characters within the storyline. And virtual reality projects with 360-degree images and interviews of people on site, such as “The Displaced” (*The New York Times*) or “Inside the horrors of human trafficking” (BBC) bring an immersive storytelling format (Silva et al., 2020). Podcasts are mostly used to complement existing radio and television clips or to provide an audiovisual alternative in a society where mobile media consumption is on the rise (Silva et al., 2020).

User experience is enhanced by virtual and augmented reality techniques (VR and AR) which immerse the viewer into the storyline of the news story. Today’s media audiences are hyper-connected, so that participatory, transmedia narratives have become a full-fledged journalistic approach. “Virtual worlds” are the object of the so-called narrative transport theory: Viewers are involved in the story to such an extent that they let go of their connection with their own reality. One example is *The Guardian’s 6x9* documentary, which brings the experience of what it is like to be locked up alone in a cell (Green et al., 2004; Veira-González & Cairo, 2020).

Fully automated or “robotic” journalism goes one step further: The creation and dissemination of news pieces on various media platforms and carriers is done by algorithms without human interference. Through automated

journalism, news pieces are decoupled from time-related factors and created using large amounts of data (Carlson, 2015; Coddington, 2019; Sallaverría & de-Lima-Santos, 2020). It remains to be seen whether journalists have the skills needed – including coding skills and analytical abilities – to analyse and contextualise large amounts of data and to do “computational thinking”. Journalists put their efforts on asynchronous media audiences that consume news via multiple media platforms and devices (Túñez-López et al., 2020; Uskali, 2018; Posetti et al., 2019).

Public-led innovation

Journalists write with an audience in mind – an audience that is constantly changing along with the digital world. For users, technology enhances personalisation and enables participation. For instance, the *Frankfurter Allgemeine Zeitung* in Germany allows its readers to customise their news feed on mobile devices (Google, 2017). In Leipzig, Germany, *The Buzzard* tries to help people break out of their filter bubbles by letting them view many diverse perspectives (Buzzard, 2021). *The Irish Times*’s Diaspora Project provides readers worldwide with the ability to post pictures and stories on a dedicated web page, “Picturing the Irish Diaspora” (The Irish Times, 2021). And in the United Kingdom, The Bureau of Investigative Journalism’s (n.d.) *Bureau Local* has used the technology outside the newsroom and into the local community: Journalists work with members of the public, showing them how to investigate and report using open data and easily available digital tools.

Digitalisation is causing a shift in the media market, with the Big Five players (Google, Facebook, Amazon, Apple, and Microsoft) dominating the online world. Journalists must be able to adapt to these platforms, or find new media formats to bypass them, without losing their audience. Innovation and diversity in news formats is critical to this. Posetti and colleagues (2019) mention experiments with storytelling formats born from the recognition that a news story is interpreted and can be explained in various ways. Traditional consumers are increasingly seen as engaged, active citizens. Thus, social engagement has taken on a new meaning: Citizen journalism – a joint endeavour of the media and local community members – is another way to attract readers (Solito & Sorrentino, 2020). For example, citizen journalism in Canada had major impact in a news story surrounding the taser-related death of Polish Immigrant Robert Dziekanski at the Vancouver International Airport in 2007. Paul Pritchard turned over a video showing four police officers subduing Dziekanski to the police, who claimed it was necessary for their investigation. When the investigation concluded, it was not what Pritchard had witnessed and police refused to return his film, so Pritchard hired a lawyer and held a

news conference in order get the film back, which he then sent to the media. A major investigation into police tactics ensued (CBC News, 2009; see also Taylor & DeCillia, 2021).

At the same time, news practitioners also caution about how to use audiences' content. For example, in Greece, the default stance of citizen journalism is to rarely employ videos or audio items taken straight from the Internet without further text or context which is later provided by the media themselves (Papaathanassopoulos et al., 2021).

Traditional profit-based earning models are shifting with digitalisation towards an audience-driven alternative in which loyalty and personalisation are central. Users will become the core of the revenue model, making it crucial for building a sustainable relationship with the public (Rodríguez-Vázquez et al., 2020).

While the focus on public engagement has changed, so have user habits. Older audiences are more likely to use newsletters or direct references to news sites (the attempt to bypass social media hegemony by directly engaging with the public seems to be working), while younger people tend to rely heavily on mobile news notifications (Newman, 2019; Rodríguez-Vázquez et al., 2020). Direct messaging apps such as WhatsApp seem popular for spreading news in the Global South (Newman et al., 2020). News aggregators seem to thrive in South Korea. Globally, news aggregators, such as the Netherlands's Blendle and major players such as Google News account for seven per cent of the news collection. Direct access via news sites and social media remains in the lead across all age groups (Newman et al., 2020). Continuing experimentation in news diversity, and integration of new technology, therefore remains vital to reaching new audiences.

Innovation in media organisations

This section, in which we look at how technology is used in journalism, moves beyond the data of the 2021 MDM project. We illustrate manifestations of innovation in media organisations with examples from around the globe. Regarding journalistic principles and practices, Welbers and Opgenhaffen (2019) point to a conflict between the logic of traditional media on the one hand and social media logic on the other. The question remains whether Altheide and Snow's (1979) media logic – which revolves around objectivity and truth – can be reconciled with the subjective logic of social media, which thrive on virality and the rapid-fire dissemination of information to huge numbers of people.

Social media platforms can be described as a double-edged sword, since their revenue model is based on online advertising, while they dramatically extend the reach of news (Küng, 2015). The platform-capture phenomenon

means that social media such as Facebook have an unfair advantage: They are capable of adjusting their algorithms according to their own rules and with a focus on close connections (i.e., Facebook friends) to the detriment of news content and production (Newman, 2019). However, social media remain an important distribution mechanism for news outlets.

In this respect, Posetti and colleagues (2019) point to a distinction between legacy or mainstream news media and the so-called digital-born news media, with the latter focusing on long-term strategies and experimenting with innovative techniques. This means that the survival of digital-born news first and foremost depends on innovation, whereas legacy media are in a better position to contain or slow down experimentation. Digital news media are also trying to move away from a traditional media logic which favours exceptional or extreme stories. Different from the legacy media's earning models, the focus is no longer on profit only, but also on social engagement. An editor of *De Correspondent* (in the Netherlands) points out that digital, independent start-ups pride themselves on bringing a total picture rather than sensationalist snippets. Financial stability in itself is not an objective, but it is a factor that can have an impact on the journalistic goal (Witschge & Harbers, 2019).

A media organisation's stance and abilities also determine the innovative quality of its approach. *The New York Times*, for example, has its own school to train creatives intent on working within journalism and the news media. For the time being, such programmes are US-centric. The curriculum covers digital media, storytelling, and content marketing; however, technical skills, data analysis, coding, and data visualisation techniques are not yet commonly taught in media training programmes worldwide (Heravi, 2019).

Innovative journalism is also predicated on the national social-political situation (e.g., Nunes & Canavilhas, 2020). In Hong Kong, digital news media seem to be a faddish affair. They mostly focus on short Instagram videos, on animated "news" and cartoons presenting a peculiar mix of celebrity gossip, crime news, and political coverage, with dedicated editors working on content for social media. Online start-ups are an important news source within the region, but with press freedom under attack in Hong Kong (Lo & Wong, 2021), many topics are taboo. And yet, so-called civil rights journalism – *New Bloom Magazine* is an example of this – is making great strides in South Korea and Hong Kong, for instance. The fight against authoritarian regimes and their disinformation is mainly conducted online and via social media. In response, news stories can be triggered among the public, which one might call citizen or participatory journalism. For example, the Mapuche people – an ethnic group in Chile who have taken part in a historical conflict with the Chilean State for their autonomy, territories, and political representation – have started the website *Mapuexpress* to report news about their communities (Mapuexpress, 2020; see also Núñez-Mussa, 2021). In politically and socially unstable contexts, social

media platforms might be used to push back against attacks on press freedom and threats to newsmakers, coming from extreme-left or extreme-right voices in society, which are becoming more vocal. The *Standnews* (in Hong Kong) works with the public via Facebook to report the largest anti-government movement in Hong Kong 2019 (Lo & Wong, 2021). However, social media platforms can also threaten journalistic freedom (Posetti et al., 2019). For instance, journalists can be subject to continuous online attacks (see also Baroni et al., Chapter 3). And this is by no means limited to authoritarian regimes. In the Netherlands, for example, it was felt necessary to set up an online reporting and information platform – *PersVeilig* – to tackle online and offline violence against journalists. Moreover, trust in the media is lagging due to the rapid online circulation of misinformation and fake news (e.g., Newman et al., 2020).

Using technology to finance journalistic content

Striving to find a sustainable revenue model while trying out innovative ways to develop revenue is essential to the survival of the news industry. Experimenting with earning models to boost digital revenues is crucial, but due to the supremacy of Google, Facebook, and Amazon, doing so without relying on their technological infrastructure is nearly impossible. Improved technology availability and accessibility have provided increased opportunities due to open-source communities (GitHub, etc.) and software (Apache Solr, Tika, etc.), as well as new financing sources. For example, news media might use crowdfunding to finance content. This is the case, for example, in Switzerland, where some news-related online media backed by crowdfunding have entered the news market; for instance, *watson.ch* provides news and entertainment for young people (Bonfadelli et al., 2021). In Hong Kong, online media platforms such as *Standnews* and *Citizen News* rely on crowdfunding, and *AppleDaily*, one of the city's largest pro-democracy legacy news media platforms (now shut down), also raised funds through crowdsourcing as a result of political suppression and declining advertising revenue. Indeed, crowdfunding is an important way to engage with the public. For example, the *CORRECTIV* non-profit news site lets German Internet users develop news reports collaboratively, and today it has more than 18,000 contributors (Google News Initiative, 2020a; Horz-Ishak & Thomass, 2021).

Subscription is another way to finance content. In Chile, *El Mercurio* SAP is a major player in the printed press. Its *El Mercurio* newspaper features daily supplements covering economics and international affairs, and a longer weekend supplement that focuses on culture, interviews, and in-depth political reporting. The company publishes several subscription-only, long-form journalism magazines that cover current events, home decor, women's issues, and travel. In 2020, to decrease costs, these magazines became supplements of the

El Mercurio newspaper. In 2019, the newspaper implemented a paywall on its website; users must now subscribe before they can access the digital version of its print edition and exclusive content, such as a newsletter (Núñez-Mussa, 2021). In the Netherlands, print media paywalls have become common over the last five to ten years. Typically, a few articles or sections are freely accessible, and users can freely view a specified number of subscriber-only articles over a given period (Vandenberghe & d'Haenens, 2021). Another successful example is the Swedish daily *Dagens Nyheter*, which has flexible paywall options. Three free articles offered on a weekly basis attract readers to lifestyle articles and to premium content behind the paywall. This paid content strategy involves editorial decisions made by an editor, backed by an AI-algorithm (Nord & von Krogh, 2021). In Denmark, users tend to avoid subscription services, and editors are still striving for sustainable profit models. Print newspapers have traditionally taken a broadsheet format, carrying a range of genres (e.g., original news items, telegrams, op-eds, backgrounders, features, and columns) and topics (e.g., politics, economics, current affairs, culture, and sports) in varying proportions depending on their target market. However, the print sector has steadily lost market share during the last decade, while the online sector has grown dramatically (Blach-Ørsten et al., 2021).

Journalistic content is of course an important driver for profit, and some news companies are taking more innovative paywall approaches than others. Although forms of access to online news differ, most people have access to paid news from a single brand. The team at *vol.at*, a local news site in Austria, runs a loyalty scheme that rewards users with redeemable points. Reporters and Data and Robots (RADAR), an automated news agency, taps 400 British newsrooms to create data-driven articles using a blend of human and artificial intelligence. The publisher of Italy's *L'Eco di Bergamo* creates personalised newsletters to boost the newspaper's readership. Some media organisations operate in the audio market. The Portuguese company Observador has gained 25 per cent of the local on-demand audio market, and its live digital feeds are viewed by 180,000 unique users each month (Google News Initiative, 2020a).

An alternative way to attract audiences and earn greater advertising revenue is to pursue more sensationalist stories and formats. For example, in Austria, the private television channel ATV broadcasts a news programme (*ATV Aktuell*) with shorter, popular stories three times a day, in addition to less frequent, news-oriented magazines (*ATV Die Reportage*). Puls 4 provides two news programmes, the breakfast-time *Café Puls* and the evening *Puls 24 News*, followed by an infotainment show (Grünangerl et al., 2021). In Greece, newspapers, experiencing low circulation and fierce competition (Greeks read five to six news sources per day) have turned to a more tabloid and sensationalistic format (Diana, 2019), for instance, using click-bait techniques and embedding tweets, images, and television clips (Papathanassopoulos et al., 2021).

Social media and apps are yet another strategy for generating revenue and attracting audiences. In Germany, the most popular mobile news products are the tagesschau app and the *tagesschau24* and *tagesschau 100 seconds* news streams (updated hourly). ZDF – the second-largest public television station – provides the ZDFheute app. These new formats are a response to changing viewing habits and greater mobile news consumption (Horz-Ishak & Thomass, 2021). The NZZ Companion app by *Neue Zürcher Zeitung* (Switzerland's oldest newspaper) is a digital companion that personalises news delivery. The newspaper has enjoyed a 20 per cent increase in subscribers since launching the app (Bonfadelli et al., 2021). Twitter has become an important hub both for news dissemination and for news media networking. In Germany, the platform is popular among journalists, politicians, and the public alike. Renowned journalists such as Dunya Hayali and Anja Reschke have been increasing their audiences on Twitter, making political news more accessible, establishing a broader online discourse about politics, and forming counter-publics against hate speech and fake news (Horz-Ishak & Thomass, 2021).

Some governments provide financial assistance to support legacy media. For example, print circulation figures are declining in Flanders, Belgium, but less so than elsewhere in western Europe. This is partly due to ongoing federal government funding allocated to the national post service, which enables it to deliver newspapers and magazines from media companies to subscribers free of charge. This funding was introduced in the 1990s to support both news diversity and the postal service, although critics say it is no longer needed given the significant changes in news consumption. Many of these critics are involved in the online-only news industry and view this government funding arrangement as a barrier to fair competition between digital and print news media (Hendrickx et al., 2021).

At times, foundation grants supplement government funding. The European Journalism Centre (2021), for instance, partners with various international foundations to support new journalism initiatives, with some of the funding coming from governments. In 2019, the British government gave the NESTA innovation foundation GBP 2 million to be redistributed as grants to twenty innovative news projects (NESTA, 2020).

Much of this extra money – especially funding directed at technological innovation – comes from American technology platforms, primarily Google (and more recently Facebook). Between 2016 and 2020, Google distributed approximately EUR 150 million to 662 projects across all 27 European Union member states through its Digital News Innovation Fund (Google News Initiative, 2020a). Many of the innovations described above have been funded (at least in part) by Google. According to a number of project heads, this Google funding was essential in getting the initiatives started (Fanta & Dachwitz, 2020). Yet such funding is not necessarily beneficial to the long-term future of news and

innovation. A study by Alexander Fanta and Ingo Dachwitz (2020: 15) points to the “complex ties [that] interlink the news media and the major platform companies, the latter of which are at once competitors, infrastructure providers, and subjects of coverage for the media”. Fanta and Dachwitz conclude that Google’s funding favoured incumbents over new market entrants, supported Google’s political aims, and discouraged journalists from criticising Google.

Conclusion

The role of technology within the news realm can be ascribed to three areas: helping journalists do their job; empowering the public, giving it access to relevant content, and allowing it to contribute to the news process; and helping news outlets produce, edit, and promote content as well as generate revenue. In this chapter, we looked at examples of best practices in journalism innovation, while also recognising that innovation can compromise as well as enhance journalism. This goes to the contradiction at the heart of news innovation: Innovation can – as we have shown – provide journalists with more tools to do their work, give news organisations new ways to edit, distribute, and monetise their content, and allow the public to discover, and respond to, news that matters to them. At the same time, the more journalists become dependent on technologies that are out of their control, news organisations rely on distribution platforms that are not their own, and the public outsource their navigation of news to opaque algorithms, the greater the risk to the independence of news and to the coherence of a shared public sphere.

Nowhere is this more apparent than in the funding of innovation by big tech companies. While this has catalysed widespread innovation and invention, it has also brought dangers. Chief amongst these is the danger of over-reliance – both on funding and on technology. Funding is entirely at the discretion of Google or other superpower platforms, and it can be withdrawn as easily as it is granted. Indeed, in 2019, Google extended its news initiative to the rest of the world, downscaling its focus on Europe. There is also a risk that newsrooms become too reliant on platform technology – what Efrat Nechushtai (2018) has referred to as infrastructural capture. Most news organisations have long relied heavily on Google and Facebook to disseminate their content. What’s new is the fact that they increasingly depend on them for their technological infrastructure as well. Google even offers journalists a free suite of tools (Google Journalist Studio). This financial and technological reliance may jeopardise future news innovation and make news organisations less willing to criticise the tech giants. All told, while the last few years have seen much innovation and integration of new technologies and techniques into newsrooms, these developments are unevenly distributed between news media organisations, and there is no guarantee that

they will hold out should the money that funds them dry up. Now more than ever, investigations of big tech by the news media are needed. This is best done if news media are independent, and not beneficiaries, of big tech services and data.

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