Journalism, Digital Media and the Fourth Industrial Revolution

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Editors

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Foreword

The Fourth Industrial revolution (4IR) is a concept designed to address rapid technological developments occurring in the twenty-first century, including artificial intelligence, robotics, genetic engineering and the Internet of Things. It seeks to understand weakening boundaries between biological, physical and digital environments, interconnections between people and machines, and technology-driven social, political, cultural and economic changes in society. It considers the influence of automation on traditional manufacturing and industrial practices and how automation influences global supply and production networks.

Klaus Schwab, who coined the term Fourth Industrial revolution, finds that the rapid development of new technologies like artificial intelligence, augmented reality, robotics and automation is revising the way people communicate, create, live and relate to others and themselves. Some critics dismiss 4IR as a marketing strategy, suggesting that current digital changes are the next logical development of the digital revolution, also known as the Third Industrial Revolution. While other critics maintain that greater inequality and displacement of labour by machines will exist as 4IR develops, Schwab believes that people will have the ability to shape a sustainable, human-centred, and inclusive world. It is Schwab's notion of a human-centred active and evolving environment, and how it relates to communication and digital media, which ties together the chapters in *Journalism, Digital Media and the Fourth Industrial Revolution,* edited by José Sixto-Garcia, Alberto Quian, Ana-Isabel Rodríguez-Vázquez, Alba Silva-Rodríguez and Xosé Soengas-Pérez.

This insightful book brings together 40 international authors to consider how technological developments are impacting the creation, practice, and reception of journalism. The first part of the book, 'Network Emergence and Impact on Digital Media', considers the creation of centralized and decentralized networks to fight censorship and disinformation, as well as considers the role of cryptography in journalism. Part 2, '*Innovating Innovation* to Satisfy Increasingly Digital Audiences', addresses challenges and opportunities for

news production and innovation, new products for content automation, journalists, and audiences. Ethical considers of digital technologies are also explored. The third part, 'New Communicative and Journalistic Actors', takes on a variety of start-ups, entrepreneurial initiatives, and financing models. It also assesses the impact of AI on citizen journalism and on the practice of journalism more generally and ends by considering new skills needed by journalists in 4IR.

Overall, the collection brings together a variety of academic voices who provide an understanding of the Fourth Industrial revolution as it relates to communication and digital journalism. It reconceptualizes the role of journalism, addresses technological advances affecting journalism practices, and provides strategies to connect with audience members.

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CHAPTER 1

The Fourth Industrial Revolution: Implications for Journalism and the Media

José Sixto-García, Alberto Quian, Ana-Isabel Rodríguez-Vázquez, Alba Silva-Rodríguez, and Xosé Soengas-Pérez

The Fourth Industrial Revolution, also known as Industry 4.0, marks the fourth major stage in industrial development since the beginning of the Industrial Revolution in the eighteenth century. This new revolution is characterized by exploiting the convergence between emerging technologies such as additive manufacturing, automation, and digital services (Kong et al., 2021; Maynard, 2015). It combines cutting-edge production techniques with intelligent systems that seamlessly integrate into organizations and amongst the workforce. Communication and journalism, particularly digital media, face the challenge of incorporating emerging and testing technologies and practices into corporate structures and communicative products that are breaking down conventional boundaries between the physical, digital, and biological realms.

Various disciplines, once rigidly defined, now find themselves intertwined with different types of industry sectors (Schwab, 2016), prompting economic, social, and ethical transformations for humanity (Luo, 2023). There is a

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proliferation of increasingly sophisticated technologies, such as robotics, the Internet of Things, and artificial intelligence (French & Shim, 2016), which are bridging the physical, digital, and biological realms. This phenomenon is exerting an impact across all sectors of the economy, affecting both public institutions and private businesses and organizations (Rotatori et al., 2021).

The Fourth Industrial Revolution is meant to enhance human well-being in a sustainable and innovative manner (Alabi & Mutula, 2022). Additionally, it is geared toward fostering robust entrepreneurial spirit and leadership through the convergence of the cybernetic, human, and physical dimensions fueled by artificial intelligence (Luo, 2023). In the field of journalism, technology that has brought about significant change has led to the transformation and digitalization of the media. This has not only altered production systems, but also demonstrated how these changes affected news consumption (Kramp & Loosen, 2018).

In the dynamic interplay between journalism and society, the emergence of new skills, products, environments, and business models becomes imperative (Micó et al., 2022). This will accentuate the trend toward a more hybrid communicative landscape (Casero-Ripollés, 2018), especially in the domain of digital media, ultimately influencing the overall process of news production. Moreover, the conscientious consideration of audience needs has become an integral part of journalistic professional practice (Costera, 2020).

In this context, journalism must remain committed to continuous exploration, documentation, and the explanation of events in order to fulfil its social function in democratic societies (Eldridge et al., 2019). Nevertheless, the increasing reliance on machines and robots within newsrooms, coupled with the integration of big data, blockchain, and cloud journalism (Hassan & Albayari, 2022), is restructuring the dynamics of information retrieval, production, editing, and consumption. Audiences are not insulated from the impacts of the Fourth Industrial Revolution; rather, they actively integrate these changes. Therefore, information products will only be deemed appealing if they align with the norms and consumption routines that are inherent to the social milieu in which audiences live, which is marked by substantial changes (Lopez-Claros et al., 2020).

Despite technology consistently conditioning and reshaping the landscape of journalism (Pavlik, 2010), the practice itself has experienced more profound transformations in the past 24 years than in the latter half of the twentieth century. This evolution has fueled the dispersion and hybridization of journalistic activities. In recent years, new approaches to journalistic practices have emerged: narrative models (virtual reality, immersive journalism, etc.), strategies related to audience involvement (citizen journalism, 360° video, newsgames, etc.), data journalism, and the integration of technology into daily practice (metaverse, content automation, artificial intelligence, etc.) (Esser & Neuberger, 2019; Harris & Taylor, 2021; Jones, 2017; Lawrence et al., 2018; Lopezosa et al., 2023; Liu et al., 2020; Mabrook & Singer, 2019; Sánchez, 2020).

In multimedia journalism, dissemination practices (Domingo, 2016), cross-media and cross-promotion of content on social networks, self-destructive content distribution in digital media (Sixto-García et al., 2023), and influencer marketing (Rodríguez & Sixto-García, 2022) have already solidified their

presence in communicative practice. Meanwhile, other more innovative practices, such as the metaverse (Sanchez-Acedo et al., 2023), and co-creation (Sixto-García et al., 2022), are still in the developmental phase.

Adapt or perish. Journalistic organizations are compelled to be part of this new Industrial Revolution and to adjust to the social, economic, and technological changes. Indeed, historically, journalists have proven capable of adapting to such demands. While formats, working spaces, funding mechanisms, and the requisite skills for the journalism profession may undergo transformation, the core essence of journalism will remain the same. Reporting news is not a transient trend but an intrinsic facet of societies; hence, journalism must find ways to remain relevant. Disruptions foster a conducive environment for reflecting on the limits and future of journalism and media outlets (Carlson & Lewis, 2015; Westlund et al., 2021), not only within the profession but also in the journalistic peripheries, where innovative and disruptive peripheral actors, as well as those unrelated to the profession, strategically position themselves in relation to journalism. They develop technologies and products that wield influence over the journalistic process, from news production to distribution (Holton & Belair-Gagnon, 2018).

In the Fourth Industrial Revolution, digital journalism continues to explore new avenues to reach users in networked societies (Novak, 2018; Swart et al., 2022) by experimenting with transformed narratives, prototypes of news products (Boyles, 2020) and innovations (García-Avilés, 2021). In this Industry 4.0 scenario, virtual and physical production systems cooperate with each other to generate competitive products that satisfy the needs of increasingly demanding audiences. But how does this situation impact the media industry? Is journalism able to adapt to continue satisfying the audiences in the Fourth Industrial Revolution?

On one hand, networks have had an impact on digital media. The impact of digitization, coupled with the adoption of technologies, and Internet-connected applications by media companies (Pagani & Pardo, 2017) directly shaped work routines, altering information production methods, source selection and contact, data collection methodologies, and information visualization approaches. It also affected transparency systems (Hou, 2023), encryption protocols (Thorsen, 2017), and opportunities for citizen participation (Lee et al., 2022). Moreover, the emergence of the Web 3.0 concept has opened up the opportunity to experiment with new decentralized social technologies (Allen et al., 2023) such as blockchain (De Filippi & Lavayssière, 2020; Kadena & Qose, 2022) and open and decentralized network protocols like ActivityPub—developed by the World Wide Web Consortium (Lemmer-Webber et al., 2018)—for the interoperability of platforms within the so-called fediverse (Gehl & Zulli, 2022; La Cava et al., 2021; Mansoux & Roscam-Abbing, 2020). Within this evolving landscape, there is a growing demand for algorithmic sovereignty, data sovereignty, and technological sovereignty, challenging the current dominant and centralized communicative model of big tech

(Couture & Toupin, 2019; Giannopoulou & Wang, 2021; Hummel et al., 2021; Reviglio & Agosti, 2020).

On the other hand, innovation (García-Avilés, 2021; García-Avilés et al., 2018) is becoming increasingly necessary to meet the demands of audiences that are both more social and more digital than before (Loosen & Schmidt, 2012; Saavedra-Llamas et al., 2020). Content automation (Guzman, 2019) and algorithms (Kotenidis & Veglis, 2021; Wölker & Powell, 2021) assist in predicting tastes and informational preferences, optimizing content creation that is subsequently tested in media labs (Herrera-Damas & Satizábal-Idárraga, 2023; Hogh-Janovsky & Meier, 2021; Mills & Wagemans, 2021; Zaragoza-Fuster & García-Avilés, 2022). In the realm of journalism, prioritizing research, development, and innovation has become crucial, especially at a juncture where the very nature of news is under scrutiny from various perspectives (Carlson, 2023). Traditional journalists, alongside their hacker counterparts (Quian, 2022), and the general public, converge in journalism hackathons (Boyles, 2020) to craft prototypes of informational products. In this context, the incorporation of high-tech elements (Pérez-Seijo & Vicente, 2022) becomes indispensable, always mindful of the ethical and deontological principles (Feng, 2022) that guide journalistic practice to safeguard the public's right to receive accurate information, stay informed about public affairs, and make informed decisions in a democratic society.

Finally, the communicative scenarios inherent in the Fourth Industrial Revolution involve new actors, such as those in gamification contexts (Arafat, 2020; Dowling, 2020; Vos & Perreault, 2020), apps (Boczek & Koppers, 2020; Westlund, 2013), or platformation (Huang, 2023; Raman, 2016). The transfer of information from organizations to media outlets and subsequently to society has gained heightened importance (Ferrucci & Alaimo, 2020; Polančič & Orban, 2023). As such, within the framework of Industry 4.0, the transfer of knowledge is of upmost importance (Ripatti-Torniainen & Mikkola, 2023) and incorporates new forms of storytelling (Kulkarni et al., 2022). Artificial intelligence can assist in all these tasks (Canavilhas, 2022; Sánchez-García et al., 2023), though it is essential to clearly define the boundaries and adhere to ethical standards (Lugo-Ocando & Harkins, 2021) to continue practicing quality journalism.

The immersion of companies and organizations (Ferrucci, 2019) in Industry 4.0 inevitably involves the implementation of new technologies (Holmström, 2022). New attitudes and skills are required for journalists (Bobkowski & Etheridge, 2023; Bradshaw, 2023), going beyond simply embracing a mojo mindset (Salzmann et al., 2023). The imperative now is to create news that transcends the traditional boundaries between the physical, digital, and biological realms.

To address these and other questions and challenges, this book is structured in three parts divided into 18 chapters that can be read in any order, although a comprehensive reading of each block is recommended. It features contributions from 40 esteemed authors from 26 different universities around the world.

The first part of this book, titled "Network Emergence and Impact on Digital Media," consists of five contributions to analyze how networks (not only social networks) have reconfigured the landscape of digital media. In Chap. 2, Ramón Salaverría, María del Pilar Martínez-Costa, and Clara González-Tosat from the University of Navarra (Spain) examine the emergence of misinformation and hate speech on centralized social networks. They also explain the potential of the fediverse or decentralized social networks to combat misinformation and censorship, and expand on the capabilities of the fediverse or decentralized social networks to counter misinformation and censorship.

Chapter 3 is authored by João Canavilhas from the University of Beira Interior (Portugal) and Berta García-Orosa from the University of Santiago de Compostela (Spain). The authors delve into the effects of platformization on journalism, presenting both its advantages and disadvantages within the framework of the Fourth Industrial Revolution. Meanwhile, from the University of Malaga (Spain), Bella Palomo, Sonia Blanco, and Jon Sedano explore the intelligent use of social networks and new apps, relevant "invisible" routines in order to detect trends and possible threats in real time from an analytical perspective.

Victor Sampedro from Rey Juan Carlos University (Spain), Toby Miller (Complutense University of Madrid, Spain; University of California, Riverside, United States; and University of the Frontera and the Austral University, Chile), Pedro Fernández-de-Castro from Universitat Oberta de Catalunya (Spain), and Javier López-Ferrández from Rey Juan Carlos University (Spain) delve into the Networked Fourth Estate in Chap. 5, describing how citizens collaborate with the media through the use of leaks and cryptography. Part 1 concludes with Chap. 6, written by Laura Solito and Carlo Sorrentino from the University of Florence (Italy), where the authors examine how technologies are changing the utilization of news. The changes in the processes of their distribution produce consequences not only in the transformations of business models but also in the forms of consumption and forces to review the pact between the producers of journalism and the public.

The second part of the book, "*Innovating Innovation* to Satisfy Increasingly Digital Audiences," is made up of seven chapters. In Chap. 7, Sara Pérez-Seijo from the University of Santiago de Compostela (Spain), along with Paulo Nuno Vicente from the NOVA University of Lisbon (Portugal), Juan Camilo Hernández-Rodríguez from the University of La Sabana (Colombia), and Xosé López-García, also from the University of Santiago de Compostela, explore the innovation potential offered by the metaverse for journalistic practice. Meanwhile, in Chap. 8, Pablo Escandón from the Andina Simón Bolívar University (Ecuador) addresses the impact of content automation on transmedia experiences. Chapter 9 comes from Brazil and is authored by Suzana Barbosa (Federal University of Bahía), Fernando Firmino da Silva (State University of Paraíba), and Luciellen Souza Lima (Federal University of Bahia

and State University of Paraíba). These authors analyze the Internet of Things and its impact on journalistic innovation.

In Chap. 10, Lila Luchessi from the National University of Río Negro—University of Buenos Aires (Argentina) and Mariano Mancuso from the University of Buenos Aires (Argentina), provide insight on how innovations have reshaped the ways in which news is produced and consumed, underscoring the ongoing imperative to meet the needs of 4.0 audiences. Many of these transformations undergo testing in media labs, as detailed by Ainara Larrondo from the University of Basque Country (Spain) and Santiago Tejedor-Calvo from the Autonomous University of Barcelona (Spain) in Chap. 11, and also in journalistic hackathons to explore innovation within innovation, as detailed in Chap. 12 by José A. García-Avilés from the Miguel Hernández University (Spain). The mapping of high-technology journalism in Europe is outlined in Chap. 13, authored by María José Ufarte and Francisco José Murcia from the University of Castilla-La Mancha (Spain), and Juan Luis Manfredi from Georgetown University (United States).

The third and final section of the book is titled 'New communicative and journalistic actors' and encompasses six chapters. In Chap. 14, Carolina Moreno-Castro from the University of Valencia (Spain) explores the role of apps and platforms in enhancing citizens' feeling of being well-informed, providing them with personalized content and real-time updates, fostering active engagement with information, and empowering them to make health, environmental, and political decisions. Meanwhile, in Chap. 15, Marius Dragomir from the Central European University Vienna (Austria) analyzes communication transfer in the context of contemporary organizations and their relationships with the media.

The subject of Artificial Intelligence (AI) is addressed in Chaps. 16 and 18. In the first, Óscar Espiritusanto, Leila Nachawati-Rego, and Raúl Magallón-Rosa, from the University Carlos III of Madrid (Spain), delve into how AI can contribute to the defense of human rights and promote social and environmental justice. The second chapter, authored by two researchers from the Palestine Technical University Khadouri—Al Aroub Branch, Wafa Atieh Harb and Mohammad Mustafa Qabajeh, focuses on how journalism integrates automation into newsrooms, with journalists relying on artificial intelligence tools in language and knowledge. The discussion also encompasses important considerations about ethical responsibility and legal accountability.

Among the emerging journalistic models, the phenomenon of newsgames also plays a significant role. Hence, Chap. 17, written by two professors from the Complutense University of Madrid (Spain), David Parra and Salvador Gómez focus on exploring the gamified media context. The book concludes with Chap. 19, where John V. Pavlik from Rutgers, the State University of New Jersey (United States), examines the new professional competencies necessary for journalists working in the evolving social, economic, and technological landscapes characteristic of the Fourth Industrial Revolution.

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PART I

Network Emergence and Impact on Digital Media

CHAPTER 2

Decentralised Networks as a Tool for Fighting Disinformation and Censorship: The Fediverse and Free, Collaborative and Open Networks

Ramón Salaverría, María-Pilar Martínez-Costa, and Clara González Tosat

Introduction

The Cambridge Analytica scandal, in which Facebook sold the personal data of millions of its users to this British company to exploit them through political propaganda campaigns (Schneble et al., 2018), was the first major wake-up call in 2010 about the danger of social networks. Because of its conduct, Facebook was fined $725 million by the US Federal Trade Commission. In addition, and perhaps more importantly, it suffered a colossal reputational crisis that revealed the fragilities and malpractices of large digital platforms. Since that episode, concerns about the power and management of centralised social media in the public sphere have only grown. Other networks, such as TikTok, are suspected of serving as a resource for international espionage, or of stimulating addictive behaviour among young people. The most recent example at the time of writing is the multiplication of disinformation and hate speech reported on the X network, which was known as Twitter until July 2023, following its purchase by Elon Musk in 2022 (Fishman et al., 2023).

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The excessive exploitation of personal data, filtering of information through undisclosed algorithms, manipulation of minors and permissiveness of misinformation are some of the problems that have come to light and are causing growing concern. The major social networks are no longer seen as democratic agorae, but as bloody colosseums.

To avoid these problems, many Internet users are reducing their exposure to social networks or have decided to move away from them altogether. Others, especially those with a longer experience on the Internet, are exploring the option of decentralised networks such as Mastodon. These networks are seen as alternative platforms that can circumvent the problem of disinformation and censorship. The users who are considering migrating to these more breathable spaces, or simply abandoning social networks altogether, include some news media.

In this chapter we analyse the keys to this transformation. By comparing centralised and decentralised networks, we examine their influence on public life and journalism. Recent developments suggest that some media are beginning to distance themselves from social networks. However, many others, for the time being the majority, are still reluctant to break their links with the large corporate networks.

Centralised and Decentralised Platforms

Social media and networks have evolved. Some authors, such as Bradley and Perelli (2023), have announced the death of social media as we know it. They argue that users are increasingly sharing content over private networks and reverting to messaging applications. Meanwhile, mass commercial networks have become spaces for passive consumption, rather than places to create content. Although they were designed to organise interactions between users, large digital platforms have become somewhat "less social" (Bradley & Perelli, 2023), because they have become corporatised and have professionalised the content of brands and influencers (Chen, 2023), while becoming oriented towards the systematic collection of data, the generation of algorithms and the circulation and monetisation of those data (Scolari, 2022: 86).

With the same thesis, Bogost (2022) states that "social media was never a natural way to work, play and socialise, though it did become second nature. The practice evolved via a weird mutation, one so subtle that it was difficult to spot happening in the moment." For this author, the move from social networks to social media was a utopian one. The Web 2.0 revolution that promised user-generated content, easy-to-use tools and easy access to websites only consolidated networks of connectivity and interaction that took advantage of the big platforms. Most of these platforms were created under a "centripetal" model with the objective of retaining users as long as possible, since the more time they spent there interacting, the more personal information they shared with the social network, generating more data and, ultimately, more business (Scolari, 2022: 75–76).

It should also be noted that the saturation of users in the face of the multiplication of networks and social media and the decrease in interactions has led the business model based on user loyalty and the commercialisation of their data to show signs of exhaustion. Continuing to generate extraordinary profits from personal data that are shared across a variety of platforms is no longer an incentive even for the businesses' own shareholders (Scolari, 2022: 79).

However, the large digital networks still retain a certain dominance. In fact, the beginning of the 2020s is characterised by the coexistence of two systems: the original centralised and commercial system, and a new decentralised and open-source, non-commercial one. The former resists losing its hegemony although it is changing the rules of the game; the latter does not propose itself as an alternative system because its management is community-based and avoids the algorithm.

Centralised social networks were the first gateway for building "live" interrelationships through the Internet, with a user-centred approach that, given the considerable popularity acquired later on, eventually mutated into a profit-oriented activity (La Cava et al., 2022). The so-called *corporate social media* (CSM)—Facebook, Instagram, X, YouTube, LinkedIn, Flickr, Vine, TikTok and the like—operate as listed commercial companies that own the software that supports them. That is, they are closed source. They provide free services in exchange for content-based advertising and user data. All interactions between users are mediatised by algorithms and centralised in such a way that the users' decisions are not involved in the construction of the interaction. The technical structure of these networks is oriented towards popularity, visibility, viralisation, the influence of super-users and the power of dominant currents of opinion. The content verification systems are also centralised for each platform. In this way, users have gradually witnessed the emergence of information bubbles, echo chambers and biases along with privacy concerns, as they share their lives on these platforms (La Cava et al., 2022).

In contrast, decentralised or *alternative social media* (ASM) networks—including Mastodon, Pleroma, Pixel Feb, Peer Tube, Plume, Lemmy and others—are devised as federations of servers, known as the "fediverse," which are managed autonomously with open communication protocols (ActivityPub) and free software. The term fediverse, a combination of the words "federation" and "universe," describes a system in which several autonomous social networks coexist in the same digital environment. The fediverse is conceived as an emerging system of networks that deliberately want to move "away from the hate speech of mainstream opinion in global trending topics, influential super users and popularity algorithms," in an attempt to "give citizens back control of the network" (Orihuela, 2023: 11.12). The verification systems are not centralised, but are self-managed by users, who must follow the moderation rules of each server.

As Zulli et al. (2020) point out when referring to Mastodon, the emergence of ASM establishes a new form of relationships between users, in which the technical structure is a federated architecture that does not determine the

interrelationships between users. The decentralised structure enables the autonomy of the community, while the open-source protocol allows the internal and technical development of the site to become a social enterprise in itself. The horizontal structure changes the scale approach of the site, as it favours niche communities committed to quality content and interactions (Zulli et al., 2020, p. 1188). ASM therefore move away from algorithms and advertising. They are antiviral, there are no centralised searches or global trends, and they are oriented towards "conversation and community" (Orihuela, 2023: 17). In short, they recover foundational characteristics of the Internet that CSM abandoned some time ago.

Thus, the so-called decentralised web is gaining ground by enabling the operation of technical infrastructure and web services without centralised ownership and control. It is based on two key innovations: on the one hand, open-source software, which allows any user to set up independent servers, also known as instances, that other users can join and use within a local community, and on the other, the protocols of each federation, which regulate the combination of peer-to-peer instances to provide a globally integrated platform (Raman et al., 2019: 217).

Regarding its technical particularities, two main elements stand out: the ActivityPub protocol, which acts as the backbone of the fediverse and has been ratified by the World Wide Web Consortium, and the decentralisation of the different instances (Abbing et al., 2023). On the other hand, another of the most notable features of the fediverse is the ability of the different instances to interact with each other. A user in Mastodon, for example, can follow, interact and share content with another user in Pleroma or PeerTube, even though they are platforms with different purposes. In addition, each instance has the freedom to set its own rules and policies, which offers a wide variety of communities with very different values and norms.

Taking advantage of these two innovations—open-source and specific protocols—decentralised networks "are gaining popularity in the social media landscape as a concrete alternative to the centralised and profit-driven counterparts" (La Cava et al., 2022). They are an "opportunity to recover the values with which the Internet was born, disrupted by its commercial colonisation" (Orihuela, 2023: 11).

The Fediverse: A Paradigm of Decentralised Digital Communication

As platforms such as Facebook, X or Instagram became consolidated as the main tools for social interaction, various questions arose about aspects such as privacy, user autonomy or the centralised control of user interactions. Faced with this closed and proprietary model of platforms, the fediverse has emerged as an alternative paradigm of decentralised communication.

Unlike traditional networks, where a single entity controls and monopolises communication, the fediverse proposes a network of individual nodes that retain their own autonomy and are able to interact with each other. This decentralised structure of the fediverse encourages the creation of niche communities, environments where users are grouped according to their interests and affinities, rather than the popularised "filter bubbles" (Pariser, 2011) of corporate networks, where users are exposed mostly to content that reinforces their beliefs and silences alternative or opposing viewpoints (Marwick, 2021).

The contrast between the lack of transparency of certain corporate networks and the defence of accountability championed by alternative networks has become increasingly evident in recent times. Following its purchase by Elon Musk in October 2022, the social network X, formerly Twitter, lost much of the digital hospitality it provided, at least in its early years, for its users. Some concrete examples are the cancellation of the application programming interface access service for academics and researchers, the suspension of the accounts of journalists critical of the company, or the restriction of access to the network through third-party applications (Braun, 2023: 1). In addition, X has refused to subscribe to the Strengthened Code of Practice on Disinformation proposed by the European Commission for large digital platforms operating in the European Union. In a news context dominated by the Russian invasion of Ukraine and the armed conflict between Israel and Palestine, Musk's decision led to an increase in disinformation and hate speech on X in 2023. Faced with X's increasingly criticised practices, some users of this platform began to migrate to non-centralised networks at the end of 2022.

One of the favourite destinations of disillusioned Twitterers was Mastodon. This network had appeared years before, seven to be precise, before Elon Musk purchased Twitter (Braun, 2023: 4). Apart from individual users, Mastodon users already included publications such as *Rolling Stone*, *ProPublica*, *The Markup*, or *The Conversation*, to name a few (Braun, 2023: 3). However, there were also users and communities seeking to move away from corporate social networks where they had experienced harassment and hate speech (Marwick, 2021: 2).

The fediverse, however, is not free of problems. In contrast to the control over information and the exploitation of personal data that characterises corporate networks, in decentralised networks there are concerns about content moderation practices. Unlike centralised platforms, where moderation is exercised by a single entity, in the fediverse, each server has the autonomy to establish and apply its own policies. This decentralisation, while essential to the philosophy of the network, raises issues related to inconsistency in moderation and the possibility of the proliferation of harmful content on less regulated servers. The fact that instances are independent does not make hate speech disappear, nor does the permeability of the network prevent this type of content, as it continues to spread despite the efforts of moderators (Bin Zia et al., 2022).

The decentralised model offers freedom and diversity of expression, but it also presents risks. The absence of uniform regulation across the fediverse can fragment the network itself, leading to servers with loose moderation policies that result in havens for harmful content (Anaobi et al., 2023). In contrast to large platforms that have the financial and technical resources to invest in tools to detect such content, the fediverse is often made up of communities that lack the means to implement rapid solutions to malicious or uninformative actors and content.

This atomisation of the fediverse can also favour the isolation of users or entire communities on specific servers, preventing interaction with other groups and reinforcing existing biases or prejudices. Such "isolation" is an important factor that can intensify echo chambers, limiting the diversity of commentary and discussion and potentially exacerbating polarisation (Guerra et al., 2021). Furthermore, extreme fragmentation can facilitate radicalisation and the spread of misinformation, as isolated communities are more susceptible to extreme narratives or unverified content (Giachanou et al., 2022). These challenges underline the importance of developing uniform, robust and collaborative moderation strategies to balance server autonomy and provide a safe communication network with content that is free from hoaxes and disinformation.

Finally, the decentralised nature of the fediverse raises ethical concerns about the perennial issue of responsibility for content. In Europe, for example, the regulation of these aspects has been included in the Digital Services Act, which regulates all platforms operating in the 27 countries of the Union. As a result, companies such as Facebook are responsible for the content published on their pages. However, who is responsible for what is published in the fediverse? Should the larger (and better-resourced) servers take a leadership role in terms of moderation standards, or would this be seen as an imposition on a decentralised community?

These issues raise questions about the traditional notion of governance in the online world. In the absence of a central entity setting the rules, the possibility arises of experimenting with models of community and collaborative moderation. Perhaps one solution can be found in the establishment of reputation systems, similar to those already present on platforms such as Reddit, where users themselves earn or lose points based on feedback from other users in the community. Under this model, users who regularly contribute valuable (and respectful) content could earn a high reputation, while those who violate the rules would see their reputation diminished, limiting their ability to interact, and possibly even being banned.

Another option, already explored by centralised networks, could be collective moderation. On Wikipedia, for example, content is created and moderated collectively (Quian, 2021; Quian & Elías, 2017). Through voting or discussion tools, some nodes in the fediverse can allow the community as a whole to decide what content is acceptable and what is not. However, this approach also generates challenges, such as the possibility of manipulating information or the tendency to favour majority opinions.

Will the Media Break (Again) with the Platforms?

The relationship between news media and corporate digital platforms has a long and chequered history. Like people, their association has gone through both idyllic and difficult stages. The most recent evolution points to a rupture, perhaps a definitive one.

The relationship between media and digital platforms began earlier than many believe. Some place the first link in the early 1980s, when newspapers first went digital as part of the Internet service providers (ISPs). CompuServe, one of the most popular closed platforms at the time, hosted the first digital versions of newspapers such as *The New York Times*, *The Washington Post* and *Los Angeles Times*, as well as a few smaller city newspapers in the US (Laakaniemi, 1981). As McIntyre states, CompuServe was a direct predecessor of the corporate social networks that would emerge years later: "CompuServe developers created email and public bulletin board systems that were arguably the beginning of modern-day social networking" (McIntyre, 2014: 13). Other ISPs, such as Prodigy or America Online (later known as AOL), also moved to incorporate newspaper content as a way to attract new customers. The leap from the press to digital networks came, in the end, hand in hand with these primitives closed digital platforms.

After this initial partnership, the mid-1990s saw the first break-up. Media that had taken their first steps in ISPs opted to become independent and to publish their content openly on the web. Attracted by the promising "information superhighways" (Sawhney, 1996), many other media that had not yet ventured into ISPs also started to publish their first editions openly on the Internet. Print, audiovisual and the first digital-native media began to publish web editions independently and free of charge. From the same period, specifically 1997, dates what is considered the first social network on the Internet, SixDegree, which closed in 2001, shaken by the bursting of the dotcom bubble.

The distance between media and closed platforms was short-lived. From the early 2000s onwards, as some CSM platforms grew by leaps and bounds—LinkedIn was founded in 2002, Facebook in 2004 and Twitter in 2006—the news media became interested in proprietary platforms again. Their mammoth user volume and global reach captivated the media, which were hoping to multiply their traffic and business opportunities. This new love affair with platforms coincided with a sudden interest in "participatory journalism" (Domingo et al., 2008).

The media's fever to interact with their users resulted in the opening of sections and spaces for participation, as well as in the boom of user-generated content (Salaverría, 2021). Some media were even encouraged to create their own social networks. In Norway, for example, the publishing company of the daily *VG* newspaper activated Nettby in 2006, a network that reached almost one million users (Brandtzæg & Heim, 2010); in Spain, the daily *El País* newspaper launched Eskup in 2010, a microblogging network in 280 characters where users and journalists posted news and updates. While the large corporate

social networks consolidated their global dimension, the micro-networks promoted by news media companies faded after a few years. However, the media's interest in reaching mass audiences did not. To that end, news organisations embraced the social and commercial ecosystem created by large corporate networks: first YouTube, Facebook, Twitter and, over the years, Instagram, WhatsApp and TikTok. For their part, journalists, initially wary of these networks, quickly embraced their frenetic use as sources of information and as a space where they could project their public image.

The balance of this subordination of the media to corporate social networks, which has characterised journalism in the last decade, has both advantages and disadvantages. On the positive side, it is unquestionable that, thanks to their activity in the networks, the media have broadened their public reach and have generated profitable news dynamics. On the negative side, however, the "social" media frenzy has brought more than a few detriments.

First, there is a reputational cost, by placing professional news reporting in an environment where misinformation and unverified sources abound. A second negative effect has been the drift of journalism towards a click-driven and viral paradigm, seeking traffic at any cost (Petre, 2021). This pressure has encouraged the creation of sensationalist content at the expense of thoughtful, accurate and well-researched journalism (Bakker, 2012). The obsession with generating compelling content for the networks has, in effect, led to a growth in superficiality and the oversimplification of complex issues. By yielding to the rules of social networks, the news media have subordinated themselves to algorithms that are not designed to highlight the most relevant and reliable information, but rather to multiply interactions and maximise browsing time. In short, while corporate social networks have offered the media a global showcase, they have significantly damaged their informational integrity and the quality of public discourse.

Will this be the definitive separation between media and corporate networks? Will journalism embrace decentralised networks? It is too early to tell.

The news media's attraction to mass networks will be hard to resist. Since the emergence of the popular press in the nineteenth century, audience leadership has always been a priority for the media. It is highly unlikely, therefore, that this obsession with audience maximisation will disappear. The temptation to embrace platforms that make it easier to reach massive global audiences will always be there. However, news media seem to have learned a lesson from their uneven relationship with corporate platforms, where the latter have set the rules of the game and have been the main beneficiaries. The steep decline in advertising revenues from platforms has also revealed to the media that increasing traffic volume is of little value if it does not translate into a higher financial return. Instead of seeking one-off visitors through clickbaiting techniques, digital media, at least those of higher quality and prestige, have begun to focus on attracting loyal subscribers and strengthening direct and stable links with their audiences. Due to the new importance of subscriptions, the usefulness of social networks is declining. Moreover, the media realise that placing their

brands in spaces where misinformation is rife can have a reputational cost. Some media outlets, in fact, have decided to abandon some corporate social networks, in particular X, due to the erratic policy of the new owner. For example, NPR abandoned X in April 2023 and, six months later, claimed that the impact on the public broadcaster's traffic had been insignificant (Nieman Reports, 2023).

On the other hand, the alternative of decentralised social networks does not offer, for the moment, significant incentives for journalistic media, although it may do for journalists. The antiviral nature of the fediverse does not help to massively disseminate journalistic content and, therefore, discourages the media from exploring spaces other than corporate networks. However, journalists, like any other professional or those interested in any discipline, can find in decentralised networks a more friendly, collaborative and free place where they can find new information and contact qualified sources. Time will tell if this is the next step for journalism in its shifting relationship with the networks.

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CHAPTER 3

Centralized Networks for Journalism in the Fourth Industrial Revolution: The Platform's Role

João Canavilhas and Berta Garcia-Orosa

Introduction

The fourth industrial revolution is affecting all sectors of the economy, with a particular focus on those that are most dependent on technology. This is the journalism situation, which has always been linked to emerging technologies, but which after digitalization and online has entered an accelerated process of technological evolution that influences the entire activity. Knowing that the form and content of journalism are highly conditioned by news gathering, production and distribution technologies (McNair, 2009), the activity has changed radically in recent decades and has entered the fourth industrial revolution with platforms and their growing use of artificial intelligence (Schwab, 2016).

The use of these technologies is a consequence of technological evolution, but it is also a necessity for the media given their economic fragility. By opting for automation, the media are trying to respond to the new challenges they are facing (Flew et al., 2012; De Lima-Santos & Ceron, 2022), namely the growing lack of human resources to respond to the increase in demand for information (Chadwick, 2013) caused by the recent crises, but also because the

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massification of smartphones as media consumption devices leads to greater pressure on the demand for information.

Automation using AI would be a way to maintain the flow of information with fewer resources, but some studies show a different reality: the implementation of automation processes require heavy investments (Karlsen & Stavelin, 2014), so it is not within the reach of small- and even medium-sized legacy media. In global media, the use of AI technologies has increased in recent years (Beckett, 2019; Newman, 2022), a trend that is starting to become global, although sometimes with the use of external development companies (Canavilhas, 2023). In the case of local media, most successful examples of AI use come from one-off experimentation or collaborations with universities, but maintaining the systems remains a problem for small media. That's why companies with financial resources opt to outsource this service, while the rest look for cheaper solutions using global platforms. By operating with economies of scale, these platforms manage to make a return on their investments and gain dominant positions in the market, becoming true oligopolies. "These companies have through research and strategic acquisitions also steadily expanded their capabilities in the field of artificial intelligence. Not only does the technology complement core businesses, it also offers further cost and revenue economies of scale, scope, and learning" (Barwise & Watkins, 2018: 28).

In this scenario, it is important to understand whether platforms and artificial intelligence, two hallmarks of the fourth industrial revolution, are an asset for journalism, just as they are for other economic activities. It may also be that these technological innovations are yet another problem that aggravates the situation experienced by the media since the beginning of the twenty-first century, and we can't rule out the possibility that their importance in the ecosystem is related to the type and size of media, affecting some more than others.

The Fourth Industrial Revolution and the Centralized Networks

The convergence of digital technologies, artificial intelligence, automation, and the Internet of Things has led to the fusion of physical, digital, and biological systems that could cause major challenges in the coming years under the umbrella of the so-called fourth industrial revolution. These developments bring about changes in relation to the information flows and communication systems recorded over the last few years. However, this current revolution, unlike the previous ones, could imply a restructuring of the knots of power, modifying our daily habits, and the relationship between individuals and society (Bianchi, 2020). Moreover, this revolution is transversal to all sectors and may imply a very relevant change for the form of social organization.

The advantages and disadvantages of this new stage are yet to be written. As happened with Quandt's digital journalism (2023), the fourth industrial revolution brought a moment of euphoria in which transformations would liberate human beings and make life easier and more democratic. Then came the disillusionment when we saw, among other effects, those caused by the centrality

of networks and, finally, we find ourselves in a moment of fear especially marked by the rise of artificial intelligence and ChatGPT with all the open questions (Gutiérrez-Caneda et al., 2023). Society can wait for new ways of living, thinking, and working that can bring great social benefits or, on the contrary, concentrate the benefits and control of information in a minority. As the professor and communication researcher Manuel Castells recently recalled: "because power is rooted in our minds, be it through persuasion or intimidation. And so is counterpower, the capacity of humans to revolt against what they consider an unjust condition" (Castells, 2022: 5).

It is a new phase of social evolution with various innovations and characteristics, but in which digital platforms emerge as drivers of change, fundamentally from 2019. Digital platforms and artificial intelligence are the main drivers of change. Their importance is causing the emergence of a platform society (Van Dijck et al., 2018) which places these devices at the center of the reorganization of cultural and social practices (Micó et al., 2022). Platforms are no longer just applications, they are ecosystems (Dubravac, 2015), and, sometimes, relevant social and political actors (Garcia-Orosa, 2021) which has led to talk for some time now of the platformization of society with an omnipresence of these in all aspects of our lives. Digital companies work with profiles of citizens and collaborate or influence in a decisive way part of their social but also personal life. The use of participation platforms in decision making is already a pillar of our society (Deseriis, 2021).

Therefore, the fourth industrial revolution may produce very relevant changes in the world through the convergence of digital technologies, artificial intelligence, automation, and the Internet of Things, but also great challenges and questions.

Within this trend toward platformization, one of the most questioned aspects is the centrality of networks, which plays a relevant role in the technologies of this fourth wave. Network architecture plays a fundamental role in the distribution of power through communication, its actors, and flows.

This chapter explores challenges, advantages, and opportunities of centralized networks in the fourth wave of the industrial revolution, especially in the field of communication, as a source of power. In particular, digital journalism, much more than digital technology (Zelizer, 2019), needs to continuously evaluate where we come from, question our key paradigms to test them and feed critical debates about the future of journalism (Hanusch, 2023), especially in the current turbulent times, when platformization, social networks and misinformation have introduced radical changes in the communicative ecosystem (López-García, 2023).

Platforms and Society

The massification of the Internet and the need to improve web usability has led to the development of increasingly user-friendly tools and interfaces to meet users' expectations and needs. It is in this context that webmail and weblog

platforms have begun to emerge, with the aim of facilitating the exchange of emails and the publication of content without the need for computer skills.

While webization was initially used to identify the growing influence of the World Wide Web on society, over the years the phenomenon has taken on new forms, extending its sphere of influence to a wide variety of areas, and migrating to new media, such as smartphones. It is in this context that the concept of "platform" arose, with the aim of naming "a programmable architecture designed to organize interactions between users" (van Dijck et al., 2018, p. 9) in online environments.

If you ask people what a "platform" is, they are likely to come up with various definitions, few of which coincide with what van Dijck et al. (2018) allude to when they refer to a platformization of society. But if we talk about Google, Booking, Amazon, Facebook or Uber, these same people will quickly associate these brands with online services, online shopping, entertainment, travel reservations, etc. In essence, these people are making an association between certain social activities and a group of global service companies, the platforms, which over the years have assumed dominant positions in the most varied sectors.

The star group of this new platformized world are the so-called GAFAMs (Google, Apple, Facebook (now Meta), Amazon and Microsoft), companies in the service sector that began by dematerializing tangible services that existed up to that point, making them digital, but which over time began to offer new services that created their own need.

Mail was replaced by email (Gmail), video clubs were replaced by streaming (Netflix), bookstores and stores were replaced by online sales (Amazon), and travel agencies now have competition from Booking or Rumbo, just to name a few examples. In other cases, the platforms' offer has created its own market, as is the case with social networks, opening a new global dimension in the relationship and interaction between people.

With their success in various sectors of activity, some GAFAMs have tried to gain a dominant position over their competitors by offering similar services, but recent history shows that these attempts are doomed to failure. Google, for example, tried to launch its own social network (Google +), but the project failed. Meta launched Bulletin to fight Substack, Hobbi to compete with Pinterest or Instant Articles to compete in the news market, but all the projects failed and ended up being shut down. As a result, the big digital giants have come to realize that it is simpler to buy successful start-ups, assuming a "display strong winner-take-all dynamics" (Poell et al., 2023: 1395).

By assuming oligopolistic positions, these companies determine how the market works, impose their own rules, and condition the behavior of individuals in society. Some of these platforms, such as social networks, have transformed social relationships in many ways (Baek et al., 2013), and are today responsible for changing young adult health behaviors (Vaterlaus et al., 2015), in addition to many other influences at the interactive and relational level. Others, such as Amazon, have imposed an online sales model with a strong impact on physical commerce, rising the phrase "Death by Amazon" (Solon &

Wong, 2018). Therefore, the platformization of society is a phenomenon that must be studied to understand its full influence.

While it is true that platforms have facilitated many aspects of society's daily life and, in a way, even democratized access to certain types of services thanks to their ubiquity and increasing usability, it is also true that their hegemonic position and the way they store and use consumer data represent a danger to society, as Facebook's Cambridge Analytica scandal made clear. That's why it's not surprising that around the world there is growing concern about citizens' privacy, and legislation is being published to protect users from fraud, disinformation and other phenomena with the potential to affect society.

As an activity that cuts across all of society, platformization also affects journalism, albeit in a very specific way. Platformization is gradual and varies from sector to sector of the economy (van Dijck et al., 2018): its influence on each sector is different, as mentioned, and evolves at different rates. In the case of journalism, its action can occur in all three phases of the process (information gathering, production and distribution), and the strongest impact has been on distribution, with repercussions on the economic model that has historically made the ecosystem viable: sales of content and advertising.

In fact, journalism, which was plunged into an unprecedented crisis for around two decades ago (De Mateo et al., 2010; Siles & Boczkowski, 2012), is one of the activities that has been greatly affected by platformization because advertising investment, which represented more than half of its revenues, started to be directed to GAFAM, leaving legacy media, mainly the press, in great financial difficulties.

The 1990s marked the beginning of a significant change in the media landscape with the emergence of the Web. The new media, which initially seemed to be just another channel, quickly proved to have its own characteristics (Canavilhas, 2014) and enormous potential to be autonomous. With Web 2.0 and, later, mobile access devices, such as smartphones, the new medium proved to have an enormous potential, deepening the crisis that the media was already experiencing. These developments have led to a significant transformation in the way we consume news information, changing the media ecosystem and creates the ideal stage for GAFAM to impose its rules.

More recently, the public emergence of chatbots, such as ChatGPT, has added another disturbing element to the already troubled media ecosystem. Artificial intelligence, especially the generative AI, has brought journalism into the fourth industrial revolution, but it also adds new threats and opportunities to the media.

Platforms and Journalism: Disadvantages

To analyze the disadvantages of platforms for journalism, it is important to take an individual look because they have distinct impacts in the activity.

As mentioned earlier, the economic model of traditional media is based on sales and advertising. In the case of the press, the "sale of newspapers" is, after

all, the sale of news content (news, interviews, etc.). The trick lies in the way this content is surrounded by advertising space, with advertisers reaching potential customers in this way. In essence, newspapers are made up of two parts: their own product (news units) and advertising (Kaye & Quinn, 2010). Social networks have imploded this model, offering a third-party product taken out of its context (news units) and advertising from its customers who have no relationship with the original producers of the content. This new model poses two problems.

The first one has an economic nature: advertising investments that were previously made in the media have moved to social networks and search engines because they are spaces with millions of consumers and where it is possible to personalize advertising. While traditional media are losing their audience and it is not possible to target advertising to a specific audience, social networks personalize advertising both according to personal tastes and the time of advertising, and by using the user's own location thanks to the technologies available on smartphones. In addition, advertising in these spaces is scalable; that is, the price varies according to the size of the intended audience and not according to factors not controlled by the advertisers.

The media reacted in the most natural way: they asked to disappear from search engines, thus trying to cut off the raw material—the news—that attracted users. The aim was to win back readers for their sites and prevent these tech giants from profiting from his work. The first major battle between newspapers and Google took place in Belgium and, in 2007, a Belgian court ruled that Google should pay the country's newspapers for the use of their content. This decision was a response to a request made by the newspapers a few years earlier, but Google claimed that it didn't make any money from indexing the content and removed the newspapers from Google News and searches. The immediate consequence was a drop in the media traffic, which forced the newspapers to request their re-entry into search (González, 2014). Although the conflict continued, agreements were later reached whereby Google collaborated with the Belgian media, particularly through technical training and advertising. This situation was repeated in many other countries, but always with the same consequences: not appearing in searches meant losing traffic and, consequently, advertising. On the other hand, appearing in searches and on social networks meant seeing your news "marketed" by third parties, without the producer receiving any benefit.

The alternative was to look for economic models that would allow for a better distribution of the online advertising pie. After the free model, in which technology companies were the main beneficiaries, and the phase of implementing paywalls (premium model), in which there was a drastic reduction in traffic, the ecosystem looked for a solution in mixed proposals (freemium model), combining the offer of some news with charging for long formats, such as reports and exclusives, and opinion articles, believing in the 5% rule (Anderson, 2009), that is, that 19 free users are made possible by one subscriber. Other models have also emerged, such as 360° (Canavilhas et al.,

2016), which combines a wide variety of revenues that can be combined depending on the characteristics of the media, the type of content it uses or even its geographical location. The proposed options combine the freemium model (free content to attract traffic + paid content, but sold per information unit in the iTunes model), with interactive forms of advertising that involve users (gamification), crowdfunding, the sale of apps for mobile devices, cross-promotions offering subscriptions, and the creation of fees to be paid by Internet service providers, smartphone manufacturers, and software developers related to the consumption of news content.

Despite all the alternatives, the system still doesn't work for most media outlets (Nieborg et al., 2019), especially small- and medium-sized local ones so the lack of a viable economic model remains a major disadvantage of platformization in the field of journalism.

A second problem of platformization, related to the disaggregation of information into independent information units, is that it makes it difficult to contextualize and understand issues. By circulating autonomously on social networks, or appearing in searches made on a search engine, the news loses the framework given to it by the spaces where it is placed in newspapers or on television, being associated with specific editorials and slotted into news spaces where there are other related subjects. Appearing in isolation, news stories lend themselves to being confused with other content, favoring disinformation processes (Canavilhas & Jorge, 2022).

In addition, the personalization systems typical of social networks tend to enclose users in information bubbles (Pariser, 2011) because they mainly offer news tailored to their interests. By consuming news accidentally (Boczkowski et al., 2018) on social networks or suggested by browsers, users are restricted to a narrow information universe that offers them a partial view of the world. In a global society, where freedom of choice is at an all-time high, it is curious to note that users are increasingly confined to decontextualized information niches or, alternatively, they are diluted into a huge, standardized mass, comforted by information that responds exactly to what they are interested in reading, reinforcing their convictions and doing the exact opposite of what journalism usually does: offering the various points of view on a given subject.

However, there are other disadvantages related to the platformization in journalism and that doesn't just involve social networks. One of them is the imposition of certain formats, languages, or narratives, which start out being specific to certain consumer platforms, but end up spreading across the media. This is the example of adapting information to mobile devices: news has fewer words and videos are short. On the other hand, the number of news in circulation increases substantially and seeks to acquire a viral character, encouraging users to boost their circulation within the platforms (Borges-Tiago et al., 2019). In recent years, there has been an increase in short formats to the detriment of long ones. The reason given is that the new generations prefer shorter texts, but it's becoming difficult to understand whether this is a preference or a habit, that is, whether they read because they prefer to or because it's the

reality they know, since this is the type of information they receive on social media.

Whether for one reason or another, the truth is that many of the formats and narratives that have emerged in recent years have been the platforms rules and not a choice made by the media themselves, as was the case in the pre-Internet era. Of course, not all the new formats/narratives have impoverished journalism: in some cases, such as the use of parallax scrolling technology, they have imposed high qualitative standards and improved the final products, an advantage that will be commented on in the next section.

The latest platforms to influence journalism are those linked to artificial intelligence, such as ChatGPT or Bard (now Gemini), for example. Among the major disadvantages of using AI platforms to produce content are the ethical issues. When using these generative platforms, attention must be paid to the databases used to avoid reproducing stereotypes, ensuring privacy, and checking that the content produced automatically is consistent with the publication's editorial criteria (Ventura-Pocino, 2022),

Another disadvantage of using generative AI is the quality of the automatic text, which tends to use repetitive structures (Graefe & Bohlken, 2020), impoverishing the final work. In addition, AI has strong limitations in terms of interpretation (Sandoval-Martín & La-Rosa Barrolleta, 2023), so its production should always be done by journalists. What's more, today's bots hallucinate; that is, it produces false or nonsensical information because of database errors, biases or programming mistakes, which can be a very serious problem if there is no human control over the final product.

Finally, some authors also identify high implementation costs as a disadvantage (Peña-Fernández et al., 2023), but this is where platformization comes in once again as a way of making these solutions more accessible to all media.

The Other Side of the Platformization in Journalism: The Advantages

Platformization has also allowed the media to make a qualitative leap. Except for a few global newspapers, such as *The New York Times*, *The Guardian*, *Le Monde*, or *El País*, to name but a few, there remains a huge mass of small- and medium-sized newspapers with few, or no human resources exclusively dedicated to IT development. For this vast majority, the emergence of platforms that provide low-cost tools has been the way to produce innovative content with little financial effort.

Content hosting platforms such as WordPress (websites), YouTube (video), or Soundcloud (audio) have enabled the media to significantly improve their web presence without having to invest in servers or human resources for software development and system maintenance. Other platforms, such as Atavist, have made parallax scrolling technology available for free, allowing anyone to

produce work with the technical resources used in *The New York Times*' famous Snow Fall.

Some platforms, especially content repositories and some tools that allow the use navigation through images or the production of immersive content, have made a decisive contribution to closing the gap between global newspapers and local newspapers, stimulating creativity, and improving the quality of products (Nielsen & Fletcher, 2023).

The use of more appealing multimedia languages has also enabled the media to win over readers from the younger generations. Several studies have shown that this generation is interested in this type of content (Casero-Ripollés, 2012), which is why betting on differentiated content appears to be a way of recovering users lost to other activities.

Another way of achieving this goal was to be in the social networks, the spaces most frequented by young people (Yanardağoğlu, 2021), especially after the massification of smartphones. The use of news by these platforms has taken advertising away from newspapers, bust also attracts more traffic to newspaper websites. And that's what some media have done with great success, offering content aimed at more specific audiences and using these platforms as a personalized distribution network. By attracting more traffic to their sites, the media can explore different ways of raising revenue from these audiences, whether through advertising on their own sites, cross-promotions and other marketing activities that create strong links between these audiences and the newspaper.

Another interesting advantage of the use of social networks in journalism was the incentive for interactivity. Although newspaper comment boxes already allowed this, the fact that they required registration meant that many people didn't participate or, alternatively, created fake profiles just for the comments. In the case of social networks, comments are made from personal accounts, which, even if there are fake profiles, is more reliable and allows for quick confirmation of identity.

AI platforms also have some advantages for journalism. In general, the use of AI tools improves efficiency because machines are faster at performing certain types of tasks related to compiling and processing data. This efficiency has an impact on improving productivity (Thurman et al., 2017), helping to solve a problem arising from the reduction in the number of professionals in newsrooms due to the crisis. The possibility of replacing some routine tasks with AI applications makes it possible to speed up the process and achieve greater accuracy in the information produced (Silverman, 2013).

AI also has the advantage of being able to help combat disinformation (Manfredi Sánchez & Ufarte Ruiz, 2020), especially when journalists are confirming data, which speeds up the process.

Finally, AI also helps with distribution by allowing personalization (Túñez-López et al., 2021). This is, in fact, a field where platforms have been investing more because they know it's a problem for journalism.

Implications for the Future of Journalism

In recent years, journalism has followed all the technological trends, trying to attract the attention of users. Most of the time, these technologies are associated with online platforms or technological devices that allow the production of new content, with new languages or previous languages remediated (Bolter & Grusin, 1999), and improve the distribution system searching for an exact fit between the news and the users. In this context, platforms have managed to gain a central place in the media ecosystem influencing journalism in all its aspects. The problem seems to be the fact that these emergent technologies are concentrated in a group of large and powerful companies whose objectives are not the same as those of the media that use them (Simon, 2022). Perhaps for this reason, the current panorama of the ecosystem shows two different realities.

On the one hand, there are the global media conglomerates, which are developing their own IT solutions on their own initiative or replicating what is emerging but hosting the content on their servers and having their own development teams to adapt emerging technologies to their journalistic and commercial interests. However, this group of media outlets is very limited and boils down to just over a dozen newspapers, a few television channels and a handful of news agencies.

The other media group, which is much larger and spread around the world, continues to rely on platforms to stay in business. Although some of these media can develop in-house solutions, the speed with which technology evolves forces them to turn to the tech giants to keep up with innovations in the field of journalism, making them highly dependent (Nielsen & Ganter, 2022): generative AI is a good example of this. With newsrooms getting smaller and smaller, the media are unable to keep up with the growing demand for information, so the production of automatic text appears as an opportunity to maintain the flow of information. That's why they use existing platforms or companies that specialize in producing this type of robot, which limits their control over production. Losing control of the process is the biggest risk that small- and medium-sized media face, and so they are plunged into a dilemma: use the platforms and lose some control of the process or not use them and become irrelevant by losing social impact?

The future of journalism, especially that of small- and medium-sized mainstream media, will depend on their ability to find a balanced solution that allows them to maintain a certain degree of technological autonomy without missing the innovation train. The solution is to use open-source platforms, because this way there will be less dependence on the big platforms, allowing the media to maintain their editorial criteria and control over the entire production and, above all, distribution process, thereby raising the revenues that are now mostly distributed by the platforms.

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CHAPTER 4

Intelligent Networks for Real-Time Data: Solutions for Tracking Disinformation

Bella Palomo, Sonia Blanco, and Jon Sedano

Introduction

Monitoring online activity makes it possible to generate valuable and predictive information on audience behaviour, reduce uncertainty and facilitate editorial decision-making in contemporary journalistic practice. Web analytics and the datafication of the digital news environment facilitate audience influence on newsmaking in real time, altering the traditional process of gatekeeping, encouraging de-selection (Tandoc, 2014) and combining an audience-centric view and a data-driven scenario. These tasks prove to be indispensable for survival in a liquid scenario, which is why the analytical function of the journalist has been revitalised, re-baptised with more specific work profiles such as growth editor, audience engagement editor, audience development editor, social media strategist, or AI editor.

Therefore, the mass media have professionals on their staffs who focus on analysing audience activity in the medium, in competitors and in social media to increase engagement (Gutiérrez & Milan, 2019), influence story placement on the front page and practice predictive journalism, in which improvisation is reduced by making use of invisible data to guarantee the success of the news product, not only prior to publication but in post-publication as well (Salonen et al., 2023). The automation of these procedures is a reality that has been installed in newsrooms for over a decade thanks to intelligent networking.

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Gershon (2011) defines this concept as "a series of networks designed to enhance worldwide communication for business and individual users alike," and it is characterised by two basic features: in the first place, its unique intelligence proceeds from the system's users and their contributions; in the second place, these are environments that grow and evolve through self-learning qualities.

In spite of that, the agility provided by metrics in professional routines is not free of criticism. On one side, the journalist must find a balance between reporting what the audience needs to know (hard news) and what it wants to know (soft news); and, on the other, he or she must be aware that data provided by users generally proceed from external companies. ChartBeat, Google Analytics, Parsely, Branch, Mixpanel and Quantcast are some of the tools used by journalists to analyse the medium's digital activity and user behaviour.

Platformisation of infrastructure implies that an external actor, including technological companies, is developing many of the essential tools and services that enable the media to analyse, produce and distribute content, or even personalise a particular news flow.

As a result, there is a recent academic current that focuses on warning about the contradictions and dangers of datafied societies, given that a change is underway between an open, public and decentralised model of internet towards another, private structure characterised by power asymmetries between those who provide data and those who possess, commercialise and control data (Ferrer-Conill et al., 2023). As Hartley et al. (2023) indicate, the relation between technological platforms and media is not at present displayed; these are subtler links whose concealment can be due to their technical character, but they generate cultural, geopolitical and infrastructural dependencies, which reduce journalistic autonomy as they remodel professional routines that do have an impact which, at times, is unknown not only to society, but also to the academic sector itself.

In the age of information disorders, having available mechanisms related to transparency in journalistic practice and that show the traceability of information, has become a strength that benefits the credibility of the medium and the professional. These practices are at times complemented by enormous efforts to uncover attempts to manipulate public opinion, together with frustration at not knowing the algorithms used by Facebook, X, and Instagram.

In this vein, the strategic dimension of journalistic activity and the network of backend infrastructures have increased exponentially with the spread of artificial intelligence (AI) (Kristensen & Hartley, 2023). Technologically advanced solutions are now incorporated in the traditional selection of themes, focuses, linguistic elements and images, making it possible to accelerate and perfect professional routines; although, in parallel, this also facilitates the alteration of reality and the circulation of hallucinations. Facing this dual reality, reading metadata is a requirement for tracking disinformation (Saltz et al., 2020).

Companies like Full Fact or Logically have adopted AI-based automatic fact-checking technologies, as there is a public belief that a machine lacks biases

and therefore provides content that is more objective than that proceeding from a human being (Moon et al., 2022). However, there is no scientific evidence to support this theory. In 2023 researchers at NewsGuard put 100 prompts in ChatGPT and on 80% of the occasions the AI chatbot delivered eloquent, false, and misleading claims (Brewster et al., 2023). The DALL-E 2 application also exhibits strong stereotyping, far higher than the gender biases detected in earlier investigations (García-Ull & Melero-Lázaro, 2023).

These weaknesses confirm that while AI models are commonly regarded as the cornerstone of network intelligence (NI), AI is not the most suitable tool for every NI task. In the following pages we consider how the media are integrating algorithms in their everyday practice to obtain results in real time, and which advances make it possible to limit the impact of disinformation.

Implementation of Automated Routines in Newsrooms

In this dynamic scenario of constant transition, newsrooms must adapt and innovate to remain at the forefront, and provide agile, effective, and up-to-the-moment communication. This section explores the adoption and implementation of technologies centred on automation and AI in the journalistic ecosystem. We have identified those tasks that could not only improve newsroom efficiency and productivity, but also enable news professionals to dedicate more time and effort to the crucial activities of investigation and creation of original quality content. This variation in workflows accompanies successful cases such as *The Boston Globe*'s Pulitzer Prize–winning reportage "Blind Spot," in which the journalists used the artificial intelligence tool Google Pinpoint to analyse thousands of documents, identify patterns in their data and even recognise texts in images (McCarthy, 2021).

Basing ourselves on the experience and opinions of journalists and employing a global focus, this section has an exploratory and propositive character, as it sets out how automation tools and AI could be integrated into contemporary journalistic practices. A high level of acceptance was already registered in 2019, as 68% of the quality media stated that they used artificial intelligence to improve the efficiency of their workers (Beckett, 2019). In Spain, the case of Catalonia stands out, where 76% of the main media already applied algorithms in their routines in 2021 to select content, detect tendencies, decide on the focus, collect information, create, or distribute content (Ventura, 2021). However, these tendencies cannot be generalised since territorial contrasts can also be observed. The learning curve and scant investment usually cause the imbalance. In this sense, those in charge of the Latin American media admit that an application can be found in barely 20% of the cases (Melano & Narbais, 2021).

These practices cannot be considered in isolation and require a reflexive exploration to understand the difficulties and opportunities that AI (Hassan & Albayari, 2022) and automation entail, considered in parallel with the ethical principles and integrity required in the practice of journalism. The report

"*Algoritmos en las redacciones* (*Algorithms in the newsrooms*)" (Ventura, 2021) summarises the challenges that a medium currently faces under seven headings; automated content with editorial criteria; personalisation; diversity and health of the public sphere; responsible treatment of users' data to protect their privacy; data supervision to avoid bias; enhancing the value of the human factor; platformisation and journalistic independence; and strengthening journalistic values.

Automation in digital journalism is therefore not something new, and its use has been extended to the creation of simple news pieces with an easily reproducible structure, the analysis of large volumes of data and the distribution of content on multiple platforms. However, the launch of ChatGPT 3.5 by the OpenAI company in late 2022 marked a significant turning point regarding how journalistic routines are approached. The advanced capacities of this language model have made it possible to tackle more complex and specialised tasks with unprecedented efficiency, above all for those who make use of its API (application programming interface).

The adoption of this tool has transformed diverse areas of the profession. For example, in investigative journalism, ChatGPT has proved to be a valuable tool for the accelerated analysis and summarisation of juridical and official documents, transforming weeks of intensive labour into a few hours of work. Furthermore, its potential for generating high quality text is opening up new possibilities for the creation of diversified content, from historical outlines to improving the texts in specialised sections present in many newsrooms, such as sport and business.

The Internal View

The democratisation of these advances facilitates their applicability, without discriminating or creating gaps between local and national media. A company's capacity for initiative and its staff's appreciation of the innovative culture are the only requirements for their development. This is the case of *Diario Sur*, the main local newspaper in Málaga, Spain (Vocento Media Group), where several automated systems crucial for optimising their operations have been introduced.

Luis Moret, chief web editor and multimedia coordinator, explains how they hierarchise news items on the front page. In the first place, they access the results provided in real time by the analytics platform Chartbeat. This tool makes it possible to know what readers are reading at each moment and the relevance of the content, as well as to visualise from where they have accessed the news story. Observing such audience behaviour makes it possible to know what content is being ignored and eliminate it from the front page or relocate it on the homepage in those areas where user attention is concentrated. In the second place, these data are complemented with the mail received in the newsroom every 4 hours from Google Trends. And in the third place, they have an internal tool that shows the percentage of restricted front page content, only

accessible to subscribers. This percentage value must be maintained above what is set internally by the company.

Apart from this, and from specific uses of systems like Whisper for transcribing the audio of interviews, the automations that they have introduced are linked to the program used by the editors at Vocento, which is called Methode. This application self-generates the labels when a news story is written and, with its category identified, the article is directly published in a specific section. Additionally, to facilitate the adaptation of the printed medium's editors to the digital version, as well as to accelerate the process of transferring the content, they utilise an integration between the platform of the news story destined for the printed newspaper *Millennium* and the abovementioned Methode, adapting the content to the latter through an automatic action.

In addition to employing external tools, one of the functions of the computer staff of a means of communication is at present centred on developing systems of automation to streamline the journalists' work. The most widespread function consists in incorporating an optimisation module to share content on social media, which makes it possible for a news story to be launched on several platforms simultaneously, as well as to program its publication, thus maintaining the rhythm of publication even on days with the greatest concentration of staff rest periods. BloombergGPT, *The Washington Post*'s Heliograf, *The Times* of London's JAMES, Reuters' Lynx Insight and *Newtral* Claim Hunter are some of the solutions created by media that have opted for their own proprietary or self-governed platforms to have greater control of data, as well as increasing their reputation because of the initiative.

This internal programming capacity also strengthens service journalism, whose aim is to resolve the audience's everyday questions. In this regard, there are bots in the newsrooms that confect the weekly cinema listings adapted to social media, and also a program for publishing a daily item on electricity and petrol prices, or stock exchange results. During the pandemic this system was used to provide daily information on the number of victims, with data obtained from websites like John Hopkins University or Google.

Elena de Miguel, deputy editor of the newspaper *ABC*, notes that AI advises them on how to prepare headlines for Google Discover or what labels they should put on pieces to improve the SEO, and she shows herself to be optimistic when announcing that there are future plans linked to design and advertising, and that the majority of the repetitive processes will end up being managed by algorithmic solutions.

Like *ABC*, the rest of the media are in a phase of transition and exploration with regard to the adoption of automation technologies and AI. An analysis of the professional practices expressed by 17 journalists who participated on the course "How to use ChatGPT and Other Generative IA Tools in Your Newsrooms" at the Knight Center for Journalism in the Americas of the University of Texas Austin, held in the autumn of 2023, makes it possible to determine the three most widely used modalities. The first is centred on newsgathering, where some professionals use ChatGPT to obtain ideas on which to

work; Google Trends, Dataminr or Rapidminer to identify trending topics; Whisper AI, Colibri.ai, Otter.ai and Speech Text.ai, for speech-to-text transcription and automated translation. Also found in this section are new options for applying OpenAI, data analysis and GPT Vision, which make it possible to summarise files, interpret images or analyse large quantities of information.

The second section is centred on news production, where tools like ElevenLabs and D-ID, which specialise in creating video avatars for narrating news stories, stand out. They share the leading position with ChatGPT, which writes content and generates images using the Dall-E 3 option. Other solutions adopted are headline optimisation, style correction, proofreading, improving the quality of written content and adapting pieces to multiple formats, for example, using voicebots to convert text stories to audio format.

The third and final section is dedicated to news distribution, where tools like Echobox or SocialFlow optimise social media content scheduling, while others like Ubersuggest, which facilitates the selection of keywords, or CrowTangle help follow and analyse what is happening across social media.

Future Possibilities and Demands of Automation in Newsrooms

According to the survey conducted for the report "Generating Change: A Global Survey of What News Organizations Are Doing with AI" (Beckett & Yaseen, 2023), the expectations of journalists are centred on four main areas: fact-checking and disinformation analysis; content personalisation and automation; text summarisation and generation; using chatbots to conduct preliminary interviews and gauge public sentiment on issues.

The results of the report suggest an expanding and promising horizon in the field of digital journalism. To the extent that newsrooms advance towards the integration of these systems, new possibilities emerge that can remodel the operations, quality and efficiency of journalistic practices.

The future integration of automated systems and artificial intelligence is envisaged as having a transversal impact, from the generation and optimisation of content to advanced and personalised data analysis for better editorial decision-making. The continuous exploration of new tools and technologies will enable newsrooms to be at the cutting edge, maintaining a sustainable relevance and competitiveness in the changing media ecosystem.

Below, Table 4.1 synthesises a variety of automations and AI systems that could be progressively integrated in newsrooms, together with a brief description of their applications and potential benefits. The table is based on the result of the AI Trends Report (2023).

The data contained in the table show that the use of AI and automation in journalism appears to have a broad and versatile spectrum. There is global professional interest in exploring and adapting these technologies to improve efficiency, creativity and precision in the production and presentation of journalistic content.

Table 4.1 List of functions, applications, and phases for implementing AI in the newsroom

Required automation	*Commonly used service providers*	*Stage*
Monitoring news sources	Google Trends	Newsgathering
Preliminary research	Scraping online information	Newsgathering
Transcribing an interview	Whisper	Newsgathering
Translation of content	ChatGPT/Deepl	Newsgathering
Image analysis	ChatGPT Vision module to analyse images and create captions	Newsgathering
Content classification	Claude	Newsgathering
Fact-checking	ChatGPT Advanced Data Analysis module to verify data accuracy through cross-referencing content	Newsgathering
Summarising documents or news	Claude	News production
Automated news reporting system/first draft	Bard/Reportermate	News production
Creation of graphics or visualisations	GPT4/Dall-E 3	News production
Image generation	Midjourney	News production
Video creation	Runway	News production
Generating profiles of people or characters	Bing	News production
Grammatical and stylistic review	LanguageTool	News production
Metadata generation	ClarifAI	News production
Prioritising news on homepage	Algorithms to determine the importance of news	Publishing + distribution
SEO	Neuron Writer	Publishing + distribution
Publishing across multiple platforms	Lumen 5	Publishing + distribution
Social media distribution	Acrolinx	Publishing + distribution
Sending out newsletters	Promo.Ai	Publishing + distribution
Metrics analysis	ChatGPT Advanced Data Analysis module for analysis of traffic and user behaviour	Publishing + distribution
Management of readers' comments	Perspective API	Publishing + distribution
Social listening	Brand24	Publishing + distribution
Performance reporting	Rankmi Insights	Publishing + distribution
Fact-checking service	Chatbot that allows finding verified content	Publishing + distribution

Source: Elaborated by the authors based on the AI Trends Report

Furthermore, a tendency can be observed of using AI as a complementary tool that can improve, but not necessarily replace, human skills and judgment in journalism. The human revision and adjustment of AI generated content appears to be a common and necessary practice to ensure the quality and relevance of published content.

It is clear that over the coming months and years AI and automation will play significant roles in the evolution of newsroom operations, marking out a path towards modernisation and adaptation to the demands of a digital media landscape that has been in a state of constant change for many years.

Invisible Routines to Reduce Disinformation

The speed with which content is spread through Internet provides, both citizens and organisations, with a great opportunity to disseminate and access large quantities of data on practically any subject. Nonetheless, the democratisation of generative AI technologies, combined with the intensive use of social platforms, has accentuated the problem of fake content, threatening both democratic stability and social cohesion. Facing this scenario, it is crucial to investigate the role that can be played by intelligent networks in mitigating the advance of misleading content, placing the emphasis on deploying automatic fact-checking systems, the adoption of systems based on artificial intelligence, and the tactics implemented not only by the mass media but also by technological corporations whose networks are today major content distributors.

Additionally, automation in the processes of labelling, metadating, transcription, analysis and data verification has been perfected with the arrival of AI tools that enable large quantities of data to be processed in a much shorter time, and, as a result, intelligent networks driven by artificial intelligence provide a promising solution to the problem of disinformation.

Researchers have been exploring how fact-checking can be automated, using techniques based on natural language processing, knowledge representation, machine learning, and databases to automatically predict the veracity of claims (Guo et al., 2022). But the actors that intervene in these processes are diverse, and in addition to researchers, there are mass media, fact-checkers, technological platforms and even the users. Alliances and cooperation amongst all of them are essential and are subject to technological advance, to constant transition. However, there still remains a considerable margin for the evolution and perfection of these processes.

It is imperative to also consider the role of governments, which once again are confronted with the need to regulate a phenomenon of global scope that exceeds their jurisdictions. Government unease was evinced in the Bletchley Declaration (AI Safety Summit, 2023), approved on 1 November 2023 by 28 nations, including world leaders in the development of artificial intelligence, with the aim of establishing a consensus on the ethical and responsible use of such technologies.

The Response of the Technological Companies

Google, via the Digital News Innovation Fund, was one of the pioneers in stimulating media innovation by financing 662 projects in Europe. One of every five of these initiatives was focused on the problem of disinformation. In 2016, Journalist-in-the-Loop or Fact Checking Automation and Claim Tracking System (FACTS), were already committed to automated fact-checking. Another of the most visible and accessible of Google's initiatives was the creation of the Fact Check Tools section.

Social media in general, and X and Facebook in particular, have received criticism and pressure from different political, social and media actors because of their role in spreading disinformation, especially in relation to concrete issues such as elections, coronavirus, and international conflicts.

Facing this situation, both platforms have accepted that they have a corporative social responsibility and have adopted misinformation policies to combat false or misleading information and guarantee the transparency and veracity of the content circulating on their networks. These policies habitually combine automated strategies with human supervision.

Following the election won by Donald Trump in 2016, Facebook reached an agreement with a team of fact-checkers in almost 30 countries, certified by the International Fact-Checking Network (IFCN), to review and evaluate the accuracy of the content published on the platform. This system enables companies to access a list of pieces that by means of artificial intelligence are labelled as likely to be false, in such a way that it is finally a process supervised by humans that determines the level of veracity or falsity of the news item. However, this agreement does not in itself include the elimination of the news item, only a reduction of its distribution and, therefore, of its visibility.

Later, and once again following the presidential election in the United States in 2020, Facebook proposed an emergency change in the website's news algorithm, which would help to decide what over 200 million people see daily. The company also developed plans to fight the consequences of a disputed election, including an increase in the visibility of content generated by quality media and a reduction in the impact of ultra-partisan websites.

In the case of X, from February 2020 onwards the network began to label content as synthetic and/or manipulated, which directly affected messages by Donald Trump in which he made unfounded accusations of electoral fraud.

In that period, coinciding with the pandemic, the company decided to label messages that contained misleading or potentially harmful information on the coronavirus or the vaccines, and directed users to authorised sources like the World Health Organization or the Department of Health and Human Security. Similarly, it eliminated over 22,000 tweets that violated its regulations on health disinformation.

Nonetheless, shortcomings have also been observed in this automated methodology. In the initial phases of the Russo-Ukrainian conflict, numerous reporters witnessed how on their personal profile they were given an

identification indicating, "This Tweet links to a Russia state-affiliated media website." This label suggested, without justification, that the communicator had pro-Russian leanings simply because he or she was employed by a communication medium from that country. These designations were subsequently eliminated and are a further proof that automated actions require human supervision.

At present, the trends section has brief descriptions to provide clarity to users. It continues to be an automatic system, but it is now supported by the supervision of trusted partners, by which it seeks to explain the importance of a specific issue, personality, or place at the present moment. Horizontal cooperation continues to be key, and the audience has the option of being proactive and reporting if a trend is harmful or spammy.

These are some of the measures that X and Facebook have taken against disinformation, although both platforms recognise that this is a complex and dynamic problem that, in addition to the automated process, requires constant collaboration with other entities like governments, mass media, experts in fact-checking, and their own users, as has been demonstrated.

Journalistic Solutions

In this chronology, we must not forget the fact-checking agencies. In 2020, health moved into the foreground due to the COVID-19 pandemic, and facing the resulting infodemic the need arose to verify much more information in much less time, which required automation in the process. A good example of this was the case of Maldita.es (2021). Its chatbot was launched in July 2020 with the aim of automatically gathering and reviewing huge quantities of content that was suspected of being false.

In 2021 it was already possible to make use of WhatsApp's introduction of the attribute "Frequently Forwarded (FF)," and thus label and analyse those messages that were frequently resent. Examination revealed that in 78.72% of cases this content was linked to fake news or disinformation.

One of the aims of a fact-checking company is to attain verification in near real-time, and chatbots offer a series of advantages for achieving this. In the first place, they make it possible to reach a wide and diverse audience as they can be integrated into various platforms, such as websites, messaging applications and social media. And in the second place, they are an attractive tool for organisations that seek to educate the public about disinformation and encourage fact-checking.

On the other hand, the main media conglomerates are addressing the challenge of news verification from a privileged position. They are better equipped with resources, in both advanced technology and specialised talent. Furthermore, their extensive documentary archives facilitate two key processes: feeding their artificial intelligence systems and developing advanced systems for

automatic metadating. This synergy gives them a notable advantage in data authentication. One outstanding example is *The New York Times*, whose department of Research and Development worked on a tool that ensures that each image that circulates on the net carries embedded contextual information. This not only enriches the reader's experience, but also reduces the possibility of misunderstanding or improper use. In the television field, RTVE, the Spanish public broadcaster, has the capacity to transcribe, catalogue and add metadata to 11,000 h of audio-visual content per year, a significant volume of material that proves essential for corroborating news items using NLP (Natural Language Processing) applications.

Keeping in mind that fake news stories usually involve inflammatory language laden with opinions, automatic learning algorithms can be trained to identify fake news by analysing characteristics such as the language, source, and structure of the content (Shu et al., 2017). But AI can also enable the automatic detection of chatbots; analyse the activity and attributes of profiles, labelling and metadating; and analyse sentiments. With all of the foregoing, it is possible to establish the polarisation of specific content on social media, with the aim of discovering disinformation initiatives that might bias collective perception (Alonso et al., 2021).

Table 4.2 shows a compendium of different platforms that employ automated mechanisms in the fight against disinformation, together with their respective promoters.

Similarly, government bodies, including those with a supranational character, have established strategies and, in collaboration with the academic sector, have supported initiatives aimed at consolidating the experience of different sectors in the fight against this information disorder. Specifically, the European Commission has sponsored EDMO (European Digital Media Observatory) that in its turn coordinates as many as 14 multinational digital media and disinformation observatories. Public policies are also forcing greater involvement and vigilance of data and content by the technological firms. Besides approving the General Data Protection Regulation (EU GDPR) in 2016, in June 2022 Google, Amazon, Meta (Facebook), Microsoft, TikTok, Twitch, X and 30 other signatories committed themselves to boosting their fight against deep fakes, fake accounts and political propaganda in the short term, by voluntarily subscribing to the Code of Practice on Disinformation. This was a precursor of the Digital Services Act (DSA), which came into force on 25 August 2023 and obliges platforms to rapidly eliminate illegal content on Internet.

In conclusion, intelligent networks offer great potential as an instrument for mitigating the spread of misleading information. However, it is essential to recognise that artificial intelligence is still a long way from providing a perfect solution. The experts consider that this advance should focus on the verification and examination of information, as well as content management, and avoid replacing the human element, which is essential in journalism (Beckett & Yaseen, 2023).

Table 4.2 Automation initiatives to reduce disinformation

Initiative	*Medium/ Organisation*	*Country*	*Platform*	*Activity*	*Open use*
Fátima	Aos Fatos	Brazil	WhatsApp + Telegram	Verification	Yes
Chequeabot	Chequeado	Argentina	Web	Video transcription	Yes
FactStream	Duke University	USA	Web + Mobile App	Verification of political events	Yes
Factmata	Factmata	United Kingdom	Web	Identifying and classifying online content	No
FACTS	Full Fact	United Kingdom	Web	Detection and comparison of information	Yes (limited to fact-checkers)
Google Discover	Google Discover	USA	Web	Selection of news items that must meet the policies of Google News	Yes
Caja de herramientas	Maldita.es	Spain	Web	Tool available to the public for carrying out their own fact-checking	Yes
Maldita Chatbot	Maldita.es	Spain	WhatsApp	Verification	Yes
Claimbot	Newtral.es	Spain	WhatsApp	Verification and filtering	Yes
Claimhunter	Newtral.es/ ABC Australia	Spain/ Australia	In-house	Analysis and verification of audio-visual discourse	No
News Tracer	Reuters	United Kingdom	In-house	Spotting and validating real news in real time on X	No
Videofact	University of Drexel	USA	In-house	Detection of falsehoods and video manipulation	No

Source: Elaborated by the authors

In order for intelligent networks to be efficient in reducing disinformation, the following aspects could be considered:

- Developing more advanced AI techniques: It is necessary to develop tools and processes that are capable of greater precision.
- Optimising alliances with communications professionals and fact-checking agencies, as well as with institutions and the users themselves.
- Improving transparency: It is essential to make visible the functioning of the algorithms entrusted with identifying false information. Facilitating this understanding amongst users will encourage greater trust in decisions and the results obtained.

- Making users literate in identifying disinformation, for example, through consciousness-raising campaigns or the inclusion of fact-checking tools on social media.

Finally, it is important to underscore two challenges that are often overlooked in current discussions. In the first place, we cannot overlook the need for journalists who teach the machines to act as journalists. This implies training future professionals in fact-checking and contrasting content to guarantee that the programs can carry out these tasks in an effective way. As a consequence, it is essential to rethink how the journalists of the future are trained in universities and how to provide them with the technical skills required for forging credibility and trust, and contributing to the sustainability of the media system.

The second challenge is to overcome the growing gap between the Global North and the Global South in terms of the resources available to journalistic organisations. Besides the disparity in financial resources, there is a predominance of tools and technologies that are mainly developed in English and that have a limited scope in other languages. It is necessary to make a commitment to inclusive solutions, developing accessible tools and resources for all languages, in order to guarantee balanced and global activities.

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CHAPTER 5

An Imaginary and the Reality of a New Networked Fourth Estate

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The Networked Fourth Estate

In the eighteenth century, journalism joined religion, oligarchy, and labour as a *Fourth Estate*, linking writing, and hence easily shared knowledge, to lawmaking (Carlyle, 1908: 189). Thomas Carlyle summed up its claims to authority in demagogic and economic terms: "Great is Journalism. Is not every Able Editor a Ruler of the World, being a persuader of it; though self-elected, yet sanctioned, by the sale of his Numbers?" (Carlyle, 1930: 955). Thomas Babington Macaulay emphasized expertise; he called newspapers crucial safeguards of "public liberty," authorized by a phalanx of the great and the good and

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legitimized by readers (Macaulay, 1848: 210). Readers were always there as key players, but in consuming roles. The Networked Fourth Estate (NFE) is an expression coined by Yochai Benkler in relation to a Networked Public Sphere (Benkler, 2006, Cap. 7). We resume the concept of an NFE (Sampedro, 2014) to imagine a journalism that seeks to transform the other three estates democratically, acting as a counterpower via an informal platform of media coalitions collaborating with each other and their audiences. Its expanded function could translate public debate and social mobilization into salient, actionable politicals.

The NFE provides a sociotechnical imaginary for the reinvention of journalism in the twenty-first century—a feasible utopia. We must, however, consider its limitations and accept that such changes will take place incrementally, with unavoidable conflicts between the actors who materialize it. For such a process of social and technological innovation is always exposed to contradictions—a utopia that may never be wholly realized. But it fosters initiatives that promote and activate democratic values in the social body, considers digital citizenship as a right, and can (re)create communicative institutions and media practices (Sampedro, 2014, 2016; Sampedro et al., 2015).

The NFE should comprise

> collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology. This definition privileges the word "desirable" because efforts to build new sociotechnical futures are typically grounded in positive visions of social progress. (Jasanoff & Sang-Hyun, 2015: 4)

Jasanoff and Sang-Hyun point out the utopian character of sociotechnical imaginaries—considered "Dreamscapes of Modernity" in the title of their book—and relate them directly to "the Fabrication of Power." Whereas the technological norms that dominate today are marked by citizen demoralization, corporate monopoly, state monitoring, and widespread misinformation (Hendrickson & Galston, 2019), the NFE is a future projection from a technological present that requires generating institutions, collectives, and forms of citizenship *contra* prevailing digital dystopias.

The NFE should be stripped of its present, deliberative function: to nurture public conversation, considered as a social cement and motor of change. We propose reducing its role to that of a counterpower responding to citizen demands and accountability for public and private management alike. This new NFE must leverage cognitive-capitalist workers' technological training and access to data banks. In other words, it will incorporate more active and digitally empowered audiences into the joint production of reportage and public-interest journalism (Sampedro, 2014). It must equally consider the Global South as a model, thereby turning journalism orthodoxy on its head and acknowledging theoretical and practical advances from "new" places, while also bringing to bear a recognition that most people read, write, and survive in

different worlds from a Benkler, a Manning, or a Snowden. And its funding? An Independent Journalist, writing in 1909 for the *American Journal of Sociology*, suggested the following:

> only generous endowment could 'emancipate a great newspaper and enable it to be true to its highest ideals—to be honest in all things, to tell the truth boldly, to eschew sensationalism and vulgarity. And wealthy philanthropists have been urged to establish an 'exemplary,' a model newspaper, just as model libraries, model tenements, model orchestras are established by endowment. (An Independent Journalist, 1909: 322)

The way that South American reporters in imminent, daily danger can do their work is often in concert with foundations, as we shall show.

The motto that currently drives the Fourth Estate has been "transparency for powerful, citizen privacy" (Assange et al., 2012), opposing conventions of the corporate and state internet. If citizens do not invest in that transparency—protecting themselves from monitoring and anonymizing themselves to monitor their representatives—they will lose the ability to intervene autonomously in public life (Sampedro, 2023). The NFE's proposal is to "make investigative journalism a social duty that can be exercised by any citizen with the help of professionals" (Sampedro, 2014). This project therefore recovers the pulse of humanist liberalism, which underlies democratic ideation. But it also allows other forms of radical democracy that avoid the current drift towards illiberal regimes and the co-optation of digital technology by authoritarian populism (Govil & Baishya, 2018).

The Networked Fourth Estate in Hybrid Media Systems

The NFE appeals to an almost-lost world of muckrakers and investigative reporters. In the digital age, it is linked to a literature that understands the digital audience to be "*mediactive*" in the production of news and communication (Gilmore, 2006). The NFE also appeals to *recursive publics* (Kelty, 2008), who not only own the material capital—hardware and software—necessary to communicate; they adapt machines, codes, or algorithms, or create new ones under free and open licences. "A recursive public is a public that is vitally concerned with the material and practical maintenance and modification of the technical, legal, practical, and conceptual means of its own existence as a public; it is a collective independent of other forms of constituted power and is capable of speaking to existing forms of power through the production of actually existing alternatives" (Kelty, 2008:4). A fundamental absence in such prescriptions, however, is a recognition that the vast majority of the world's people lack the means to contribute in such ways, which have been cheerfully designed and ideologized from the comfort of the Global North. We use examples below of Colombian and Ecuadorian reporters operating under conditions of extreme danger in their attempts to elude control and murder by narco-trafficker

corporations, press barons, and officials by using innovative technical means to connect their experience and expertise with readers.

Traditional and digital media have generated "hybrid media systems" (Chadwick, 2017; Mattoni & Ceccobelli, 2018) in which various organizations collaborate and compete with one another (Benkler, 2011: 376). The NFE remains "especially democratic, open, and diverse" due to "the relatively large role that decentralized, non-traditional speakers and journalists can play" (Benkler, 2011: 366). The result is a global communication fabric with unprecedented information capture and processing capabilities.

> The networked entrants, not individually, but as a network of diverse individuals and organizations, will have an agility, scope, and diversity of sources and pathways such that they will, collectively, be able to collect and capture information on a global scale that would be impossible for any single traditional organization to replicate by itself. (Benkler, 2011: 396)

The democratizing potential of the internet depends on its interaction with pre-existing institutions and organizations beyond as well as within the Global North and its engagement with a wide range of practices: professional and amateur, commercial and altruistic, collective and individual. Its materialization should give space to the commons and grant greater roles to public initiative from the poorest societies. Without the latter, and oversight by civil society, it will not be possible to reverse the monopoly position of large technological companies (Marda & Milan, 2018). The NFE must be part of "a transnational civil society" blended with "leak journalism" (Sampedro, 2023: 90).

Citizen Breaches and Collaborative Journalism: Rehearsing the Networked Fourth Estate

Scholarly interest in journalistic innovation has increased substantially in recent decades (Lopezosa et al., 2021). Academic approaches have addressed issues as diverse as the transformation of the labour process, media-to-audience communication channels, and changed business models. Incorporating the political and social dimension of such innovations into these approaches seems critical. Therefore, we pay attention to a series of experiences that reinforce journalism. These experiences vary, but all rely on collaborative logic and a conception of civil society as a key player in greater transparency and accountability in public and corporate life.

The most notable instances are international media consortia and transnational networks of journalists. Although some of these consortia existed before WikiLeaks, it marked a turning point in investigative journalism (Quian, 2013). Disclosures via the platform demonstrated the potential for leak journalism to share publicly relevant information without compromising its sources. At the same time, it opened a new scenario in which different media could collaborate in publishing transnationally (Quian, 2021; Sampedro et al., 2018).

In 2007, WikiLeaks made public images of an attack in Iraq that killed a Reuters photographer and 11 other civilians. Human rights violations carried out in the Afghanistan and Iraq wars were also shown, demonstrating that the US military had committed—and allowed—crimes against civilians. The first WikiLeaks reports were publicized by *The New York Times*, *The Guardian*, *Le Monde*, *Der Spiegel*, and *El País*. That said, journalists' relationships with the hackers were marked by governmental tensions and pressures as well as norms of professional practice (Quian, 2013; Quian & Elías, 2018; Sampedro, 2014). Nevertheless, a model was promoted in which "professional journalists and amateurs mobilized audiences and media who had previously prescribed and competed with each other, but now collaborated" (Sampedro, 2023: 91).

NFE principles were embodied in subsequent transnational media coalitions such as the International Consortium of Investigative Journalists (ICIJ), European Investigative Collaborations (EIC), and the Organized Crime and Corruption Reporting Project (OCCRP), among others. Initiatives have linked to both the private (ICIJ and EIC) and third sectors (OCCRP). This demonstrates that both professional journalism and the most critical and committed citizens understand that collaborative processes are basic means of reinforcing the right to information. This is especially important in the Global South.

More than 290 research journalists from nearly 130 media outlets working in over 100 countries and territories participate in the ICIJ. Some of these media (*The New York Times*, *The Guardian*, *Le Monde*, and *Der Spiegel*) initially collaborated with WikiLeaks. Thanks to this network, they brought such issues to light as elite tax evasion and money laundering (consider the Panama Papers, Paradise Papers, Swiss Leaks, and the FinCEN Files) and combated the corruption and criminal practices of diplomatic personnel (Shadow Diplomats) or human trafficking for labour or sexual exploitation (Trafficking Inc.).

Mediapart (which is owned by its readers), *Politiken, Der Spiegel,* and *infoLibre* are involved in the EIC, "a networked (research) journalism laboratory." It aims to conduct and publish research that shows "how power structures affect European communities." It has disclosed corruption within football (Football Leaks in 2015) and mechanisms for tax evasion and money laundering (Jersey Offshore in 2020). Reports of espionage against European citizens by the United Arab Emirates to identify members of the Muslim Brothers, and corrupt politicians and journalists defending their interests in Brussels and the European media, stand out (Abu Dhabi Secrets, 2023). EIC combines competitive and exclusive logic with collaborative dynamics.

By supporting citizen breaches and collaborative logic, research journalism can focus on social justice and accountability. This is the case with OCCRP, which fights corruption and organized crime. The Rotenberg Files of OCCRP (2023) show how Russian oligarchs close to Putin circumvent sanctions imposed by the European Union (EU) through a web of Western lawyers and bankers. This investigation, supported by the exposure of 50,000 emails from one of the companies involved, suggests that EU sanctions on Russia following the partial occupation of Ukraine in 2022 could have similar effects.

Foundations are key—and it is important not to focus on people from rich, upper-middle class countries as crucibles of innovation. Consider instead Colombia's La Liga Contra el Silencio, an independent alliance of journalists linked to the Fundación para la Libertad de Prensa [Foundation for Press Freedom] (FLIP) http://ligacontraelsilencio.com/; https://flip.org.co/. For example, FLIP estimates that eight million Colombians in 500 municipalities effectively live in "zones of silence," without adequate access to information—or the means of communication to create their own. Just 10 per cent of the population in those areas of Colombia is connected to the internet, where local radio is generally run by and for the military. FLIP's *Cartografías de la Información* [Information Maps] project, which tracks reportage across the country, refers to the "extinction of local journalism."[1] Three Ecuadorian reporters were abducted and murdered in 2018 by the Frente Oliver Sinisterra, on Colombia's south-eastern border. Nineteen journalists from both countries investigated the crime. Forbidden Stories[2] visited the area in search of what happened. The results of these investigations were published simultaneously in newspapers across the globe, from Brazil to Malta, Germany to Ecuador, Spain to the UK, Belgium to Ghana, Switzerland to Italy, France to Senegal, Niger to Argentina, and Portugal to South Korea[3] (Barrios & Miller, 2021). At the same time, digital outlets such as *Minuto30* and *Las2ORILLAS* were founded by Latin American journalists who grew tired of low salaries and limitations placed on their work and sought to collaborate in non-hierarchical ways.[4]

Consortia of research journalists and professional and non-profit volunteers have won some important awards. ICIJ received a Pulitzer Prize in 2017 for the Panama Papers and was nominated again with FinCEN Files in 2021. That same year, ICIJ and the Global Alliance for Tax Justice were nominated for the Nobel Peace Prize thanks to their investigations into illicit capital flows.[5] OCCRP received honorary mention in the Global Shining Light Awards, presented by the Global Investigative Journalism Conference (GIJC), on several occasions, and in 2023 was nominated for the Nobel Peace Prize.[6]

Such recognition highlights the ability of NFE organizations to cover issues of transnational impact collaboratively and affect public opinion and international institutions. The development of digital leak boxes has been critical to such projects. Open-source software such as SecureDrop and GlobaLeaks allows organizations to receive information of public interest from sources anonymously and securely (Quian, 2022: 288).

Other initiatives have emerged that also apply the principles of NFE to boost the right to information. Some projects apply Open Source Intelligence (OSINT) to map and monitor infringements of rights, based on public data. It

[1] See https://flip.org.co/cartografias-informacion/.
[2] See https://forbiddenstories.org/.
[3] See https://forbiddenstories.org/case/deadly-border/.
[4] See https://www.minuto30.com/.; https://www.las2orillas.co/.
[5] See https://www.icij.org/tags/awards/.
[6] See https://www.occrp.org/en/component/tags/tag/awards.

is being implemented by initiatives such as Forensic Architecture, Bellingcat, and the Syrian Archive to document and map social events and processes independently of official and corporate sources. Using fragmented information and data, often generated by witnesses, they reconstruct facts and uncover previously hidden realities through data analysis, influencing journalistic work, and judicial proceedings in international courts (Goo, 2021).

NFE initiatives linked to civil society and data activism are examples of "distributed networks of activist and technocivic communities: people with digital knowledge and a civic ethic that lead them to participate in public debate using their own resources" (Sampedro, 2023: 91). People are acting as information filterers to media, institutions, and social organizations within technocitizen groups, equipped with a sense of agency and strong social commitment. They deal with the most troubling logic of corporate digital communication today: monopolistic concentration, propagandistic and commoditised misinformation, algorithmic monitoring, and manipulation, with a consequent loss of user privacy, as reported through citizen breaches such as Christopher Wylie (CA).

The identities and socio-political traits of filterers may be changing. First, because the disclosures went from affecting the state to the corporate world. And second, due to a growing loss of collective engagement by filterers in favour of individualism and standardized dynamics. We have analysed some relevant cases, in order to understand this double evolution.

The Networked Fourth Estate Journey

Julian Assange, Chelsea Manning, and Edward Snowden represent the democratizing potential of the NFE for hackers with powerful connections in the Global North (Quian, 2022: 207–276), and the culmination of an emancipatory technopolitical process that dates back to the 1970s and the beginnings of the Californian ideology characteristic of contemporary cybertarianism (Barbrook & Cameron, 1996). A review of the current NFE and the profile of whistleblowers and hacktivists who have materialized it with journalistic help also illustrates the evolution of the internet and digital technologies as social influences.

The self-described cypherpunks (Assange et al., 2012; Quian, 2022: 227–241) updated and realized the dystopic cyberpunk imagination of the 1970s. Developing encryption at the end of the twentieth and in the twenty-first centuries, they launched WikiLeaks as a digital TAZ—Temporary Autonomous Zone—(Bey, 1991a, b). Cryptographic protection of digital dissent eventually resulted in a "free community on the network," WikiLeaks, which inspired Yochai Benkler to develop the idea of the NFE. In its early days, it appealed to "collective intelligence" (Lévy, 1994; Shirky, 2011) as a common or joint good arising from the issuance and exchange of cognitive flows. Authors who appeal to the notion of a "general intellect" (Mason, 2015) maintain critical positions that are close to our proposal. Based on this perspective, Big Tech has privatized the public attention, communications, and data

generated by citizens. The process refers to the fencing (enclosure) of communal lands to create private plots per the beginning of agricultural capitalism (Couldry & Mejías, 2019).

The turning point in digital fencing was the implementation of Web 2.0 as a model to monetize the network subject to advertising purposes and commercial objectives. In that context, companies such as Facebook and YouTube emerged that extended a profitable cybertarian rhetoric. They co-opted that speech to present "their" internet as a space favourable to horizontal participation and citizen intervention. Assange and his colleagues took it seriously and founded WikiLeaks. Faced with Facebook, they represented the opposite view in terms of transparency: if Facebook accumulated data from its users and trafficked with them, WikiLeaks published previously secret information about governments (whether democratic or authoritarian) and large companies, to expose their irregular practices and unethical behaviours (Quian, 2013, 2021). This contrast illustrates the complex profile of hackers in general (Quian, 2022) and cryptopunks in particular able to work for the security of corporations and public administrations while forcing their transparency. In this libertarian environment (anarchist or anarcocapitalist) of cryptopunks, Assange stands out because he defended individual autonomy and private initiative as bases of material autonomy. But it also understands information as a common good and counterpower, supporting market regulation and the activism of organized civil society (Sampedro, 2014, p. 136).

In 2010, WikiLeaks gained international fame (Quian & Elías, 2018) thanks to the leaks of former soldier Manning (Bradley at the time) in what were called the *Afghanistan War Journals* and *Iraq War Records*. Published in key corporate media with international reach, the filtered documents revealed the murder of civilians and the systematic use of torture by the United States, among other human rights violations. After 3 years in jail and a dishonourable discharge from the military, Manning was sentenced to 35 years in prison in 2013. Despite being pardoned by Obama in 2017, 2 years later she returned to prison for refusing to testify against Assange. Since being released in 2021, she continues to call for privacy and anonymity on the internet (Del Castillo, 2021). Manning's journey embodies a civic ethics and commitment that should characterize whistleblowers/hacktivists following the NFE model. In a deeper sense, she proposes that future digital generations take over and empower themselves via computing and genetics (Sampedro, 2014).

In 2013, Snowden disclosed the PRISM espionage program, inter alia. PRISM was used by the US government to record video calls, chats, emails, search histories, and so on throughout the world. Snowden did not give the material to WikiLeaks, even though the organization accompanied him during his exile. He chose a documentarist, Laura Poitras, and journalists from *The Guardian* and *The Washington Post* to publish the documents. Military-trained and a self-declared conservative, Snowden demonstrates that digital activism does not depend on a specific political ideology. Despite his differences from Assange and Manning, Snowden declares itself a strong advocate for the right

to privacy and freedom of expression. He was pursued by the US and exiled in Russia in 2013 (Snowden, 2019). Those events sparked a global debate around state surveillance on the network, exposing the US government's collusion with Microsoft, Yahoo, Google, Facebook, and Apple, among other megacorporations, which were participating in PRISM (Bauman et al., 2014). But the story was insufficient to amend the degradation of the digital environment in terms of civil liberties versus technological, geostrategic, and cultural imperialism (Percy-Campbell, 2016).

Four years after Snowden's revelations, another NSA breach disclosed that the internet was a site for competing national and imperialist projects. Certain countries, such as Russia, took advantage of the lack of regulation of digital platforms to influence other countries' electoral processes. Reality Winner, an employee of a company hired by the NSA, gave *The Intercept* a report on Russian interference in the 2016 US presidential election, when fraudulent bots supported Donald J. Trump (Satter, 2023). Winner was subsequently jailed, which points to the complexity of maintaining a robust NFE while professional journalists lack the technical knowledge necessary to safeguard filterers.

State and capital colonization of the internet was reflected in the profile of new filterers. In 2018, Wylie, a former CA employee, reported that the election marketing company had taken data that eighty-seven million Facebook users had provided to Mark Zuckerberg's company. Leveraging a security gap, CA created psychobiographic profiles segmented by political ideology that they were used in the pro-Brexit and Trump campaigns. These disclosures, along with Winner's on Russiagate, demonstrated that beyond the effectiveness and real impact of these strategies, the digital data industry boasted that it could influence elections. CA's customers confirmed the shift of technopolitics towards regressive, authoritarian projects. Reactionary parties, movements, and leaders advanced a common agenda that favoured (ultra)right populism.

Wylie's case is particularly relevant. First, it pioneered digital corporate breaches. Second, the CA disclosures were a turning point in today's technological backlash. Utopic rhetoric over networks that are supposed to promote equality, freedom, and democracy led to more critical visions. A dystopic horizon emerged. Digital moguls, with Facebook at the forefront, were revealed as threats to democracy. Manning and Assange with WikiLeaks, Snowden with the NSA, and Winner with Russiagate disclosed the role of new technologies in geostrategic conflicts and Wylie CA's influence over domestic electoral processes and international alliances. The latter saw Facebook's CEO summoned to the US Congress and drove the company to rebrand itself as Meta.

Two other breaches affected Facebook. In 2020, Sophia Zhang, data analyst on the "Fake Engagement" team, revealed that governments around the world were using the platform to manipulate their populations, simulating nonexistent popular support, such as in Honduras. In other countries, such as Azerbaijan, it harassed opposition parties (Wong, 2021). A year later, Frances Haugen, of the "Civic Engagement" department, publicized the harmful

effects of Facebook on individual, psychological levels in *The Wall Street Journal* (known as Facebook Files, 2021) and then to a consortium of 17 media outlets (Facebook Papers, 2021). The information provided by Haugen manifested numerous Facebook security flaws and misconduct, including exemption from certain profiles of the rules of use and moderation and Instagram's (also owned by Facebook) harmful effects on youth self-esteem and suicide. The constant changes of misinformation and viralizing algorithms, and the promotion of lies about COVID-19 vaccines, plus use of the platform for human and drug trafficking, have become notorious. The impact of these disclosures, and the decline in youthful participants, can be quantified in the US$6 billion market capitalization Facebook lost 1 year after Haugen's whistleblowing.

An anti-ethics filter profile required by the NFE has led the most recent impact case. In April 2023, US soldier Jack Teixeira leaked documents relating to the Ukrainian War and international alliances. Unlike his predecessors, Teixeira did not use any media for the filtration but directly published the documents on a Discord platform server, disseminated on Twitter, Telegram, and even in the 4chan /pol/ thread, known as a tool of the extreme right. Far from a commitment to informing citizens, Teixeira's goal seemed to be impressing other chat members. He is a weapons enthusiast and active member in far-right online environments (Harris & Oakford, 2023). That allows us to reflect on the future of the NFE in an increasingly degraded cybertarian fantasy.

Conclusions

The initial model of NFE emphasized "individual action in nonmarket relations" (Benkler, 2006: 16). It did not consider the role of the state or prioritize the collective action of social organizations that democratize networks. Nor did it engage the Global South as a model, or even a problem. In more recent writings, Benkler (2020) presents NFE as an antidote to the "network propaganda system": "[W]hen the professional, commercial, and nonprofit think tanks [...] all functioned to reinforce the disinformation campaigns, it was then that the networked public sphere turned into a networked propaganda system" (Benkler et al., 2018: 347–348).

The NEF also failed to address questions asked across journalism about how stories are told—something crucial in an era of digital technology. The prevailing orthodoxy has long seen reporters obeying generic rules of topic, prose, and structure, as if the world came to them in unvarnished form, hence the "Inverted Pyramid" (Walker et al., 2009). It prioritizes what is deemed "most newsworthy" in terms of those involved, what happened when, where, why, and how; sloping down next to "important details"; and concluding with background information. This model has been criticized by feminists, and other critics concerned that it seeks the approval of fellow-journalists rather than readers and audiences, and should be replaced by linear narrative, which much research shows is preferred by citizens (Walker et al., 2009; Kulkarni et al.,

2023). In addition, the urgent tasks of movement journalism do not fit the pyramidal model (Simonton, 2017).

The pre-eminence of commercial and promotional practices in the digital sphere generates biases in information and a hybrid ecosystem with commercial television that encourages lying (Sampedro, 2023). Some of the cases we have discussed try to counter those trends. They share the idea of communication as a common good and exploit the collaborative potential of digital scenarios, reinforcing the press' role as a fourth power. The NFE is profiled as a distributed counterpower impossible without citizens.

ICIJ, EIC, FLIP, and OCCRP are examples of transnational media alliances based on citizen activism. They show that both private initiative and the third sector can drive collaborative projects on a global scale that favour the right to information and elite transparency and accountability. They began with WikiLeaks' strong collective profile, which reported the wars and diplomacy of North American neo-Imperialism and Snowden, at the service of the NSA, sharing global spying and surveillance.

In the next phase, the filter profile was of corporate employees who report their bad practices without being connected to activist groups, reducing the hacker identity. A more recent case points to a profile of more individualistic and exhibitor filterers, lacking the institutional impact and public service of breaches. The conflicting tensions and dynamics set forth herein will be maintained: they may mean the generalization of citizen leaks between citizens or trivialization and consequent deactivation of their impact. The result will determine the entity and future consistency of NFE.

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CHAPTER 6

The Utilisation of News in the Fourth Industrial Revolution

Laura Solito and Carlo Sorrentino

Introduction

For several decades, the channels through which we obtain news have been changing. The number of news sources has grown considerably and the types of news available have expanded. Yet, it is only with the advent of the digital environment that the way we use information has been completely transformed. We have seen an explosion in forms of and approaches to news that has radically deconstructed the ways in which the content is accessed. Indeed, until the advent of digital, we all used specific defined 'packages' of information: the 48 pages of the daily or weekly newspaper, the 5 min of the radio news or the 30 min of the television news, and the 2 h of a specific talk show.

In the digital environment, on the other hand, we enjoy individual, timely content that arrives in a constant stream, with all the innumerable updates, always different from 1 min to the next. And this is content that reaches us even without any specific action on our part. A continuous, vertical flow. News stories come one at a time, not all at once. We do the synthesising ourselves, quickly scrolling down the screen and lingering on the keywords and content that really draw us in (if anything), thanks to the skilful imprinting through which the news sources try to capture our attention. Essentially, almost without realising it, we are performing a journalistic task—selecting content—on the basis of a series of stimuli that can be more or less clearly provided to us or

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through guidance by algorithms that detect our consumption habits (Gillespie, 2014, 2018). But we also do this completely freely, intermittently switching our attention.

Although—as we well know—there are no passive forms of utilisation, because in every communicative act the person receiving the news activates cognitive processes to select a specific degree of attention and perception, we could define this process established by the digital environment as productive utilisation, because it requires a more complex cognitive mobilisation.

First, more and more frequently our proactive action consists of querying search engines to obtain news about a certain fact, social phenomenon, or subject (Thorson, 2008; Meijer & Kormelink, 2015).

Not only do we receive news in a continuous flow, but when we are prompted by a doubt, a curiosity, or a need for information, we immediately and easily search for that information. This mode of consultation has led to consequent adaptations in news services, where experts in Search Engine Optimisation (SEO) are asked to determine the demand from the user for information on a specific event as accurately as possible and to tailor the information in the manner that best responds to that demand. It is not enough for SEO to guess what topics or facts might be of interest to us—it must also predict the keywords we will use to ask for information about that fact.

So, the configuration of news is completely changing. Citizens receiving information are in fact called upon to participate in both the gathering of information and in the selection of the desired information from among the countless news items they constantly receive on their devices (Meraz & Papacharissi, 2016).

At the same time, journalists are able to perform their work through access to constant information about when their public is interested, or they can engage the audience in collaborative efforts. Exchanges of dialogue between those issuing and those receiving information are becoming more frequent.

This changed process reflects the purely relational nature of news (Rosen, 2006). But this also tallies with Carlson and Lewis's (2015) observation on how the digital environment has taken away journalists' exclusive control of newsworthiness, transforming their relationship with the public into something more in the realm of co-participation.

Of course, the news packages do not disappear, because when we want to learn more about a news, we often land on a site that is specifically package. However, the main packages in which we place the news we receive have become our social network. These packages are quite different from the classic newspapers or radio and television titles because they are set up directly by us, sometimes without us even realising it. Algorithmic mediation plays a central role in the definition and organisation of these packages, characterised by what has been termed mass customisation and generalised individualisation (Esposito, 2022), as information is profiled on the basis of the context in which the person receiving it is situated or the browsing behaviour detected by the algorithms (Hawalah & Fasli, 2014; Xiao et al., 2020).

The prediction made in the 1980s by Negroponte (1987), who spoke of my media, a personalised means of communication in which everyone puts what they want, has been realised. However, Negroponte did not foresee that such information would come to us through platforms of interactions with a virtually infinite variety of contacts, such as what Facebook incorrectly calls friends and other social network more generically refer to as followers. This represents a considerable difference, because it mixes all the various kinds of information received: from the more strictly service-related to intimate conversations with friends and relatives, from consumer offers made through the most diverse forms of marketing to those relating to work (Papacharissi, 2015).

The Complex Banality of the Consumption of Information

In short, news literally 'comes at us'. Management of this huge volume of data has a number of important consequences.

First of all, news are trivialised specifically because of the ease with which it can be found and consulted.

Second, as happens to every good when it is in plentiful supply, information are becoming devalued. We have so much information available for free that it becomes more difficult to decide to spend money on it.

Information is becoming like the air we breathe. It is all around us, we are immersed in it, and, therefore, we do not understand why we should pay for it. And just like the air we breathe, news can be polluted. So much information is circulating on all subjects, from the most disparate sources, in formats where it is often difficult to distinguish facts from opinions, and it is therefore particularly difficult to distinguish the most reliable from the others.

As is always the case, overload produces news clutter, which makes it more difficult to navigate. It is this clutter that has generated certain phenomena that have been much discussed in recent years, such as fake news—news that is wholly or partially false—or post-truth, namely the prevalence of feelings and emotions over actual fact-checking.

If we receive dozens and dozens of representations of a single fact, it is very likely that the emphases will differ, often making it difficult to see which is the best news received.

Abundance and ease of access are driving a two-fold devaluation of news: of its commercial value—because of the consequent dominance of free news sources—but also of its relevance, because people often doubt the veracity of the information received. This creates a risk that news will predominantly be seen as a kind of background noise from which it is difficult to identify truly relevant consequences for the public interest. This leads to a substantial trivialisation of the act of consuming news, which is often not even perceived as such, given its immediacy, and this could potentially result in a superficial analysis and a lack of reflection. News products appear to be a commodity that is at our

disposal at all times of the day and night. However, this can lead us into a spiral of progressive irrelevance, produced by the combined effect of the free and immediate nature of our information. Moreover, this is evinced by the continuing loss of credibility of journalism and of trust in the professionals who provide information. The Reuters Institute's, 2023 Digital News Report shows a drop in trust of a further 2% compared to the previous year, confirming the reversal of the slight improvement seen during the years of the pandemic.

However, it is precisely the pervasiveness of news and the increasing complexity of the ways in which it is consumed that make it appropriate to take a closer look at how we consume information and to ask what the public does with that information.

The degree of interest in news has always varied from one individual to the next. It is possible to construct a relevance scale consisting of three levels.

There is a first level, consisting of news for which we are content to acquire basic, superficial information.

Second-level , on the other hand, is information that is considered interesting, but without triggering an actual desire to learn more. If need be, in order to complete our knowledge about this type of news, we rely on quick verifications or, even more frequently, we ask that vast horde of acquaintances, friends, relatives, and work colleagues with whom we all negotiate the meanings of the news to which we are exposed through our daily conversations. Moreover, as early as the 1950s, Katz and Lazarsfeld (1955) spoke of opinion leaders, namely those individuals who were considered to be particularly well-informed mouthpieces on certain subject areas and were therefore questioned by their own network of contacts. If we wished to better understand the national political picture, we would ask those who showed a particular interest in politics, preferring those with similar political ideas. To get advice about a trip or to choose a film to see at the cinema, we turned to those we considered reliable in those specific subject areas.

Finally, there is the third-level, the news considered most important, for which we are likely to be willing to spend more time expanding our understanding.

Obviously, these different levels of interest have always existed. However, the news produced by professionals and organised into an overall package—the 48 pages of a daily newspaper rather than a half-hour news broadcast—had a relevance that was directly proportional to the prominence given to each item in terms of the space and time devoted to it. In fact, the hierarchisation of news stories carried out by journalists has always made it possible to understand the importance of a piece of news based on these indicators, allowing us to grasp the degree of relevance, even if it is then left to the individual user to decide whether to explore it more fully.

With digital news, on the other hand, in the first instance everyone is alone in assimilating each news item and must decide what relevance to assign to each. This is a decision that is also based on other existing variables, such as the

contingent availability of time or an individual's propensity to pay for more precise and in-depth information.

Until the advent of the digital environment, the act of consumption consisted of two distinct moments:

1. The deliberate act of purchase, in the case of print media, or of tuning in, in the case of radio and television, which implied a choice between many possible news offers.
2. The actual utilisation, which could be more intense, more selective, depending on the modalities chosen by each individual.[1]

We used to enjoy something defined, self-contained. Even if we made drastic selections, these choices were made based on an news universe demarcated by the available package.

The circumscribed scope of news was also favoured by the habitual nature of our choice of newspapers, given that information is traditionally one of the most habit-based forms of consumption.[2]

While these characteristics remain in the print media and in radio and television news sources, the news consumed through the digital environment appears much more jagged and fragmented. There does remain a certain degree of decision-making tension when each of us chooses which newsletters to subscribe to or which titles to request notifications from. But then, in everyday reality, we select much more randomly, no longer with respect to a single package but rather in terms of a much more varied offer. The possibility of using search engines to identify the most interesting breaking news allows greater room to choose, although it produces results conditioned by consumption habits detected with increasing precision by algorithms. This last point is particularly widely debated among scholars, who are split between those who believe that the digital environment fosters serendipity (Vaccari & Valeriani, 2021), namely the possibility of arriving at information randomly, hopping from site to site, and those who, on the other hand, emphasise how we are locked in information bubbles (Sunstein, 2001; Pariser, 2011), limiting a pool of information that tends to be potentially infinite.

Ultimately, a more dialogue-based pattern of consumption emerges, not only because of the increased choice but also because we interact with a number of different subjects. For years now, newsrooms have been acquiring data on how long we dwell on a specific news item, which successive navigation pathway resulted in the acquisition of that news item, and so on. This is news through which journalists 'dialogue' because they decide what to investigate

[1] Not by chance, supply traditionally increased at weekends, when it was assumed that the audience had more time available. An example of this—especially in the Anglo-Saxon world—is the very richly packed Sunday supplements of newspapers.

[2] Although it has always been said that in order to have more complete information, the audience should differentiate its information sources; in fact in this field, consumption habits are more marked than in other product areas.

and how to do so on the basis of the data in their possession. Other times, however, the interaction is conscious: when we comment on the news, addressing the source—using a simple like or arguing the degree of agreement or disagreement with the information received—or circulating the article read or the video viewed among our contacts, if necessary, making changes or formulating simple personal judgements.

In reality, this dialogue takes place with many other possible contacts: from those mentioned above, to whom we bring the article or service that has interested us, to the many other sources that we access—thanks to the intrinsically interactive nature of the network, with its links that refer us to more in-depth and specific news—and to the possibility of tracing the source of the information, for example by linking to the institutional sites of the mayor of our city or the Prime Minister or the coach of our favourite team.

It can be said that each of us does not simply receive news but rather becomes an interactive node that dialogues with reference worlds, which become more or less established over time, but which could potentially change at any time.

These characteristics assumed by consumption processes require the acquisition of appropriate skills, through a process of digital literacy, and thus a clear understanding of how the digital environment works and what advantages it provides, but also the tasks it requires of us so that we can avoid falling prey to agents that are very often interested simply in achieving their own gain. But then, and more specifically if we are talking about news, we need an in-depth knowledge of the production processes through which facts are transformed into news and of the logic processes that lead us to deal with certain facts rather than others, in certain ways rather than others.

For all these reasons, we define the consumption of news using an oxymoron: trivial complexity. In fact, a news consumer becomes a sort of bricoleur who must have the resources—cognitive, time, willingness—to make a complex series of micro-decisions that lead him or her to assess the degree of commitment he or she is willing to give to a piece of news. But to carry out this task, that individual must acquire journalistic skills: to assess the reliability of a source, the relevance and positioning of the various social actors involved in the event, the substance of an argument. We must all become our own gatekeepers.

Of course, we cannot expect to know how to do this like journalists and to be able to do so. We could say that we need to develop a degree of gatekeeping tension, because when we receive news directly on our devices from the most disparate sources, we should know the basic principles in order to verify the reliability of what we have received (Singer, 2014; Singer et al., 2011; Tandoc, 2014; Tandoc & Vos, 2016).

A New Pact With Public

The profound transformations described above in how news is used require that a new pact be established between journalists and its public.

Traditionally, the information-delivery pact has long rested on three main characteristics of journalistic work: the selection of news, the fundamental phase of verifying its reliability, and the subsequent attribution of relevance through news hierarchy.

As we have just seen, the new ways in which news is being used postulate participation by the person receiving that information in the phases covering selection and attribution of relevance (Hermida, 2010, 2020; Heinderyckx, 2015; Anderson & De Maeyer, 2015; Ananny, 2016; Bruns, 2018; Belair-Gagnon, 2019). Journalists must be aware of this inescapable task-sharing and must accept it through more assiduous dialogue with the audience.

But it is on the verification process that we now want to focus our attention, to explore the equally significant transformations that can be identified due to the expansion of the newsworthy, the progressive acceleration of the already swift dissemination of news, and the more circular nature of the information process.

By the expansion of the newsworthy, we mean both the realisation that journalists is dealing with events, social phenomena, and issues that were previously neglected, which further promotes the fragmentation of audiences, and the evolution of the concept of news itself, which becomes mixed—sometimes ambiguously—with commercial or service information, but which circulates in forms very similar to news, making it difficult to distinguish.

In terms of the concept of acceleration, both Ericksen's (2001) very effective expression, the 'tyranny of the moment', and Rosa's reflections (2015, 2022) on constant perception of the scarcity of time in our society, accentuated by an increased readiness to be interrupted in order to respond to the continuous stimuli of the digital environment through notifications that have now become the punctuation marks of our everyday life, seem particularly apt to describe what is happening in the journalistic field. A clear confirmation of this acceleration can be seen in the dazzling succession of news stories and the consequent reduction in the news cycle.

Finally, the circular nature of the news process refers to the possibility of reaction available to each person receiving information, specifically because of the accelerated spread of news. Everyone can respond in real time, including those directly involved in the news. The observation that the function of journalism is to transport content from a source to a public needs to be rethought and reformulated: today, rather, journalism is part of a dialogue with sources and audiences that is unfolding each moment.

The simultaneous expansion of what is newsworthy and the contraction of the time available to package news make verification more difficult.

This difficulty is at the heart of the crisis of journalism. This factor is crucial because it has produced quite a few mistakes over the past few years, some of them glaring, which have also been made by prestigious newspapers and journalists, and because it undermines the principles that support journalism, such as completeness of news and objectivity.

The meaning of completeness of news has always been controversial. The most effective response is that this means achieving full significance of the news by the deadline set. In other words, a journalist must acquire information that can provide a clear and comprehensive picture of what is being reported within the time he or she has available to make the corresponding report. The elimination of deadlines produced by the digital environment, which makes all news up-to-date at all times, has to a large extent removed substance from the value of completeness. All news has potentially become developing news, and is thus always in flux. The news has evolved from being a closed story to an open, always updatable process. Not only that, but the hypertext logic inherent in the digital environment means that journalistic work is always amendable, thanks to cross-references and links that make it possible to go infinitely deeper and continuously add information to what has already been published.

As far as objectivity is concerned, this has been defined as a strategic ritual (Tuchman, 1978; Schudson, 1978). Behind this phrase is an awareness of how journalists needed operational procedures to provide reassurance in respect of both the legitimate interests of the source and the public's demand for truthful news. For this reason, objectivity in journalistic practice has ceased to be merely a value to strive for and has also become a practice guaranteed by the observance of precise behaviours: checking the reliability of the source, checking through the consultation of several sources, identifying a minimum number of sources to be used for the news to be considered reliable.

As we can easily understand, these processes do certainly require knowledge of the field under investigation, but above all they require time. And this is precisely what is always lacking. This situation has resulted in the frequent habit, driven also by the immediacy of digital media, of publishing the news and only verifying it after it has become public knowledge.

The dramatic events of the last 2 years may be particularly illustrative in this respect. We are referring to the war in Ukraine and the renewal of the Israeli-Palestinian conflict.

In the past, wars were characterised by the absence of news, which was also difficult to obtain because all parties tended to conceal what was happening in order to avoid exposure. The subsequently mythologised figure of the war correspondent was born precisely because of this difficulty. Persuading someone to risk life and limb on a dangerous battlefield made it possible to obtain first-hand news. Today, however, the opposite situation exists. There is too much information coming in, and even the best equipped desks cannot handle it and, most importantly, are unable to verify the degree of reliability of the sources, which are often not even indicated or easily identifiable. A good example of this is the case of the destruction in late October 2023 of one of Gaza's hospitals, which led *The New York Times* to apologise to its readers for the inaccurate news published, highlighting the increasing difficulties journalists were facing in their routine fact-checking activities.

The dramatic reduction in the time available for checking is compounded by the growing number of social actors interested in making their views visible on

specific issues, social phenomena, and events. For decades now, sources have been evolving. These sources have equipped themselves, first, with professionals tasked with producing news about the institutions they represent, and then with channels (websites, social profiles, etc.) through which they can reach public opinion directly.

The growth in the pool of social actors interested in building their own newsworthiness, and thus becoming sources for journalists to cover, along with the competition represented by the communicative output produced by such actors, constitutes additional pitfalls that journalism must take into account.

The reaction of journalists is reflected by the identification of a series of defensive strategies.

First, the broadening of the topics covered has often favoured coverage of less divisive subjects, which present less controversy and, therefore, avert the danger of publishing news that could prove risky if it is not verified. This is also the reason why the number of soft news items has increased, supported by the fact that such stories provide an easier grip on a wider public. Often, this same approach has produced more blurred boundaries than commercial communications, through the creation of services bordering on complicity with major advertising users.

Another avenue chosen to limit the difficulties associated with fact-checking was to broaden the use of opinion pieces, which are clearly not subject to any need to verify the reliability of the news published. An even more effective strategy has appeared to be handing the 'microphone' over to third parties. In such cases, journalists cannot be held responsible for what is said. For this reason, there has been a significant increase in the space allocated for interviews, both with relevant figures in the field covered and with ordinary people, which also allows the newspaper to feel proximity to its public. This strategy also includes the use of the double interview, in which very different thoughts and positions are put side by side, allowing the news source to appear more impartial.

These mechanisms are a kind of partial means of addressing the difficulty in fact-checking that, as we have already seen, has not prevented a loss of confidence in journalism and journalists.

The fact-checking difficulties described and the diminishing trust in journalism are direct consequences of an information overload that makes everything redundant and confusing. However, mediation by journalists is increasingly necessary precisely because we need to unravel the tangled skein of information clutter. But such mediation must take place on the basis of new assumptions. Obviously, it is neither possible nor appropriate for journalism to deviate from its traditional principles of objectivity and completeness. However, in view of the considerations stated above, it will be necessary to make the limitations highlighted more explicit (Muñoz-Torres, 2012; Schudson, 2023). Journalistic output is less and less closed content, placed inside equally closed packages. Rather, these stories are presented as open texts, in the process of developing, which we often come across by chance, and the public accesses and uses them

in a way that is extremely fluid. On the other hand, it is precisely this fluidity that produces a greater fragmentation of the audience, which is now scattered among the thousands of offers that the network places alongside the mainstream titles.

As already noted, journalism no longer has total control over the news process (Carlson & Lewis, 2015). The 'facts' are assembled, distributed, and utilised thanks to a network of social actors linked together in ways that still rely on the mediation of journalism but then expand to include other references (Deuze & Witschge, 2020).

More fragmented distribution processes and increasingly segmented audiences adversely impact the effectiveness of sharing, making news more unstable and exposed to constant challenge. Therefore, stabilisation of meaning becomes difficult to achieve, because the negotiation of such meanings changes in form and substance, involving more actors. The unified sense of the message is lost and is now swallowed up in a crowded communication environment. This becomes cultural chaos, in the words of McNair (2006), in which the times required for production, distribution, and utilisation of information merge into a concept of immediacy with no spatial boundaries (Thompson, 1995). Everyone is constantly receiving information from mainstream sources, but also from other sources that are increasingly professionally equipped to handle their own communication needs, crowding the information ecosystem with voices that are attractive and persuasive in different ways (Mellado, 2021).

The term 'chaos' would seem to be appropriate insofar as it contrasts with the concept of 'control', which journalists now share with all those who enter the communication arena—as already described—no longer simply in the role of consumers but also as producers.

This rich but confusing flow of news redefines the journalistic function, which is transformed from a 'decision-maker of last resort' for what is considered newsworthy into a relationship-based task, namely the ability to unite the thousands of strands of this flow into a coherent whole, involving the various actors who co-participate in creating the new information pact (Robbins & Wheatley, 2021). The evolution of this relationship obviously also affects journalists' perceptions of their role (Vos, 2023), albeit with varying degrees of responsiveness depending on their professional positions. In fact, it is those who work in the digital field who best grasp the new scope of the profession (Sorrentino & Splendore, 2022).

However, this involvement struggles to transform into real inclusion, both because in continues to be more advantageous to treat the public as consumers to be satisfied and because it's difficult to identify paths that manage to acquire the many skills present in society and translate them into effective practices (Hermida & Turman, 2008).

Journalism is gradually losing its monopoly in the production and dissemination of news (Vos & Heinderyckx, 2015), and thus the elements that have long been the basis of its authority and the acceptance of the legitimacy of its modus operandi. If we insist on characterising journalism as such a monopoly,

we run the risk of exacerbating distrust on the part of citizens. After all, as Carlson and Lewis (2015) suggest, journalism has always already been a varied cultural practice embedded within a complicated social landscape and destined for constant change. Therefore, it seems normal and almost a foregone conclusion to ask this industry to open itself up to a profound transformation, in order to respond to the demands arising from the enormous transformations produced by the digital environment.

The new pact between journalists and the public can be based on better dialogue and greater inclusion, to foster the acquisition of skills and then recognise them as valuable for a relationship that enriches the quality of news. This dialogue must be based on substantially transparent procedures, with journalists being called to account for their work and the principles by which it is underpinned. It is no longer possible to ask for carte blanche to decide what is important and interesting to know, as in fact happened in the past.

The pact between journalists and the public must also be based on the ability of journalistic mediation to shed light on events, in contrast to the current opacity created by information overload, and to frame the social phenomena described by contextualising those events, with a view to linking facts together, analysing their actual relevance, and providing keys to interpret them so that the audience can understand their true significance.

The increasingly frequent attempts to find new pathways to journalism where it is not limited to exposing the facts but is also focused on pointing out possible solutions—solution journalism and constructive journalism—and taking more time to delve into the causes of events—slow journalism—seem to be moving very much in this direction, working to help journalism regain a role of social responsibility but through mechanisms that are able to address the heterogeneity and complexity of contemporary societies (Witschge & Sabbah, 2023). This should be a pact capable of strengthening its relational dimension through the establishment of a collaborative dialogue with the multiple actors that inhabit the public space (Jones et al., 2022; Zelizer et al., 2022), which allows journalists to reinterpret news values in the light of a more structured interpretative framework for the reality they report (Parks, 2020; Rosa, 2022) and, at the same time, provides what the public continues to demand of journalism: to learn new things; to gain social recognition; above all, to better understand the society in which people live (Costera-Meijer, 2021a, 2021b). The journalism "it does not show us where we're going, let alone where we should go, but it helps us to know where we are" (Schudson, 2023, 100).

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PART II

Innovating Innovation to Satisfy Increasingly Digital Audiences

CHAPTER 7

Journalism and the Metaverse: Opportunities and Challenges for News Production and Consumption

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An Introduction: Transformations in Digital Journalism and the Arrival of the Metaverse

Digital journalism, which in the second decade of the millennium has achieved the scientific recognition of a "consolidated reality," not only in the professional sphere but also in the academic one (Salaverría, 2019), has undergone a rapid and intense transformation, with different stages marked by the evolution of the technological environment; the prevailing social, political, and economic context since the 2008 financial crisis; and renewed uses and consumption of information.

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The multiple intersections of technology with journalistic practice have not only fueled the emergence of renewed professional profiles but, in the face of the undeniable irreversible technological matrix, have encouraged the vast majority of journalism professionals to embark on an adaptation process that has entailed the acquisition of competencies and skills to confront current challenges (López-García et al., 2017). Today's journalists, better prepared in the technological dimension, have fostered a dialogue between journalists and technologists that has established itself as an "advisable model" in many newsrooms, both in legacy and in digital-native media.

After the latest transformations, current digital journalism, although it encompasses more than technology (Zelizer, 2019), has accepted that "high technology" sets the sign of the digital era (López-García & Vizoso, 2021). In this regard, it seeks to ensure a stable supply of public interest information that meets the needs of citizens in democratic societies. This implies the defense of good professional practices and the rejection of pressures from management and commercial departments (Henderson & Cremedas, 2017), as well as the search for suitable business models that can revitalize the media industry (Medina-Laverón et al., 2021) and provide alternatives for digital-native media that emerge in the media ecosystem.

Quality news and good journalism are essential for the proper functioning of contemporary democratic societies, constituting a dynamic and evolving construct, but on which there is significant consensus among academics and information consumers/users (Bachmann et al., 2022). Hence, the need to uphold, in these times of "high-tech journalism" (Pérez-Seijo & Vicente, 2022), the banner of journalistic quality (Palau-Sampaio et al., 2023) and the adherence to the best professional practices.

In the last 5 years, in the context of changes and transformations, two of these high technologies have had a special impact and development in the field of digital journalism: extended reality—encompassing augmented, virtual, and mixed realities—and artificial intelligence. Both have opened new dimensions for digital journalism while also reopening old professional debates, especially in the realm of ethics (García-Avilés, 2014; Ramirez, 2022) and principles (Cetina-Presuel & Gutiérrez-Atala, 2022; Franklin, 2013; Shapiro & Rogers, 2017). They have also sparked hope in conquering new territories that were previously uncharted by journalistic practices.

At this stage of the debate, the vast majority of social and political actors are already aware that these two new avenues are in the present and future of digital journalism, and they do not question their relevance. However, they call for transparency, regulation, and the updating of ethical codes.

Aware that it is not possible to put gates on the field, professionals and social actors are working to create a favorable scenario for good practices and quality journalism with the current high technology. Time will tell if they can effectively harness these two technologies for journalism, which herald the beginning of a new digital wave (Schroeder, 2018), in a world moving in the shadow of mobile communication and in constant flux (Chib & Ang, 2023).

Undoubtedly, it is a challenge in this third decade of the millennium when high technology sets the sign of the times.

In this context of disruption, the Metaverse emerges as what some describe as the future of the Internet. Its impact is expected to be substantial, and journalism is unlikely to remain on the sidelines in this novel transformation in the digital age (Pavlik, 2024). Hand in hand with high technology in general and immersive media in particular, the Metaverse heralds a significant transformation in the field of communication. Its potential is based on virtual worlds, extended reality, interactivity, immersion, and a renewed social meaning.

In particular, in this chapter, we explore the initial steps of journalism in the Metaverse, along with the implications in terms of storytelling, which now acquires an experiential dimension, and the specificities of news work and news coverage. However, before delving into these aspects, it is necessary to understand what the Metaverse is and how it has evolved since the 1990s.

The Metaverse: Virtual Worlds and Immersive Experiences

The Metaverse has been heralded as the next generation of the Internet. Major technology companies and social media groups—Microsoft, Meta, Unity, Roblox Corporation, Amazon, Google, and others—are behind the construction of a new digital social and communicative universe based on virtual worlds where users can interact and engage in various activities—playful, commercial, educational, social, touristic, and more. In essence, the Metaverse is founded on the premise of delivering connected, immersive experiences in which the self is present (Radoff, 2021). Supported by a range of emerging technologies grouped under the umbrella term "extended reality" (augmented, virtual, and mixed realities), the Metaverse aims to enable the enjoyment of parallel experiences in persistent, three-dimensional virtual worlds with the promise of driving a major change: transitioning from being on the Internet to being within the Internet (Scherer, 2021).

However, to comprehend its implications, it is necessary to delve first into the roots of the concept. The term "metaverse" results from the fusion of two terms: "meta," which derives from Greek and means "beyond" or "after," signifying a change; and "verse," which refers to the universe, in this case, grounded in virtuality and interactivity. Specifically, it was the writer Neal Stephenson, in his dystopian science fiction novel *Snow Crash* (1992), who first combined both words to refer to a three-dimensional digital world in which people use digital avatars of themselves to interact and explore a virtual space that uses the metaphor of the real world (Benítez-Rojas, 2024).

Since then, technological evolution has allowed going beyond Stephenson's imagination and obtaining several samples of what the Metaverse could truly become as a hypothetical virtual reality-based successor of the Internet. Kumar et al. (2008) note that the first metaverse on record is CitySpace, an Internet-based virtual world for children created by Zane Vella. It was launched in 1993

at the SIGGRAPH conference and remained active until 1996. The foundational idea was for kids to collaboratively build an imaginary city and to then play within it.

Subsequently, other online virtual worlds have emerged—e.g., Active Worlds (1995) or There (1998)—although none would achieve the popularity that Second Life would gain after its launch in 2003: "it was responsible for introducing millions of people into virtual spaces for the first time; for fostering incredibly tight-knit communities, especially for outcasts or physically impaired people; and for pioneering digital economies" (Chow, 2021). Developed by Linden Lab, Second Life is a 3D virtual world where users, represented through avatars, can create, connect, and chat with others worldwide. It even created its own virtual currency, the Linden Dollar (L$). Its impact was such that it is considered the first case of a large-scale metaverse (Benítez-Rojas, 2024). Even universities—in 2009, the University of Texas at San Antonio established a virtual campus named TejanoTech, artists—in 2008, the rock band U2 held a virtual live concert, news companies—in 2006, Reuters opened a virtual news bureau, embassies—in 2007, Sweden became the first country to open a virtual embassy, and corporations in general—Edelman, a global public relations consultancy firm, created its own island in 2006—had established a virtual presence.

Following this online multimedia platform, other events have shaped the conception of what is now referred to as the Metaverse. Among the most relevant are the following: the release of the gaming platform Roblox in 2006, created 2 years earlier by David Baszucki and Erik S. Cassel and described as "a proto-Metaverse with a path to the Metaverse" (Sisson, 2020); the development of the first cryptocurrency, Bitcoin, in 2009; the launching of the initial code of Blockchain also in 2009; the emergence in 2012 of NFTs (Non-Fungible Tokens), which are Blockchain-based tokens; the rise of the virtual reality industry in the 2010s, highlighting devices such as the Oculus Rift, PlayStation VR, Samsung Gear VR, or HTC Vive headsets; in 2014, Facebook announced the acquisition of the company Oculus VR, founded by Palmer Luckey, for $2 billion; the launch of the beta version of the 3D virtual world browser-based platform named Decentraland in 2017, opened to the public in February 2020 as the first decentralized virtual space; also in 2017, Epic Games released the online video game Fortnite; the presentation in 2021 of Microsoft Mesh, a Microsoft's mixed reality platform for organizations; the same year, Mark Zuckerberg announced that Facebook was changing its corporate name to Meta, indicating its growing ambitions beyond social media and a clear commitment to the Metaverse.

Over the decades, and in parallel with technological evolution, the conception of the term "metaverse" has been changing. For example, in 2008, Kumar et al. defined metaverses as "fully immersive virtual spaces" (p. 46) that, unlike online games, were characterized by presenting "a single seamless, persistent world where users can transparently roam around different regions without predefined objectives" (p. 47) and by enabling user-generated, massive, and/or dynamic content. A few years later, Lee et al. (2011) published a study in

which they classified the Metaverse into four dimensions: augmented reality (AR), mirror world, life logging, and the virtual world. A typology elaborated based on whether the implemented space is focused on reality or virtuality, as well as whether the integrated information is centered on the external environment or the identity and actions of objects or individuals.

More recently, Park and Kim (2022) have defined the Metaverse, supported by the contemporary idea that the online and offline selves are not different, as "a three-dimensional virtual world where avatars engage in political, economic, social, and cultural activities" (Park & Kim: 4211). These scholars consider that the current Metaverse differs from the previous one, which was based on Second Life, in three ways: the improvement in the accuracy of language recognition and vision, along with the creation of more immersive environments and a more natural movement; the greater accessibility and ubiquity thanks to mobile devices, which can connect to the Internet at any time; and, finally, the ability to program within the Metaverse and the greater integration with real life through the use of virtual currencies.

The Metaverse, understood as a new way to interact on the Internet, requires three components: hardware, software, and contents (Park & Kim, 2022). Firstly, hardware, which includes physical devices and sensor—e.g., HMDs (Head-Mounted Displays), eye tracking tools, etc.—plays a fundamental role in the immersive user experience, although it still presents technical limitations that set it apart from the true real-world experience. Secondly, software is linked to recognition and rendering. Its aim is to contribute to an effective cognitive illusion, which is key in the immersion in both the objective reality of the physical space and the subjective reality experienced by users. Finally, the contents, including scenarios and stories. Content serves as the foundational element upholding the Metaverse, as it is aimed at providing users with an immersive experience through carefully crafted narratives and user-generated events.

Metaverse Journalism and Immersive Media

The relationship between Metaverse and journalism has been investigated and implemented, to a large extent, from frameworks such as immersive journalism or virtual reality journalism which, regardless of their differences, highlight the opportunity for the user to experience, cognitively and emotionally, news events in first person using technologies such as augmented reality (AR), spherical videos (180° and 360°), and three-dimensional computer image reconstruction (IGC) (De la Peña et al., 2010; Hernández-Rodríguez & García-Perdomo, 2023; Pérez-Seijo et al., 2023). We are facing what Pavlik (2018) called "experiential media." These media allow people not only to manipulate the technological artifact, but also to participate and agency the story in real time.

Applied to the journalistic field, the Metaverse is an environment that offers users "news experiences"; these are unique and memorable opportunities to observe and make practical contact with news events. In this chapter we argue

that such opportunities have their own characteristics, as opposed to what has been pointed out about experience from fields such as marketing. News experiences are factual—they make it possible to know the facts, contextualized—they facilitate the understanding of events, emotional—they contribute to connect the citizen affectively, and actionable—they stimulate to do something. These features, adapted to the Metaverse, are taken from the model of news users' needs proposed and updated by Shishkin and Verhoeven (2023).

News experiences also require their own narrative to spread through the Metaverse; that is, they need not only a particular way of being told but also of being internalized. It is the appropriation of the experience that guarantees the creation of meaning by the user of the journalistic event. In the Metaverse, it is not enough for people to be told the stories; they want to live (from the inside) the stories. This is what is known as storyliving (Maschio, 2017), which we propose here to define as a three-dimensional narrative that is transmedia, multisensory, dynamic, and nonlinear (Hernández-Rodríguez, 2023).

From a transmedia perspective (Scolari, 2013), the Metaverse should be a "narrative universe" in which non-fiction macro-stories are constructed, the result of articulating autonomous narratives using different multimedia languages, formats, and platforms, both virtual and physical. In other words, Metaverse narratives can be deployed in computer-generated three-dimensional scenarios, and, for example, in holographic designs using volumetric displays that intervene the physical public space (Lee et al., 2021). To fulfill the transmedia promise, the narrative universe must be able to expand with user-generated content (UGC); this phenomenon of participation that was imposed with Web 2.0 will be deepened in the Metaverse due to its social and creative nature (Terrasa, 2023).

Much of the journalistic content produced for years is based on text, audio, and image, which at the time of consumption directly affect people's senses of sight and hearing. However, information communication is finally reaching the other senses: touch, smell, and taste (Dincelli & Yayla, 2022), thanks, among other processes, to the chemical synthesis and recognition of smells and tastes (Lee et al., 2021). Multisensorial is so important that one of the pillars on which the 6G—the technology that will facilitate the development of the Metaverse—is built is the Internet of the Senses (IoS). This Internet will provide "experiences almost inseparable from reality and increase intelligent human-machine interaction" (Panagiotakopoulos et al., 2022: 52).

It is known as a living narrative, among other reasons, because its spirit is contrary to the static. Instead, it aims to be a dynamic narrative or one that can be transformed or enriched in real time (Herranz de la Casa & Sidorenko Bautista, 2023). At the center of these news experiences are algorithms, with their benefits and risks. It is the developments in automation, deep learning and neural networks, and their combination with the multiplicity of data provided, for example, by the Internet of Things (IoT) that will open the doors to the user being able to have some agency (or control) over the narrative structure in situ.

The dynamic capability makes possible, in turn, nonlinearity in the consumption of news stories. Sometimes, the user should not be conditioned by

rigid narrative structures predefined by journalists; he should choose, among various thematic combinations, routes, and formats, the news experiences to which he wishes to be exposed and the way in which he wishes to interact with them. Nonlinearity also means rethinking the constructs of time and space. Already, extended reality technologies make it easier for people to transport themselves without restriction to past events or explore future events or that, while their physical body is on one continent, their digital representation (avatar) travels to another continent (Costa & Brasil, 2017; Nielsen & Sheets, 2019).

Finally, as a specific narrative of the information metaverse, storyliving is largely possible—and it will be perfected in the future—thanks to the unique affordances of experiential technologies or media, which allow people to do things that were not possible due to the technological limitations of traditional media (Hernández-Rodríguez, 2023). These potentialities are at least four:

- *Presence* or the user's feeling of "being there" (Slater et al., 2009), taking part in the news event or witnessing it alone or in copresence (Pérez-Seijo et al., 2023). This re-evaluates the person's notion of proximity to the news event, which for years has been one of the news values (Hernández-Rodríguez, 2023).
- *Embodiment* or the sense of body ownership to navigate the Metaverse (Shin & Biocca, 2018; Steed et al., 2018). Such a body could be synthetic or represented by an avatar. It is one of the ways for the user to take advantage of the "first-person perspective" offered by experiential media (De Bruin et al., 2020; Pavlik, 2018).
- *Interactivity* or, fist, the ability to perform actions in the physical and virtual domains thanks to haptic components (Dincelli & Yayla, 2022); secondly, the opportunity to meet other users and to build communities (Vázquez-Herrero & López-García, 2019); third, the opportunity to participate in the production of journalistic content (Hassan, 2020); and fourth, the agency to modify the narrative structure (De Bruin et al., 2020).
- *Gamification* or the possibility of incorporating ludic elements to the informative contents (Rubio-Tamayo et al., 2017; Terrasa, 2023), not only to guarantee the enjoyment of the experience but also to facilitate the apprehension of journalistic facts.

Journalistic Experiences in the Metaverse

As we saw earlier, the journalism industry's adoption of, and experimentation with, virtual worlds has been shaped by the availability of specific technologies over recent decades, often being adopted as quickly as they were abandoned. In this subsection, we document paradigmatic examples of the more recent adoption of the Metaverse in journalism and the transformations this suggests in structural aspects of the profession such as news work and news coverage, the understanding of journalistic narrative and its ongoing mutation, as well as the emerging possibilities for the media business models.

News Work and News Coverage

Understanding the Metaverse as a new geography relevant to the public space and, consequently, justifying journalistic coverage dedicated to the economic and business activities that take place there, the Spanish media outlet *elEconomista.es* created in 2021 what has been identified as the first journalistic correspondent's office in the Metaverse. "Under the classic motto of any correspondent or special envoy (go to the place of the events to tell what happens there), this newspaper strives to get closer to the new environments, which are always newsworthy and of growing interest" (Lorenzo, 2021). In February 2022, the designated correspondent, Antonio Lorenzo, responsible for information on technology and telecommunications of *El Economista* and *elEconomista.es*, conducted the first interview of a Spanish media live on Metaverse, interviewing Julio Obelleiro, co-founder and CEO of WildBytes. The interaction between the two lasted approximately 30 min and was based on the Oculus Quest head-mounted display using the VR Chat platform: a virtual social environment where multiple users can meet to chat and interact through their personalized avatars with other people from anywhere in the world.

Similarly, in December 2021, *Financial Times* conducted an interview in Metaverse with UK's former deputy prime minister, Nick Clegg, on avatar form (Mance et al., 2021), clearly signaling the coming to the surface of news media strategies that are not only more visual, immersive, and interactive, but fundamentally based on the notions of virtual, augmented, and mixed experiences and realities (Vicente & Pérez-Seijo, 2023).

Also in 2021, the Korean business newspaper *Maeil Business Newspaper* held an editorial meeting experiment in the Metaverse, attended by editors and reporters who were physically dispersed but converged in the form of an avatar in the virtual world. Vice Media Group has likewise been testing the possibilities of decentralized editorial and creative work, having inaugurated the *Viceverse* virtual office. This space is intended to function as an innovation laboratory in which Vice's teams can directly test the functioning of a decentralized autonomous organization (DAO), as well as experiment with the use of NFTs. At the same time, the company intends to use the space as a fieldwork site to better understand the potential of Web 3.0 (Finney, 2022).

The Metaverse and, globally, the concept and materiality of Web 3.0 seem to be stimulating the creation of decentralized newsrooms based on interaction in virtual worlds. In this respect, the *JournoDAO* initiative has emerged as a professional network aimed at journalists so that they can acquire skills and experience with Web 3.0 tools and give rise to new projects. From the perspective of training future professionals, different universities have also started to incorporate Metaverse into their academic programs, either from a media management perspective (e.g., Media, Al and the Metaverse, at the University of Exeter) or from a journalistic perspective (e.g., master's degree in Immersive Media Communication, University of Oregon).

Monetization System and Media Business Models

As media organizations begin to implement cutting-edge technologies related to the advent of the Metaverse, the adoption of NFTs is particularly relevant considering the possibilities for diversifying organizations' economic sustainability strategies. As the Metaverse is a virtual space where social interaction takes place, NFTs, which are technically unique identifiers and certificates, enable the possession and transaction of virtual goods. Between 2021 and 2022, *CNN* maintained the *Vault* project dedicated to "spark conversations about the world events we experience together through digital collectibles (NFTs) of historic news coverage and art inspired by it." In this way, members of the community could buy and sell digital representations of historical events. The *Marketplace Vault* (CNN) platform is still active, and NFTs can be purchased, for example, of the launch of the Space Shuttle Discovery that deployed the Hubble Space Telescope in 1990, an animated representation of the invention of the World Wide Web, the release of Nelson Mandela, or the broadcasting of historic political results, such as the re-election of Barack Obama, in 2012.

In June 2021, the daily newspaper *The New York Times* published the article *Buy This Column on the Blockchain!* (Roose, 2021), which, being dedicated to the subject of NFTs, was itself converted into an NFT and put up for auction. That same year, *The Economist* carried out a similar experiment by publishing an issue dedicated to decentralized finance, with the cover produced by visual artist Justin Metz and designer Graeme James. Since March 2022, *Time* magazine has also made its covers available on the *OpenSea* platform, a non-fungible token marketplace. These are experiences that take place outside a 3D virtual world, but which, nevertheless, by resorting to forms of commercial transaction of digital editorial artifacts using digital currency, signal the predisposition of the media to their appropriation and potential use in the Metaverse.

A Critical Look at the Future

The speed at which high technologies are being developed and used seems to facilitate the adoption of the Metaverse as a plausible (virtual) reality. The journalism industry, as in so many other technological transformations, has not remained oblivious and has taken its first, albeit timid, steps into the Metaverse. In this sense, some media outlets have explored virtual worlds in an effort to test the new potentialities that, in terms of communication and social interaction, these digital spaces offer or can offer for journalistic practice. To date, experimentation has revolved around three strategies that provide insights into how journalistic media can exploit the possibilities of the Metaverse: the innovation in news coverage, mainly through remote interviews, taking advantage of the affordances of virtual environments and the features of storyliving; the use of NFTs as a way of diversifying the economic sustainability strategies; and, at the workplace level, the exploration of flexible workspaces and decentralized newsrooms based on interactions in a 3D immersive space.

However, these initial attempts to delve into the Metaverse reveal various challenges that media outlets must confront. Among the most pressing issues is the platformization of journalism: news organizations are experimenting with the creation of factual content in virtual environments, where programming, design, and functionalities are dictated by technology companies external to the journalistic profession. Similar to the discussions concerning automated journalism, the entry into the Metaverse presents ethical issues related to the preservation of editorial integrity, independence, and accountability, among others. In any case, good journalism should always adhere to the best professional practices, regardless of the technology used.

Furthermore, it is essential that journalism in immersive environments be front and center in the development of curricula at higher education institutions. At this time, universities must look to the horizon and fulfill their role of preparing a new generation of journalists who will face renewed ethical, deontological, and also functional challenges in terms of digital competence. If, as predicted, the Metaverse is the future of Internet, journalists need to be equipped to face this new virtual scenario.

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CHAPTER 8

Self-Managed Automation and Collaborative Communities

Pablo Escandón-Montenegro

Introduction

The informative construction, like all content elaboration, is configured by two basic elements: the content and the continent, or the substance and the form. As form or continent, we refer to the structure that supports and on which the elements of the content or background are interwoven: a novel such as *El ingenioso hidalgo don Quijote de La Mancha* renewed the structure of the stories told up to that time, since its background, the various stories that enrich the adventures of the noble character, required breaking with the established canons. It is then that the modern novel was born.

Similarly, on the Internet, substance and form are diversified with various elements in the construction of spaces with journalistic, informative, and nonfiction content. Thus, choosing a content management system (CMS) is directly related to the narrative needs, interactivity, and information storage, as well as the collaborative and/or dissemination spirit of the project.

Content management platforms are also automation technologies, which organize the work in terms of information hierarchy, editorial structure, navigation, usability, and adaptability to viewing devices. In times of expanded information, the interconnections between platforms structure the complementary and participatory stories of what we call transmedia journalism.

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Since the beginning of digital journalism and the studies on the constitutive expressions of this media practice, experts have focused on the content and, at first, were concerned about the hypertextuality, interactivity, and multimedia (Salaverría, 2005; Toural-Bran and López-García, 2019) of the information. The computer support, like paper, radio, or TV, was considered as the matrix medium (Toural-Bran and López-García, 2019) and not as the transformation of a new medium (Manovich, 2005).

It is Manovich (2005) and Bolter and Grusin (2000) who consider the interface as an element that characterizes the new media, and therefore the new way of presenting and configuring information in a support that is different and differentiated from the previous ones. Therefore, a new media is constructed from the language itself, in this case, that of computer programming and cyberculture.

Cybermedia are considered as collaborative constructions and informative products in constant development and transformation; therefore, not only journalists and information experts intervene, but also computer scientists and multimedia, interactive, and web designers are important in informative and journalistic projects. As McErlean (2018) indicates, when referring to transmedia audiovisual narrative, every narrative arc is structured according to a predetermined coded platform that allows the user to view it in multiple navigation and visualization options. The use of a platform or tool to communicate content is predetermined. Therefore, it is important that the team of developers, computer scientists, journalists, scriptwriters, and producers take into account which is the most appropriate software so that the user has a satisfactory experience when consuming the information.

López-García and Vizoso (2021) reflect on the processes of media convergence in the production of information on digital platforms and make an overview of all the elements that build a digital information product, from the beginning of the twenty-first century to the present day, and conclude that "software and hardware, if properly used, allow innovative formats and products that show good journalism" (López-García & Vizoso, 2021: 3).

To this view, we can add what Lawrence Lessig argues about the use of technological platforms in user behavior:

> Like Marwick and others, Lessig thus argues that technology—in the form of 'code'—does play a key role in influencing and shaping online behaviour, even though other factors also come into play. (Wilding et al., 2018: 48)

From this perspective, when generating an information project for any digital platform, it is necessary to start from the usability of the user interface (Nielsen, 2020), with which structure and content converge, according to the needs that the information requires and the editorial proposal of the cybermedia or the digital narrative project: it will include 360° photography and video, 3D tours, data visualization. In other words, platforms must comply with

Lessig's four points for the user to develop a behavior in the proposed content consumption itineraries.

In this chapter, we will focus on reflecting on the interfaces and their development in content management services and the development of automation for the publication and dissemination of existing fiction and non-fiction digital news projects, as well as on the participation of technology-based communities.

Usability and Interfaces

Writing for screens and their extensions breaks with the traditional Aristotelian form of writing, for among all the stylistic and structural innovations, the most important is the inclusion of the user in the progression of the story. In this way, digital rhetoric includes the experience that users have when consuming products on various devices.

In 1994 Jakob Nielsen proposed 10 points for the construction of projects on the Web, which are still valid for the development of digital content, because in his own words: "When something has remained true for 26 years, it will probably also apply to future generations of user interfaces" (Nielsen, 2020).

The 10 points of usability proposed by Nielsen are related to how the system communicates with the user, that is, how the interface generates recall, ease of use, saves time, retrieves information, and establishes a relationship between the represented system and the real world. In other words, the user interface is the most important element in the communicational mediation between information producers and content consumers.

For the specific case we are dealing with in this chapter, the following points developed by Nielsen (2020) are essential, since cultural software systems (Manovich, 2005) for content management in media-communication projects come from the same cultural matrix (Martín-Barbero, 1998) and, therefore, when digitized, they are remediated (Bolter & Grusin, 2000) and produce a new medium (Manovich, 2005).

Point 4 of the Nielsen recommendations (2020) refers to the fact that any interface should be consistent and establish common standards between users and developers, so that both identify the same industry and platform codes.

The sixth point (Nielsen, 2020) is oriented to the way we recognize and remember a place in the interface, because in this way, the user produces itineraries that he repeats to complete a path or complete an activity and this information is easily visible to be retrieved, that is, the computer system produces the instructions, but from its execution and not as a manual.

Finally, the eighth point has to do with the design of the interface, which clearly must be aesthetic and minimalist (Nielsen, 2020), without irrelevant or anecdotal information, which makes the user get lost.

For Manovich (2005: 113), the computer interface, from semiotics, functions as "a code that carries cultural messages in a diversity of supports," while for Scolari (2018: 22), "it is like a skin that conveys information to the user on

how to use the interactive device" and is built based on visual metaphors, whereby "the best interface is the one that does not need instructions" (Scolari, 2018: 23), since its contextualization of processes and reference to the real world (Nielsen, 2020) make the user have the intuition to manipulate the artifact without the need for an introduction or prolonged learning for its use.

Cultural objects and their production share interface at two levels: for consumption and for construction. In this way, content management systems (CMS) work on two levels of interface: the back end, where the programming, code, and coded information are, and the front end, which is what the end user sees.

At the end of the day, a cultural software (Manovich, 2005) to generate informative media content automates processes from the back-end interface so that the front-end interface complies with the 10 elements of Nielsen (2020) and there is an effective and efficient interactivity.

CMS: Self-Administered Transmedia

The incorporation of programmers to the journalistic or news content production teams of a digital project starts from the choice of the use of a content management system (CMS), and it is quite common that project managers delegate to designers and computer scientists the choice of this tool.

Sørmo Strømme (2023) defines the arguments for including programming in a journalistic project as an automation tool for data collection and processing in the fields of investigative journalism, based on a list made by Flew et al. (2012): (1) automation, (2) tasks that would otherwise be impossible to perform, (3) fact checking and data quality control, (4) abstractions: making sense and new ideas, (5) visualization, (6) crowdsourcing and other ways of including allies.

In this sense, the six points can also be developed when deciding on a CMS, because (1) it automates the editorial processes and the production chain specifies in the same platform the roles of the users, (2) the tasks that are impossible to perform are produced in the content manager, otherwise it would not be possible, (3) the administrator himself verifies the actions and certifies the quality of the elements in production, (4) depending on the CMS, modules can be developed to improve the back end and front end, (5) visualization of new graphical design interfaces, (6) ways of monetization and configuration of multidisciplinary team.

Although the construction of media or digital projects requires the active participation in each of the production phases of designers, computer scientists, journalists, scriptwriters, etc., the production chain in this case does not change in its general line, but it does at the time of integrating the members, because the work is not exclusive to the expert, but also involves the users, in this case, journalists, scriptwriters, etc.

As Sørmo Strømme (2023) indicates that editorial and production teams must identify what will be coded, i.e., which IT tools will be appropriate for the

construction of the content; therefore, when there is no experience in the team, it must be evaluated whether learning to write code is indispensable for the project, or whether development experts will be asked to participate and thus the production time will be more effective. There are rapid learning processes, such as hackathons and team challenge meetings, where content creators are paired with IT developers and learn from each other's skills.

> Stencel and Perry (2016) query that aimed to identify skills that are highly ranked by editorial employers reveals that two-thirds of the organisations considered "coding/development" as essential. They identified two categories of coders: code-friendly journalists, journalists who have learned basic coding; and editorial-friendly coders, ICT specialists with enough understanding of news production to be able to engage in collaboration with journalists. (Sørmo Strømme, 2023: 15)

In this way, collaborative and teamwork is real, and the media production processes have their leaders, but they all have in common that the management system is not only known but can also be modified by each of the members of the production chain.

Although collaboration between different professionals is important and beneficial, many journalists and documentalists prefer to work offline, locally, and testing how the front-end works, and let the developers take care of the back end (Sørmo Strømme, 2023).

CMSs replace large newsrooms and production rooms, as their decentralized, linked, and modular characteristics allow everything to be integrated without the need for physical presence, so that process automation helps each member of the production chain to develop innovations or improvements to the system.

Newsrooms and production studios are giving way to decentralized collaborative spaces or, alternatively, producers are looking for professionals outside the media group who know how to understand their needs, and they find it in programming communities and laboratories, since the creation of new media (Manovich, 2005), ceases to be a specialized production line task and becomes a transmedia space from its conception (Serrano-Tellería, 2023b).

Serrano-Tellería (2023a) establishes an overview of the evolution of the media, from MacLuhan, Fiedler, and Scolari, and concludes that all news, entertainment, non-fiction, and fiction projects are currently transmedia, since media hybridization and evolution are not sums of parts, but integral processes that make up an ideal transmedia universe.

> Thus, current challenges are centred on several dimensions, including business models, audience practices, mobile first acclaimed strategies, the ever-changing algorithm parameters, the increased relevance of personalization in content and channel distribution (mobile applications, podcasts, messages, newsletters, etc.); the differences between media ecologies, and their ambient and technological environments. (Serrano-Tellería, 2023a: 95)

Thus, a digital transmedia project is so from its conception, and the choice of a CMS or writing code from scratch is an important choice for the configuration of a trans and multidisciplinary team, which will be seen in its front end.

The media business is changing and, therefore, media design interfaces are being transformed, which for Serrano-Tellería (2023a) take on greater notoriety in the current times of media hybridization and increasingly show that media life cycles are more fleeting, since their interfaces depend on information architecture, interactivity, and usability, linked these three elements from the construction of a back end, not only from automation, but elements of holistic analysis of the digital project must enter.

Communities and Development

For this chapter, three experiences are taken as case studies that are in line with the proposed points of integration and development of CMS as the beginning of automation in media communication projects, based on innovation, collaboration, and interdisciplinarity: Media Party, developed by the Hacks/Hackers community of Buenos Aires, the Google News laboratory and the interactive experience of fiction and non-fiction El Cubo of RTVC Play of Colombia.

If we start from the proposal that every digital project is transmedia (Serrano-Tellería, 2023a), it is important to highlight that one of the elements for a project to make the leap from hypermedia to transmedia is the participation of the community, but this participation is not limited to consumption, but rather a transmedia community of reference is configured for the creators and producers of the projects and also for the users, since the relationship between them is closer and thus cybermedia and digital projects are created with "authenticity, credibility and transparency" (Serrano-Tellería, 2023b: 202).

Both producers and consumers, at a certain point in the production and distribution of content, must be part of a community and therein lies, among other important elements, the success of a digital project and its transmedia characteristic.

Platform automation is closely linked to setting up a back-end user community for front-end users to unify around and disseminate the content created.

In this sense, the cases we will see are directly related to the proposal of active participation of the community of creators, from the activities of the community of Hacks/Hackers of Buenos Aires, who promote the Media Party.

Since 2012, in Buenos Aires, Argentina, the Hacks/Hackers community, led by Mariano Blejman, has been working on the configuration of innovative journalistic projects that link IT developers, multimedia designers, and journalists.

The purpose of this community that links journalists and computer developers is to improve the cybermedia environment through innovation that comes from the collaborative work of members of different computer communities who apply their knowledge to develop tools for general and specialized media: "Our mission is to create a network of journalists ("hacks") and technologists

("hackers") who rethink the future of news and information" (Hacks/Hackers, 2023).

This community is present in 122 cities around the world, and in each of the locations they develop projects that link the media and developer communities on issues of programming, media innovation, misinformation, media education, data visualization, and investigative journalism (Hacks/Hackers, 2023).

Every year, the Buenos Aires node holds conferences, workshops, and hackathons at the Konex Cultural Center for 3 days, with the aim of enabling digital native media to develop skills and tools and replicate successful journalistic practices in their spaces and contexts, in order to build complementary communities on issues of journalistic research, data visualization, and non-fiction projects on different platforms.

In 2023, Media Party held two meetings, one in Chicago and the other in Buenos Aires, which were attended by diverse audiences, with the aim of building communities of programmers and journalists around net neutrality, journalistic research, the construction and programming of secure digital spaces, as well as the digital protection of journalists' identities and activities (Hacks/Hackers, 2023).

The 2023 and previous meetings promote the presence of interns, digital media representatives who participate in workshops and mentoring to improve processes, tools, and information products on their platforms.

The philosophy of Hacks/Hackers is to link journalists and/or non-fiction documentary filmmakers with computer programmers in order to produce digital content on various platforms that do not rely on commercial content management systems (CMS), such as Xalok or CMS for Digital Diaries.

The companies mentioned above are the ones that provide their content management services to the most important and traditional Hispanic American newspapers that have their digital editions from matrix and digital native media.

Hackathons, workshops and expert talks, service market, among other activities, are the ones that for 11 years have been held in this annual meeting, which promotes collaboration and the development of new journalistic projects, which promote coding experiences from scratch to not depend on proprietary CMS, or the customization of community managers, such as Drupal, Joomla, etc.

Media Party, from Hacks/Hackers Buenos Aires, is associated with Google News Initiative, International Center for Journalists, Media Development Investment Fund, Internet Society, International Fund for Public Interest Media.

Mariano Blejman is the leader of this annual meeting that brings together academic experts, media development experts, documentary makers, non-fiction creators, data journalists, and, fundamentally, journalistic communities of users and developers, with the purpose of sharing the necessary elements to generate informative projects from the experiences and realities of the exhibitors, but with the characteristic of each of the local contexts.

Another interesting experience in this area is the Google News Initiative (2023), which aims to collaborate with editors and journalists around the

world to fight misinformation and share resources and platforms for automating journalistic work in order to create innovative information ecosystems that respond to the needs of each locality.

This platform and the resources offered comply with what Lessig (in Wilding et al., 2018) proposes, as it is oriented to three areas of digital journalism: audiences, journalistic tools, and monetization.

The actions and tools are based on these three axes, with tutorials, self-learning courses, and online courses on demand, directly organized and taught by Google representatives in the sub-regions where the company does business.

All the proposals and tools of the Google News Initiative can be linked to the different media management platforms and the courses develop not only practical activities for the media but are also oriented toward the generation of digital skills for journalists, so that they understand the processes of machine learning or deep search so that the use of their applications does not remain instrumental.

In addition to the workshops and tutorials, they present success stories, which have been developed on a continuous and permanent basis under the form of scholarships for journalists and for the media themselves, with the aim of creating communities in other countries or regions that use the same tools or have the same informative themes.

The back end of the tools is managed by Google, but the front end can be adapted and customized by each medium, and incorporated into the CMS it uses, with a good graphical interface.

A last example is the one developed in three seasons by the team of El Cubo (2023) for RTVC Play of the Colombian public media, which in the first two seasons developed interactive fiction, the first as a theater and the second as a police series; for the third season, they created a non-fiction docuweb about a rural Colombian town.

The user interfaces for each of the projects or seasons differ due to the interactivity needs of the narrative proposed for the stories. In this sense, the Drupal CMS, through an API, has been modified for the correct adaptability of what the story required in terms of interactivity and visualization. The IT director, José María Guaimas, was responsible for this challenge and answered a questionnaire about the way of adaptation and automation of the CMS, as well as the external participation of communities in this type of projects.

For Guaimas (personal interview, 30 October 2023), there is no direct relationship between technology-based communities, as in the examples of Google News Initiative and Media Party, since the teams of developers are not guided by a motivation of wills and see what they achieve along the way, but by achieving the goal set: to correctly layout the tools on the platform and make the project easy to use in the graphical interface.

Regarding automation processes, Guaimas (personal interview, 30 October 2023) recognizes that each season had its own production flow and there is no homogeneous standardization, but that the use of planning software helps a lot so that production times are met.

> My role was technology manager and coordination of the engineering team. For this we had to align our development with the directives of the channel's internal engineering team. We developed EL CUBO externally and then integrated it to the RTVCPlay platform. Version control and software integration systems were very important for the development. Platforms such as Figma and Slack were very useful to implement agile methodologies with the rest of the team (production, direction, script, design). (J.M. Guaimas, personal interview, 30 October 2023)

Regarding the experience of working as an external team that matches the work with the internal contracting team, Guaimas establishes five important elements of how an external team contributes to the institutional project, which may well be considered for production processes, such as those described above:

- Expertise and specialized knowledge that may be difficult to achieve internally, not because of capacity but because of biases inherent to the environment.
- Diversity of perspectives can offer a fresh view on the project. This is valuable in planning and decision-making stages, as they can bring new ideas and approaches that internal teams may overlook.
- Avoid conflicts of interest: An external technical team has no personal interests and ensures that decisions are made in the best interest of the project and the organization.
- Access to tools, infrastructure, resources, and technologies that may not be available internally or may take an administrative time to obtain.
- Objective evaluation of results (J.M. Guaimas, personal interview, 30 October 2023).

For this IT developer, collaborative and remote work is fundamental, as it improves the quality of the final product, and he is convinced that the contributions generated by Google News and Media Party are valuable in the topics they are developing, but he criticizes that they are focused on urban issues and discard rural areas, where community and communal issues are important, in this era when mass media are not the priority or what shapes digital public opinion (J.M. Guaimas, personal interview, 30 October 2023).

Conclusions

Automation and digital or technology-based communities maintain a constant work, since the initiatives described above, which bring together several communities of users and developers in the world, focus mainly on issues of media disinformation, applications for digital journalism, and data visualization.

Communities such as Hacks/Hackers and Google News Initiative are focused on the development of digital media and their journalists, with the use of applications, workshops, and meetings, where the development of CMS and

their interfaces are not the foundation of their coding, but rather an instrumental use of the tools to facilitate and automate the work of research and data visualization.

Digital and/or computer-based communities seek to position themselves in the media market with a form of digital evangelization, but not the construction of content self-management systems, since their work logic is the construction of elements that can be linked to any operating system.

In the case of interactive projects, such as documentaries and fiction and non-fiction works, they link work teams that start from a clear objective to adapt the front end, that is, the final user experience in the interface, from the modification of the back end, since the CMS closest to their needs has to respond to the programming and use requirements that the project directors propose in the digital narrative.

CMS for journalism and web documentaries are the first form of automation in the creation of digital content; therefore, every digital project is transmedia (Serrano-Tellería, 2023a), and as such should include a development team that thinks about how to manage information and the back-end interface to make it as usable as possible (Nielsen, 2020) and thus influence the end user through a front-end interface that can be constantly updated (Wilding et al., 2018).

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CHAPTER 9

The Internet of Things and Its Impact on the Platformization of Journalism

Suzana Barbosa, Fernando Firmino da Silva, and Luciellen Souza Lima

Introduction

Technologies based on mobility, connectivity, and network communication continue to multiply, resulting in new configurations of the Internet of Things (IoT) where communication devices are reshaping the consumption habits of the public, their needs, and their expectations. For journalism, these technologies not only represent innovations that generate opportunities for the creation, production, and distribution of content, but they also adapt to contemporary cultural and media contexts, keeping up with and adopting technological developments in various areas and in people's everyday lives. This movement is part of a trend toward intense application of high technology in journalistic production (López-García & Vizoso, 2021). The technical

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possibilities of production, distribution, and consumption in constant transformation have led to information convergence, flows, and new experiences, accentuating the complexity of narratives (Longhi et al., 2020). Many of the formats for journalistic content are designed for the growing consumption on mobile devices, boosted by the popularization and multifunctionality of smartphones, which have accelerated the development of the Internet of Things in society. Portable, personalized, and versatile smartphones provide access to multimedia content with different levels of complexity (Canavilhas, 2021).

For contemporary journalism, innovation is paramount at a time of crises and uncertainties (Christofoletti, 2019; García-Avilés, 2021) that have affected business models and the proposition of new formats and languages. The goal is to somewhat win over and retain audiences (Flores, 2019), especially young people from generation Z who are becoming more and more detached from journalism (Newman, 2022), migrating over to more dynamic platforms such as TikTok (Newman, 2023). As a result, innovation has become essential to guarantee the future of news production (Canavilhas, 2021) on different platforms and formats (Palacios et al., 2016). With this constant need for technological innovation—which influences organizational innovation, editorial processes, and products, as well as the relationship with the public—the development of journalism has become a challenge given the difficulty imposed by the speed of implementing and processing the required changes.

However, technology's strong influence on journalism is not just a current event. In fact, this close relationship has always existed and stimulated a number of changes (Zelizer, 2019). What differentiates present day from other technological advances in the media is the speed at which it develops and the profound changes that the technology has made in society, which leads to continuous changes in journalism, with no prediction of stability. Zelizer (2019), on the other hand, has a dislocated view of technocentrism. For her, the future of journalism must be based on a more complete understanding of what it is in itself, regardless of current technological trends. Carlson and Lewis (2019) support this idea when stating that temporal reflexivity is necessary when researching journalism, observing both what changes and what remains, and encouraging critical judgment on emerging phenomena.

We list some of the main technologies that are part of the Fourth Industrial Revolution and the Internet of Things that have the potential to be used more in journalism. It is important to note that these technologies do not work alone; they complement each other and depend on each other to perform and improve performance. These technologies are directly linked to the shaping of the Internet of Things as it currently exists, as well as trends and perspectives for the near future. We also list broader contexts formed by the confluence of several technologies, platformization being at the top of that list due to its predominance in today's society (Birch & Bronson, 2022; Dijck et al., 2018; Napoli, 2021; Nielsen & Ganter, 2022; Poell et al., 2019, 2020, 2022, 2023; Scolari, 2022; Simon, 2022).

In this chapter, we describe (in an illustrative and exploratory manner) some of the ways journalism uses the Internet of Things, demonstrating the potential and also the tensions. The Internet of Things is not directly applied to journalism, but it has benefited from everyday uses in society such as self-driving cars, map navigation systems such as Waze and Google Maps, sensors in smart watches, in addition to artificial intelligence and wearable technologies. In an exploratory manner, we use symbolic cases to illustrate the Internet of Things in journalism and take into account more central aspects of identification, especially a theoretical-conceptual discussion of the paradigm.

The Internet of Things (IoT) Paradigm

The concept of ubiquitous computing, defended by Mark Weiser, in 1991, in his seminal article *The Computer for the twenty-first Century* (Weiser, 1991), led to the idea for what the Internet of Things (IoT) would eventually become in the twenty-first century, with ever-present and invasive sensors embedded in a wide variety of objects. At the time, the idea did not seem feasible considering that computing was not everywhere, networks and connections were far from ubiquitous, and the Internet itself had not been released commercially. In 1999, Kevin Ashton, from MIT, created the term Internet of Things, which encompassed the relationship between the digital and the physical world through interconnection sensors using RFID (radio frequency identification) tags. The term soon became popular in the market and in academia.

> The basic idea of this concept [Internet of Things] is the pervasive presence around us of a variety of things or objects—such as Radio-Frequency IDentification (RFID) tags, sensors, actuators, mobile phones, etc.—which, through unique addressing schemes, are able to interact with each other and cooperate with their neighbors to reach common goals. (Atzori et al., 2010: 1)

As it pertains to journalism, this scenario was even more distant. However, media convergence began to be discussed based on the telematic networks that emerged in the 1970s, yet it was rudimentary and had no multiplatform function. The multiplatform media took shape in the 1990s and beginning of the twenty-first century with the process of convergence and integration in the newsrooms of journalistic organizations (Lawson-Borders, 2006; Salaverría & Avilés, 2008). However, the impact of the Internet of Things on journalism is beginning to take shape today due to the proliferation of diverse technological devices and platforms (infrastructural and complementary) in the context which Dijck et al. (2018) and Poell et al. (2019, 2020) classify as the platformization of society. Billions of sensors embedded in smartphones and smart watches and data inserted into GPS navigation systems such as the Waze app, all operating in real time in the metropolises and highways, are like something straight out of the 1980s science fiction cyberspace book *Neuromancer* (Gibson, 2003), except now it is a reality.

The development of the Internet of Things is linked to the development of software culture (Manovich, 2013), the proliferation of devices connected to high-speed mobile networks (Silva, 2015), and the platformization of society with pervasive sensors and ubiquitous computing in cars, homes, wearable technologies, supermarkets, and other traceable objects. The Internet of Things is an intelligent way of interfacing between the physical and the digital, of connecting objects and humans.

In addition, the fifth mobile generation (5G) has accelerated the development cycle known as massive mobile communication. An umbrella term for this is the Fourth Industrial Revolution and ubiquitous computing or ubiquitous journalism.

The Internet of Things paradigm has emerged in other fields and subfields such as automobility (Urry, 2007), which focuses on mobility in twenty-first-century automobiles and infrastructure. Together with mobile communication technology, self-driving cars have been part of the changing urban space ushered in by sensors and sensitive technologies embedded in cars, likewise in wearable technologies such as smart watches and drones that allow objects to communicate (Lemos, 2013) within the logic of non-human actors (Latour, 2005) where objects have agency. For journalism, IoT has the capabilities to change formats and modes of interaction (Barcelos, 2019; Magrini, 2018).

The current context is the Internet of Things, high-speed mobile networks (5G) with low latency and new capabilities, proliferation of devices based on Massive Machine Type Communications (mMTC) of 5G technology. Similarly, artificial intelligence (AI) is a member of the Internet of Things in the Fourth Industrial Revolution. Micó et al. (2022) point out the Fourth Revolution trends that impact journalism, such as Virtual Reality, Augmented Reality, drones, and others. "The fourth revolution or Industry 4.0 is still current today and has popularized drones, driverless vehicles, smart homes, smart cities and especially all kinds of robots and technology based on artificial intelligence" (Micó et al., 2022: 242). In this way, we have a complex situation in the scenario, which Barcellos et al. (2017) call "journalism of things".

> The Internet of Things connects objects and automatically activates them, serving people's habits, desires and actions. Thus, we can assume that the same will happen in the near future with journalism, which will be dematerialized, without a clearly demarcated origin, at the appropriate times and situations, on the most appropriate devices, in line with the recipient's information desires. (Barcellos et al., 2017: 1)

From the point of view of a business model or emerging formats in journalism, the Internet of Things is not so prominent. Journalistic organizations feel it is too abstract considering that it is not a specific technology, but a set of systems, sensors, and strategies that, when combined, trigger the notion of IoT. Table 9.1 explores six types of Internet of Things in the Fourth Industrial Revolution, among the trends and implications.

Table 9.1 Typologies of the Internet of Things in journalism in the Fourth Industrial Revolution

Tracking Sensors Journalism takes advantage of the sensors embedded in different devices to generate news in real time, such as geolocation data from users and algorithms on geolocation platforms that use browsers such as Waze, Google Maps and government traffic systems, drones, smart watches, and other wearable technology.	Artificial Intelligence The Internet of Things establishes machine-to-machine communication between communication objects (AI robots) to share data with automated systems of news agencies and journalistic organizations with non-human production or low human interference. Examples are data from earthquake seismographs and crime statistics. In Brazil, the G1 portal used cross-referenced electoral data from each city to generate hyperlocal news from 5564 cities in 26 states
mMTC Mobile devices—5G Massive machine type communication using the Internet of Things for objects connected to high-speed networks that allow for massive and instantaneous exchange of data. IoT benefits from the mobile structure in cases where speed, low latency, and reliability are relevant characteristics	Big Data, IoT, and narratives Large collections of data (big data) are one of the characteristics of the industrial revolution 4.0, and the Internet of Things relates to the environment, enabling the use and reuse of data in dynamic narratives that adjust between volume and variability. To this end, other typologies converge into this category, such as sensors, AI, 5G, and dynamic data generated by humans or objects

Source: Own elaboration (2023)

The relationship between IoT and journalism is becoming increasingly closer with structures built to incorporate real-time use (for example, traffic data fed by users and sensors), complex narratives and reports that use sensors (data set tracking), artificial intelligence, enhancing 5G technology, and large collections of data (big data). These typologies are visible on the Internet of Things in journalism based on the visibility of the Fourth Industrial Revolution.

Platformization

The Journalism of Things is currently based on the increasing platformization of society, mainly powered by the actions of *Big Tech* companies and their dominant digital infrastructures (Birch & Bronson, 2022). This means that social sectors, including journalism, are increasingly having to adapt to the logic of digital platforms (Dijck et al., 2018). These companies create the structural bases of the contemporary world, exerting a strong influence on institutions, the economy, and social and cultural practices. Platforms, as highlighted by Poell et al. (2022), give rise to multilateral markets, acting as "matchmakers" by connecting end users, a wide variety of companies (including journalists, advertisers, content creators, etc.), governments, and non-profit organizations. Each group of actors, including end users, represents a "side" in the platform market.

According to Dijck et al. (2018), online digital platforms are programmable digital architectures with algorithmic processing that organize interactions between people, corporate entities, and public bodies, as well as collecting, circulating, and monetizing data from these users. Algorithms are automatic instructions that transform information into desired actions, filtering large amounts of data and connecting users to content, services, and advertisements. Platform studies mainly research the performance of social media platforms, but research into platformization occurs in various fields, such as science and technology studies (STS), new media studies, critical data studies, algorithm studies, law (Birch & Bronson, 2022), and journalism (Barbosa, 2023; Bell, 2016, 2017; Dijck et al., 2018; Jurno & D'Andrea, 2020; Napoli, 2021; Nielsen & Ganter, 2022; Poell et al., 2019, 2022, 2023; Zhang, 2022; Simon, 2022).

With platformization, the production, circulation, and consumption of news are shaped to the logic of the platforms. For journalistic media, this represents two sides of the same coin. On one side, adapting to the rules established by platforms results in less revenue, a gradual loss of autonomy and credibility, and relativization and flexibility of values (D'Andrea, 2020; Dijck et al., 2018) due to the dominance of big tech. Its growing influence in society makes it difficult to create and maintain media platforms that are specific to journalism, such as websites and applications, which, according to a Reuters report (Newman, 2022), lose space in consumers' habits in terms of direct access. Audiences are increasingly targeted through social media or search engines. But on the other side of this coin, social media platforms (linked to high-tech companies) also drive innovation, offering pre-formatted structures for the development of journalistic products.

The term platformization of journalism addresses issues resulting from the Internet of Things, taking into account that ubiquitous journalism on different platforms can lead to the development of new formats or to cross-matching traceable data by the IoT, which occurs in two main ways: the data is either collected and processed by objects or human actors in automated systems or the data is given new meaning by the proliferation of sensors and devices that are connected to networks and spread the generated data.

In fact, the platforms act as catalysts for data originating from the Internet of Things. Journalism, in turn, can increase its narratives based on this approach to IoT and the mobility of data and objects in the IoT's ubiquitous computing. This not only involves technical issues, but also ethical, security, and privacy issues. The capacity of artificial intelligence together with the IoT's interference leads to an emerging relationship between journalism and the agency of non-human actors, machine-machine, and machine-human. The discussion reaches the field of data-based journalism (Barbosa, 2007) or automated journalistic systems (Santos, 2020).

VR, AR, MR, the Metaverse, and Drones at the Intersection with IoT

One of the more recent devices with the potential to generate media and change communication are high-tech Mixed Reality (MR) glasses, which offer immersive and experiential digital universes that involve Virtual Reality (VR) and Augmented Reality (AR), which have potential to add to the Internet of Things.

Virtual Reality aims to provide experiences mediated by sensory stimulation devices that provide immersion and interaction, enhancing the feeling of being present in virtual environments where the user has a 360° view (Lima, 2022). AR is a technology that reproduces digital information in the physical world (Pavlik, 2019). Unlike VR, AR is a multimedia and multisensory resource that does not aim to replace the physical world, but to add to it, not only in terms of image, but also sound (Lochrie et al., 2018; Pase et al., 2020), and conceptually speaking it comes closer to IoT considering the physical and virtual interface as a layer in which data can spread from objects and sensors.

Both technologies are not new, but over the last decade they have seen a resurgence due to recent technological advances. The technology industry continues to invest in them. It periodically launches Mixed Reality devices consistent with the Fourth Industrial Revolution of connected and networked technologies. Apple, for example, inaugurated its entry into Mixed Reality technologies with the launch of Vision Pro glasses, in June 2023. This device is controlled by one's eyes, voice, and hands. Equipped with several applications, users can see what is around them in the physical world while using the glasses and can choose to make the lenses transparent so that other people can see their eyes. The device is also equipped with cameras and microphones, allowing you to record videos and take 3D photos. Meta, which strives to be one of the biggest drivers in this market, launched its Meta Quest3 glasses. Compared to its predecessor, the Meta Quest2, this new device has improved its ability to combine virtual elements with real ones and offers enhanced screen resolution, among other improvements.

The most recent MR glasses can connect to the Internet and are designed with mobility in mind. They can communicate with humans and non-humans, joining the hyperconnectivity of devices so characteristic of IoT (Barcellos et al., 2017). New possibilities are opening up for journalism from the perspective of the Internet of Things. We shall give a few hypothetical examples to illustrate this. These devices can facilitate the work of a video reporter as it captures photos and 3D video and audio without that reporter having to hold it in his or her hand. In the newsroom, these devices can send captured data in real time and include it in news reports and web pages. Since the images are taken from the user's eye level (while wearing the glasses), it simulates what the user sees, facilitating immersion in places where specific events are taking place. This can happen in real time, for example, when covering a demonstration.

In terms of consumption, there are countless possibilities. One of which is that these devices are capable of collecting various amounts of information using one's eyes, head, hands, and body movements. This information data, in the logic of IoT, can be interconnected with commands and map attention patterns, preferences, and behaviors. This data, together with algorithms, can provide personalized news without the need for clicks. So, we can wear MR glasses while having breakfast and consume news that is pre-selected by artificial intelligence, without the need to use our hands, only elements that open in Augmented Reality. Another possibility is to simplify user interaction with immersive narratives, using only eye movement. For example, this ability to capture data and share it with other users in real time could be used by fans at a football match who could take 3D images with their glasses and then share them with users at home who would have the option of choosing which viewing angle they would like to watch the game from, as if they themselves were at the game (Santos, 2016).

In addition to developing devices, technology companies are also seeking to develop the metaverse, which is based on a hybrid reality where the user, using MR devices, can carry out activities, including consuming journalistic products based on VR and AR. If it goes ahead as planned, the project will only come to fruition in 10 or 15 years (Bonfim, 2021), as it depends on infrastructure that does not yet exist and further technological improvements resulting from the popularization of gadgets (Orgaz, 2021). The development of the metaverse is a construction of hyperconnected platforms that serve as the basis for products and services, including journalism. However, it is still too early to say to what extent they will actually become part of the general public's daily life or whether they will be products for more specific audiences.

These are possibilities for the not-too-distant future when the structures will be ready and the technology a little more advanced and accessible. For Santos (2016), combining the possibilities of MR devices with IoT (following the logic of games) could be the key to connecting more young audiences to journalism. According to Pavlik (2019), exploring new forms of developing and delivering content that integrates with the technological, cultural, and economic changes is a priority; it is a way of maintaining and meeting the consumption habits of a growing portion of the public, especially younger people (Pavlik, 2019).

In addition to immersive technologies (VR, AR, MR, and metaverse) being used with the Internet of Things, drones also occupy a central space in terms of ubiquitous journalism as they are equipped with sensors, they are mobile (aerial), and they use 5G technology with 4K cameras. Drones are unmanned aerial vehicles and are currently equipped with various devices (Pavlik, 2020; Prudkin & Mielniczuk, 2019). A drone is both a computer and a robot that can fly, move in various directions, and rotate around on its own axis, in addition to hovering in the air. For journalistic organizations, drones are a resource that complement, facilitate, and reduce production costs as they take aerial

images in a practical, safe, and cheap manner, replacing the need for a helicopter or a small plane (Prudkin, 2019).

Drones are very useful within the logic of the Internet of Things as they are capable of collecting data and sending it in real time, in addition to responding to remote commands. For journalism, which already routinely uses this equipment, a drone connected to a newsroom can provide the journalistic team with lots of data that would be otherwise difficult to obtain. Current technology allows drones to generate high-definition photographs and videos, thus enriching the journalistic visual narrative with aerial images. They can take images of the land (mountains, cities, people, buildings, etc.) from different altitudes (Prudkin & Mielniczuk, 2019). These images provide other points of view not otherwise visible from the ground, enhancing one's understanding of certain situations and contexts (Pavlik, 2020). Furthermore, drones can collect data on radiation, temperature, air pollution, motion, and deflection of obstacles. They are also an important resource in higher risk situations or unfavorable socio-environmental contexts (Prudkin, 2019). These devices can also generate material for immersive and experiential journalistic content and are capable of volumetric capture and recording 360° video.

Despite the various benefits that drones can bring to journalism, including its close relationship with IoT, there are discussions around its legal and ethical implications, especially pertaining to issues such as invasion of privacy and the creation of intentionally false content. For this reason, Pavlik (2020) states that the use of drones in journalism requires adherence to the highest ethical standards.

Final Considerations

As we can see, the Internet of Things is already a reality in journalism in several ways. Technological development leads to new opportunities, and there are many future perspectives as a result of the proliferation of platforms and data generated and spread from objects, humans, and systems (traffic, communication, environmental, industrial). In some cases, like the immersive and experiential content for VR, AR, and MR, technology still needs to advance and become more accessible in order for journalism to find a suitable context in which to use its narratives. It is currently being experimented with, but we are not yet able to use it on a larger scale. Drones, on the other hand, are already being used in journalism. They are very useful and versatile devices and have the potential to increase the range of possibilities, but there are still some ethical and legal issues that need to be resolved.

In terms of the impact of the Internet of Things on journalism, usage trends are still developing or being used experimentally. We find it important to point out the tensions of the Internet of Things in journalism. There are ethical questions that need to be addressed with the invisible IoT universe as it is not a tangible, materialized platform, but rather a set of high-tech sensors with a

close physical and the virtual relationship that explores the ubiquitous computing infrastructure, 5G networks, data collected from urban systems such as toll roads, car navigation applications, an invisible network of sensors spread throughout the cities, devices, wearable technologies, and other types of interactive objects.

As we have seen, journalism faces a challenge of a different nature when appropriating the Internet of Things, and trends indicate formats that adapt to the language of this IoT situation. In the past, it was characterized by its ubiquitous and pervasive computational sensors; however, new actors are now creating and making the concept more complex, such as artificial intelligence, platformization, and big data. Certainly, the many uses of IoT and trends in journalism will differ according to the particular national, regional, and local contexts in which journalistic media operate, whether *legacy media* or different types of digital natives.

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CHAPTER 10

Audiences for the Journalism of the Third Millennium

Lila Luchessi and Mariano Mancuso

News Production Cycles for Another Time and Space

In the current unstable and ever-changing media ecosystem, journalism is forced to rethink its limits. Internet speed and the omnipresence of mobile devices redefine the traditional time and space references that used to determine the creation of news content.

Periodicity used to establish the rate for creation and publication but is now affected by an increase in consumption speed. Interested in the present as a timestamp, Internet users push producers to remove layers of information, causal contexts, and time serializations.

At the same time, the usual criteria to determine if something is newsworthy have become obsolete. The emergence of new participatory audiences that not only consume, but also create and spread information, has put in check the asymmetrical relationship that had prevailed between journalists and their audiences in the twentieth century.

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The adjustments made to bridge the gap between the interests of producers and users (Boczkowski & Mitchelstein, 2015) cause a weakness in information producers. The informativeness of topics that make it possible to retain enough traffic and an audience flow to sustain the company's finances is not always acceptable for demanding users.

Given that the number of users is decreasing, segmentation and direct communication with potential clients also lead to a decrease in advertisers that threatens the finances of journalism companies.

This also modifies the body of knowledge that is now essential to produce, consume, and share information. The logic of traditional journalism no longer applies. Those who manage relevant data for people to coexist in society need to have other knowledge and skills that exceed their usual roles.

News values that have organized production of information for decades have changed and, with them, the ways of producing news. Journalists accept with resignation that they have lost their central position and focus on trying to satisfy—always late—the new demands and ways of consuming information of new digital audiences (Luchessi, 2016).

Facing a multiple, fragmented, and juxtaposed universe of audiences, media organizations broadly reconsider their information offering. Like before, audience rates determine the course of information, but now, given the large amount of data on audience interests and consumption, media companies interpret that data with a bias that proposes a certain immediate relationship with their audiences.

Metrics condition contents. Ever since traditional media have started collecting consumption data, the course of the offering has been determined by coverage (gross and net) or a focus on ratings.

In digital ecosystems, these metrics not only track navigation within each medium, but also in each of the articles published. Intersections with horizontal interactions, decisions to spread content in microblogging accounts (Jenkins et al., 2013), and the conversational exchange arising from that puts users in a central position.

Information professionals are limited to a role related to providing a very specific service: satisfaction of a few users that want to confirm their assumptions and be informed of news that do not necessarily coincide with what Twitter (renamed X) bubbles deem essential.

Politicians, journalists, and citizens that are influential in their peer groups, in small capsules (Muraro, 2000), discuss topics against the flow of digital discussion groups in which more ordinary members of society interact.

The current journalistic production process adapts each day to the consumption practices of its diverse audiences, which it easily segments, and to the digital technological innovations that set the pace for news production and circulation. In this sense, the latest technological innovations focus on speeding up news production automation processes, while journalists focus on tasks that are less informative and more related to user engagement.

All these changes in the routine of journalism have also changed the measures that determine the informativeness of the news. As Luchessi (2015) suggests, the incorporation of digital technologies as essential tools in journalistic work poses three issues: the loss of the asymmetry that affected journalism after the emergence of audiences as information producers and disseminators; traditional analytical categories for analyzing news production are no longer suitable for this present; and the shift from periodicity to immediacy requires a redefinition of roles and functions in news production.

Journalists no longer have an advantage, in terms of knowledge, over their audiences. The relationship is often considered in terms of equality or inverted asymmetry when audiences know more about a subject than the journalist. At the same time, news values change, and now consumption practices, search criteria, and the potential of content to go viral determine the hierarchy of the information offering. All of this within news constructions that reach higher levels of readers and circulation because of social media as the preferred space for journalistic content to go viral (Luchessi, 2015).

In view of the central position assumed by audiences in this new media ecosystem, journalists reposition themselves in the information process. They abandon the central role they used to have as information disseminators that is relevant for society, as intermediaries between information sources—to which they used to have privileged access—and audiences. Their role of verifying those sources in order to offer audiences the information that is essential for their daily lives, of processing and presenting complex situations to citizens in a simple way, no longer defines their work.

Due to the widespread use of new digital technologies, there are more and more people that have access to the tools necessary—through web media and languages—to produce and spread news. Thus, a network of messages that are quickly spread from one mobile device to the other is created, without a journalistic screening or mediation process to select, edit, and prioritize news (Luchessi, 2015).

What digital audiences consume, instant data about their likes and dislikes, shapes the agenda of news. A gap appears between the interests of journalists and of their audiences, who often value soft news (Boczkowski & Mitchelstein, 2015).

Digital audiences choose entertaining and light content. In general, most facts supporting this kind of information do not develop from the journalist-source relationship. Sources talk directly to audiences. There is no professional treatment of data in mediation, but it simulates direct contact, a lack of mediation. This logic breaks the traditional way of connection. Journalists are forced to rethink their role in light of information and data management.

Given this new relationship among sources, journalists, and audiences, news production is no longer the most relevant place for journalism, and the spotlight is now on editing information produced elsewhere. Those productions are not created according to the professional criteria of those who manage

news, but to the intuitive forms established in the relationship between producers and consumers.

These constant changes—caused by the inclusion of information and communication technologies in daily life—and audience appropriations—that add practices, framings, and topics—completely reconfigure the criteria for newsworthiness.

Contents produced by audiences, with an increasingly higher access to tools to produce and distribute content, now set the pace of digital communication (Luchessi, 2015). Journalism tries to keep up, to adapt to this pace. Its main professional contribution to information circulation is an attempt to edit and communicate news. Its role is to adapt to sorting and distribution tasks.

Because of this distancing from traditional news-making tasks, journalism no longer defines topics or directs social conversation. Criteria that govern the selection and prioritization processes of professional and amateur contributions report unconventional ways to determine if something is newsworthy.

One of the most relevant current criteria is the potential of news to go viral (Luchessi, 2018). In the first years of digital news, speed was at the center. Immediacy was the priority and determined the organization of information portals. Under these conditions, the focus is on news reach and impact. Thus, the most relevant task of the process changes hands and moves users to a central position. News distribution moves production and producers away from the center and threatens the profession itself.

Whether a piece of news goes viral is linked to expanding the number of producers and distributors greatly with the massive engagement of audiences in the public debate. If a piece of news goes viral, has a lot of views and shares, the media cannot resist prioritizing and redistributing it, although it is no longer new. If a piece of news goes viral, traditional news values no longer apply, as this guarantees the media that new audiences will be reached.

Media quickly give up their role as organizations that shape the news agenda if an article, a picture, a piece of information, a fact becomes a trending topic or the most shared or commented content in the digital ecosystem. Editorial offices rely on the proven success of social media, outside of the journalistic process, to determine newsworthiness. “The audience is responsible for selecting and prioritizing, so only edition is left for the journalist” (Luchessi, 2015).

Despite the focus on the content made viral by audiences, the media cannot effectively join the online conversation. A one-way understanding, characteristic of the asymmetries of traditional journalism, prevails in media companies even today. The new media ecosystem and the new demands of these participatory audiences that consume but also produce and distribute news do not seem to assume this contradiction.

Media are late to reflect the interests of audiences because they only react when the existence of that interest is confirmed, when the topic becomes viral. Media organizations and journalists pursue—rather unsuccessfully—news interests that are not their own and that, as such, they cannot foresee. In this sense, actions that give meaning to journalism—verifying sources, checking

information, contextualizing, and prioritizing—are set aside in the face of the immediacy of what has already proven to be attractive in social media (Luchessi, 2015).

Journalism's goal of creating relevant content for society is, thus, replaced by the urgency of having that which is viral. And with that logic and that urgency, material conditions for the journalism practice are also ignored. There is a direct correlation between the lack of investment in editorial offices, the performance of multiple activities and the lack of training for journalists on this digital ecosystem, and the creation of news that do not meet even the minimum information quality parameters.

Participatory Audiences and Global Disparities

The current relationship between audiences and news content is new and shifting. Since the emergence of the Internet, it has revolutionized access to information, changed society's ways of consuming content (Romero-Rodríguez & Torres-Toukoumidis, 2018), and expanded traditional media's possibilities of conversation. Shortly after, the Web 2.0 redrew the limits between producers and consumers, giving rise to the appearance of *prosumers* (Liuzzi, 2014).

The notion of *prosumer* describes the overlapping of these roles of consumption, production, and dissemination (Liuzzi, 2014). This renewed player expresses its central role in today's media ecosystem through the incessant spreading of user-generated information and entertainment products on the web (Scolari, 2013).

In this media ecosystem, audiences engage with the information content they consume. Digital storytelling arouses, especially among young people, an appetite for stories that offer immersion, agency, and involvement with a multidimensional world (Murray, 2016).

In turn, these new audiences—who intuitively use communication interfaces, platforms, and technologies—are willing to contribute to information construction. More and more frequently, users alternate between consumption and production (Igarza, 2009), which makes it necessary to rethink the classic relationships between journalists and audiences. Not only the new asymmetries that arise (Luchessi, 2016), but also their potential connections as co-creators within an increasingly dynamic news production process.

Digital users break the traditional stereotype of the public: that audiences who receive content only limit themselves to interpreting it. For these new users, the logic of news consumption goes from watching to doing (Aguado et al., 2014). According to Murray (2016), users are moving away from sequential activities (watching, then interacting) and toward simultaneous but separated activities (interacting while watching) and a combined experience (watching and interacting in the same environment).

A core characteristic of these new audiences is that they are multiple. They become fragmented, become gaseous (Scolari, 2013). The public that awaits in front of the device at the scheduled time for the news of what happened during

the day is on the verge of extinction and is being replaced by diverse users that search for what they want, when they want it, taking advantage of the immediacy of the multiple screens available.

This omnipresent, interstitial, and social consumption of news (Igarza, 2009) is the result of an ecosystem of connective media (Van Dijck, 2016), which gives rise to a social organization that is not neutral at all.

This dynamic infrastructure influences and is influenced by social and cultural norms. "It has comprised hundreds of players, engaged millions of users, and affected both local and global normative and legal schemes" (Van Dijck, 2016: 45). This ecosystem enables a connection among audiences and, most of all, determines such connection. Media also need to adapt to this new logic in communication.

The development of the Internet and mobile telecommunications accelerated the connectivity process globally but did not eliminate the recurring economic and social disparities. According to data from the International Telecommunication Union (ITU), a specialized agency of the UN, 16 percent of the world's population were using the Internet in 2005, compared to 66 percent in 2023. This increase was higher in least developed countries (LDCs): in that 17-year period, the percentage grew from 8 to 36 percent (ITU, 2023). Despite this relative improvement, LDCs are still behind as compared with central countries.

In terms of gender, it gets worse: The gender gap in developing countries has remained stable since 2019. It is among young people (15- to 24-year-olds) where Internet access in developing countries has recently improved. As of 2022, 48 percent of young people were online, almost double the rate of 2019 (26 percent). For this young segment, the gap between developed and developing countries is smaller (ITU, 2023).

As regards mobile device bandwidth connectivity, in spite of the rapid growth in developing countries—an average of 37 percent per annum in the last decade—penetration rates are less than half the world average (from 42 per 100 subscriptions to 87 per 100 subscriptions). Only 83 percent of population in developing countries is covered by a 3G network or above, as compared with 95 percent in developed countries (ITU, 2023).

While 17 percent of the population in the LDCs cannot access the Internet, another 47 percent has access to it but does not use it. All urban areas in the world are covered—although with a much slower speed in developing countries—but in the rural areas of LDCs, only one-third has 4G coverage and 13 percent has no mobile signal at all (ITU, 2023). These material disparities evidence issues that cannot be solved with Internet access.

As to costs, despite rapid falls in mobile-broadband prices, global affordability is still elusive, in particular, in developing countries. Although the situation has improved, it is because prices in those countries were higher. The difference between mobile and fixed broadband is wider than elsewhere in the world. Fixed broadband costs are around three times as much, but only twice as much elsewhere (ITU, 2023).

The lack of infrastructure for international connectivity is another barrier that increasingly stands in the way of populations living in LDCs. In 2022, the average international bandwidth usage was 38 kbit/s in LDCs, while the global average is 233 kbit/s (ITU, 2023).

This disparity is confirmed by another fact: Internet speed in each country. In Latin America, Chile has the fastest fixed broadband connection and is the third country in terms of global performance with a speed of 246.39 Mbps. Uruguay is in the 26th place with 143.34 Mbps and Brazil in the 30th with 131.94 Mbps. In contrast, regarding speeds in mobile devices, in which most of the news are consumed, Uruguay has the best speed with 72 Mbps, very far from the 211.58 Mbps in United Arab Emirates, 167.98 Mbps in China, or 143.44 Mbps in Norway (Speedtest, 2023).

Mobile Audiences and Interaction Bubbles

The fact that news consumption is centered on mobile devices reflects the audiences' new ways of consumption that are becoming more central in the current media ecosystem. This is a novel relationship among time, space, formats, and news distribution media (Igarza, 2009).

This new generation of media consumers has a different attitude toward content (Scolari, 2013). We are witnessing a process of *mediamorphosis*: a paradigm shift from production, design, and curation that has transformed audience expectations in view of the news offering (Romero-Rodríguez & Torres-Toukoumidis, 2018).

Unlike previous generations, these consumers use their fast-paced routine, comprised of micropauses, to consume, produce, comment, or share contents, which are mostly brief. And they can do this thanks to mobile devices, on the go, from wherever their urban activity has taken them (Igarza, 2009).

This cooperative mobile culture contrasts with classic spectators' ways of consumption. Producer and consumer are no longer fixed and distant roles, but players in permanent interaction (Jenkins, 2006). Participation is the way in which users relate to content, but mainly the way in which they relate to each other at present.

A series of clear characteristics define these new audiences: fragmented content consumption; nomadic access to such content, anyplace and anytime; appreciation of formats designed for participation; preference of narrative expansion in different platforms; and alternation of production and consumption roles (Liuzzi, 2014). Faced with these new audiences, the media are forced to change their way of communication completely.

In a saturated and changing ecosystem such as the current one, media companies start to assume that they need to keep in mind user consumption habits (Romero-Rodríguez & Torres-Toukoumidis, 2018).

These new audiences are then named *prosumers* because they not only consume, but they also produce content. Their relationship with news breaks the molds; it is now omnipresent, interstitial, and social (Igarza, 2012).

Content is part of a new language that proposes a fluid, omnipresent, and social understanding of interpersonal communications (Aguado et al., 2014). News is no longer a product for final consumption but is now part of a network that generates value from the social relationships that users create with their interactions.

The media environment, where these users consume news, has been defined, as summarized by Scolari (2010), "by the consolidation of global information networks, convergence processes, and the explosion of new communication media and platforms, the emergence of transmedia storytelling and the appearance of a many-to-many communication paradigm" (Scolari, 2010: 24).

Users consume, produce, and are also consumed by media. For decades, the media industry produced content without knowing—with the current precision—who their audience was or what it looked like. Nowadays, this participatory audience consumes information from various devices—in particular mobile devices—with the digital fingerprint that such customized consumption entails.

The media-user relationship is as personal as can be. There is a shift from a media ecosystem focused on capturing audiences for ad sales, which is part of the traditional broadcasting model, to a new digital environment in which user information makes it possible to monetize their actions and interests in the narrowcasting models (Aguado et al., 2014).

Content customization, which for a long time has been the subject of research by large platforms that dominate the Internet—known as GAFAM (Google, Apple, Facebook, Amazon, and Microsoft)—also encompasses smart products (cars, refrigerators, etc.) and wearable technologies (watches, bracelets, eyeglasses, and even clothing) from which we can consume. A whole universe of businesses and platforms to connect with new audiences who media companies, rushed by the increasing audience and income losses, do not fully embrace as a possibility to mitigate the crisis of its financing models.

All of these products and technologies give privileged access to important information on users, their preferences, their routines, and their social connections (Aguado et al., 2014). Collection and analysis of such data are key to understanding this fragmented society of minorities (De Bustos & Casado del Río, 2016).

Media have been taking advantage of this asset only for a short time, and almost exclusively to apply more or less strict paywalls and to develop apps as a way to compensate their decreasing ad income and their increasing audience loss (De Bustos & Casado del Río, 2016).

Confirmation Bias in News Production Cycles

In the current media ecosystem, changes in audiences give way to new information habits in society. The Internet is nowadays, in particular for young people, the main channel to access information. After the COVID-19 pandemic, this scenario deepened while audiences, in particular young groups, began losing interest for news content at a faster pace, overwhelmed by a constant excess supply of digital content (Quian et al., 2023; Reuters Institute, 2023).

The endless volume of user-generated content entails that information treatment is more specific, as well as the need to localize events and information that account for a demand that is inserted in a local context and that requires hyperlocal accuracy.

In Argentina, in particular, information is consumed through all media, even in social media. Digital media are still in control: for 77 percent of people, they are the main source of information, as compared to 92 percent in 2017 (Reuters Institute, 2023). This trend is mirrored globally. Overstimulated by an almost endless amount of information options, audiences no longer require more information, but better journalistic offerings, news that are clearer and more relevant for their lives.

Both for information and for entertainment purposes, these new audiences are perfected as information hunters and gatherers (Scolari, 2013). The fact that they can engage with content makes them enjoy being immersed in stories and reconstructing them by linking content within the same storytelling world (Jenkins, 2006; Scolari, 2013). It is increasingly evident that the media and their audiences need each other.

While markets are saturated with content and information, media companies are more and more dependent on whether consumers are committed with the content offered (Scolari, 2013). This excess supply does not mean we are more knowledgeable. Society's information flow grows each day, hand-in-hand with technological development, but human capacity for assimilation remains the same. This promotes blind consumption, or plainly the rejection of information, as shown by the survey carried out by Reuters Institute (2023).

Given this critical situation, journalism needs to be reinvented based on new strategies and immersive storytelling developed around user experience (Romero-Rodríguez & Torres-Toukoumidis, 2018). Media must learn how to co-create news with their audiences. In particular with younger people, whose current practices anticipate information habits that will become the norm in the future.

Han (2021) warns that the current information overload prevents us from seeing facts as they happen. This not only affects audiences, but also journalists and decision-makers in media companies. "Information falsifies the events" (Han, 2021: 7). The huge quantity of data that audiences generate upon contacting information content, the digital fingerprint that media collects, reinforces certain previous notions that those media companies had about their audiences and practices.

They confirm information biases that prevail in the interpretation of metrics and in decisions, subsequently taken, on strategies to adapt and connect to these audiences. As stated by Sosa-Escudero (2019), having too much data does not mean having all data. And, from our perspective, having too much data does not mean that the data obtained is meaningful.

Metrics—the rating of our time—show user's actions, but not their motives or if other content that was not available would have been necessary for them.

Metrics are a photograph; they portray specific moments that do not show the whole journey. Upon choosing an image to make a decision, form criteria,

create agendas, and give rise to public conversations, the contextual framework is ignored.

Media have so much information on audiences that these organizations think they know them, but, in fact, they only know their bias. "Information alone does not illuminate the world. It can even darken it" (Han, 2021: 11). The dark side of data collection methods supports and extends the distance between media and their audiences.

Faced with the algorithm, human beings lose the ability to act on their own. Algorithms, situated between journalists and audiences, are black boxes. Even without access to their internal systems, without knowing how they work or collect information, decisions are taken based on their results.

Despite the data available to the media, they repeat their journalistic strategies and multiply the news offering (amount over quality), in particular, with the incorporation of new technologies, such as AI, with the main purpose of accelerating and increasing news production. Moreover, the media continue to turn their backs to audience participation and the creation of information communities. They either exclude audiences from news production altogether or foster dialog among different audiences, but then decide to stay out of it.

Confirmation biases of media companies consolidate a repeated interpretation of their audiences and, far from reeling them in, they keep pushing them away. The biased view of users, their positions, and the data they share becomes a practice that tends to take the part for the whole.

In this context, homogenization of voices, frameworks, and ideological-political stands creates a sense of unanimity that is not actually unanimous and that does not actually exist.

Diversity, which seemed like an attainable goal, tends to unify criteria, homogenize contents, and make social discussion binary.

If, as asserted by McLuhan (1964), the medium is the message and language is governed by algorithms, the fact that the algorithmic construction of social meanings has a binary result causes everyday practices to be binary as well.

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CHAPTER 11

Challenges and Opportunities for Journalistic Innovation in the Big Data Era: Evolution and Role of Media Labs

Ainara Larrondo Ureta and Santiago Tejedor Calvo

Stimulating Factors: Beyond Technology

In the field of journalism and media companies, innovation has become a fertile field for study and research, one with a clearly interdisciplinary character. What is often called 'media innovation' or 'innovation in journalism' offers perspectives linked to managing the media at different levels (productive, distributive, organizational, etc.), the digital humanities, media economics, and media technology. At the theoretical level, most approaches to the phenomenon of innovation in the media find support for their propositions in organizational culture and the culture of innovation (Steensen, 2018; Hogh-Janovsky & Meier, 2021).

Talking about innovation means, then, referring to new conditioning factors of different kinds, and not only technological ones. Particularly important are professional, market, and consumption factors, so the ideas of innovation and technology should not be used synonymously, even if the media and journalism

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are experiencing a new impulse characterized by the rise of algorithms and the promises of artificial intelligence (AI).

The systemic model proposed by García-Avilés et al. (2019) leads to recognise that, over and above experimenting with new technological tools (360° cameras, drones, bots, etc.), innovation departments have put effort into boosting innovation in terms of content in a way that is not dependent on technology, but rather on the creative skills of the newsroom professionals. Related to this, and over time, these departments have taken on functions linked to the adaptation of business and product models, similar to those done by Research and Development departments (Herrera-Damas & Satizábal-Idárraga, 2023: 3). This working model can be especially useful to surpass or survive disruptions in the media market (López-Hidalgo & Ufarte-Ruiz, 2016). The aim, then, is to promote spaces and teams that can maintain a certain autonomy in order to avoid being conditioned by the rhythms and needs of other teams within the corporation, but which are in contact with the day-to-day business and routines of the other departments they work with, in order to respond to their needs in terms of adaptation, understanding that this can offer the company an advantage in overall terms (Mills & Wagemans, 2021).

One of the clearest examples of this reality can be found in the struggle against disinformation that is being undertaken by the major media brands. Within these organizations, innovation teams have made efforts in recent years to develop specific verification tools supported by technological and communications innovation (Vázquez-Herrero et al., 2019).

Over time broader perspectives have arisen that consider different categories or areas in which innovation can be carried out, beyond the new overarching narratives based on techniques such as Augmented Reality, Virtual Reality, surround video, or more complex or ambitious multiplatform narratives, such as transmedia. We are referring to areas such as platforms and channels, integrated solutions, new business opportunities and projects involving technological creativity (Bisso & Mills, 2021: 660). Although these latter are technology based, particularly on algorithmic technology, the creative factor is essential.

Given this situation, a large number of studies done up to now have taken it upon themselves to study media innovation focusing on two main questions or areas: first, the analysis of stimulating factors; second, the study of cases and experiences in order to look in depth at the cultural and economic factors that affect innovation processes internally, with particular attention paid to the matter of challenges and opportunities in the field of the traditional media (Capoano & Ranieri, 2016; Hogh-Janovsky & Meier, 2021). In this respect, the review by García-Avilés (2021) of over 300 Spanish- and English-language papers reveals some priorities in terms of research into media innovation, which are tools and technologies and organizational management and culture, especially business models and professional profiles. On the other hand, areas linked to the ethics of these innovations or educational and training implications have been underexamined (García-Avilés, 2021).

Regarding initial stimulating factors, the rise of the new information technologies—linked to digitalization and the expansion of the web as the fourth

major media platform—was decisive at the beginning of this century. After this, the online media gradually took on their converging potentials and, thus, their advantages in terms of developing differentiated and added-value journalism products—light products for quick consumption, more profound interactive multimedia and immersive products, specific products for the social media, etc.. In this regard, the new media products, in terms of new formats and contents, were the second factor that stimulated innovative pioneering experiences in the media (Dogruel, 2015).

The analysis of different cases has made it possible to specify different kinds of innovation initiatives linked to the sphere of journalism and the media, which can be classified into three main groups: innovation labs and incubators that have arisen from consortiums or private initiatives; laboratories linked to educational institutions (Capoano & Ranieri, 2016), generally universities; and laboratories developed within media companies, as internal departments or sections set aside from the organization's other units (Salaverría, 2015).

First Experiences

The breeding ground for the first-generation laboratories came into being in the early and mid-2000s, when the development of web media departments triggered changes within multimedia corporations that involved a new professional culture, one that was more convergent, more broadly based, and founded on a greater interrelation between offline and online operations, as well as among their professionals. This demanded a new organizational strategy, one that involved a rethink in terms of content and therefore also of training and education (Rogers, 2003; Seville, 2017). Even though convergence processes created some resistance to change—which can also be understood as resistance to innovation—over time a first generation of laboratories dedicated to innovation in journalism arose, principally in Western countries, towards the mid-2000s, achieving their apex in terms of development in the first decade of the 2000s (Mills & Wagemans, 2021). In this respect, with a certain perspective, it is possible to note that convergence has acted as a framework for action, one that has been behind many of the innovation decisions taken in journalism, even up to the present day, although now the convergence framework is not so critical as it once was (Larrondo-Ureta & López-García, 2021).

Traditionally journalism has been carried out as a profession that creates specific production routines and rhythms, necessary in order to counteract the changes and pressures that result from the volatility inherent to the news. It is, therefore, understood that the need to assimilate an overarching culture of innovation, with an impact on different operational aspects (organizational, educational, productive, distributive, etc.) of media companies, might initially create a certain unwillingness or discrepancies (Paulussen, 2016).

The pioneering labs were mainly created by US press organizations (*The New York Times*, *The Washington Post*, *The Boston Globe*, etc.), while notable examples in Europe were print media organizations such as *The Guardian* (UK), but also public broadcast media organizations in the UK (BBC News

Lab), Spain (RTVE Lab), and Italy (RAI, currently without a lab). Some press agencies also showed an early interest in these developments, an example being France Press (AFP) (Salaverría, 2015; González-Alba, 2017). In 2022, Zaragoza-Fuster and García-Avilés (2022) identified 28 laboratories in Europe. In Latin America, outstanding initiatives have been the Laboratorio de Contenidos of the newspaper *La Nación* (Argentina) and OJOLabs (Peru). A large number of Media labs have been created in Spain, with the Catalan *El Periódico* one of the pioneers. Furthermore, a number of very interesting cases in the sphere of digital native media organizations have arisen in this country, such as *El Confidencial* and *Quartz* (Valero-Pastor, 2020).

The initiative taken by certain public radio and television companies, such as the British BBC and the Spanish RTVE, has been of interest, and this has been noted by a number of investigations (Zaragoza-Fuster & García-Avilés, 2022; Larrondo-Ureta & López-García, 2021). More recently, different studies have also analysed the innovations undertaken, with considerable commitment, by local public radio and television companies, for example, regarding transmedia projects and social projects, in which media labs have been shown to be units linked not only to matters of production or content, but also to actions affecting strategy, development, and corporate social responsibility.

These developments have been called, in a general way, "experiments" (Clarke, 2019), something that has, from their very beginnings, given media labs a distinctive position, also with respect to the understanding of them by the companies that have created them. Indeed, these departments have enjoyed greater "institutional openness" compared to other departments (Chesbrough, 2006).

In fact, many of the current digital narratives (interactive documentaries, newsgames, podcasting, immersive reports, transmedia special reports, etc.) that are applied by the big media brands have resulted from the work and experimentation of these companies' media laboratories. In this regard, different studies have underlined the role of laboratories such as the RTVELab (Radio Televisión Española). In this laboratory, experimentation has been essential and is based on a structure of multi-disciplinary teams in which journalists work with graphic designers, audio-visual producers, and web developers. The aim has been to build teams of a size and structure that are appropriate to create flexible and adaptive units.

Over time, media laboratories have found a balance between the need to undertake specific actions in the form of specific products—that is, between actions linked to day-to-day operations—and the need to develop macro-type approaches, linked to all those matters that do not come up in the newsroom. These issues are the ones that make it possible for innovation to be understood as a form of adaptation to change (Wilczek, 2019), by being linked principally to business opportunities and risks, to educational and creativity dynamics, and to changes in society and audiences. In short, these are matters that are directly related to the restructuring of the media industry, a restructuring that began with digitalization and which, far from coming to an end, is a continuing process.

Advances and Development

As has just been indicated, the *raison d'être* of media labs lies in digital disruption processes, and so it has been considered that their progress was able to continue in the second decade of the century, going beyond the search for narrative solutions or those linked to content (Bisso & Mills, 2021). As units responsible for channelling the motivations and results tied to innovation in media organizations, labs have responded to problems linked to the nature of digital production, such as business and consumption models, or the new professional practices related to new tools and new styles of organizational management.

In fact, the natural evolution over time of media laboratories has led them, more and more, to seek solutions not just intended for the short term or which have not been implemented ad hoc in order to respond to problems linked to specific technologies. Innovation processes in the digital sphere have also been important to define and distinguish the online communication paradigm compared with other, previous media models, in which the innovation processes were much more gradual, or less radical, as is the case with the press (Boczkowski, 2005).

These second-generation labs mentioned above have not only managed to make progress in terms of practical developments related to the use of technology and creativity for the creation of new products and routines; these laboratories are distinguished by being able to go further and integrate into their activities internal communication strategies that can roll out to the organization their innovation achievements, as well as promote better two-way communication with the other departments. Furthermore, they have managed to create networks with other agents or organizations outside their own, in some cases creating significant external communication, also in terms of improving the image or reputation of the corporation (Hogh-Janovsky & Meier, 2021).

In the current professional and technological scenario, labs continue to distinguish themselves as outstanding spaces within the organizational and content-creation structure of the major media companies. It can now be said that, rather than just representing a modernization strategy or a commitment to differentiate the organization, they are now considered to be an absolute necessity (Herrera-Damas & Satizábal-Idárraga, 2023). This is due to their advantages and to their capacity to become a synonym for avant-garde and quality journalism given the new challenges, particularly those linked to the development of automation and other more advanced uses of artificial intelligence (Mills & Wagemans, 2021).

The growing permeability of innovation at the heart of media companies has meant that the importance of Media Labs has been recognized, and their development over the course of the last decade has meant that it is harder now to hear critical voices denying their permanence or need as autonomous or independent structures in the media. So, while the concept of innovation and the need to recognize it as a way of facing continual change in the sphere of the

media and journalism are still alive and well, there is nonetheless a certain questioning of media labs or at least those labs that are run with a strategy that tends towards the static or is not sufficiently dynamic (Cools et al., 2022).

Today, innovation continues to be essential to survival in the media industry (Weiss & Domingo, 2010) because consumption of the media will continue to change and, with it, the need to consider new solutions for the development of products based on creativity, technology, and a good balance, in terms of journalistic activity, between the goals of service and business. More than just acting as an adaptation to change, innovation is the best way to guide the reinvention of the media (García-Avilés, 2023).

This would offer a way of getting beyond an innovation style based on what Küng (2017: 15) has called "shiny new things", that is to say, innovations based on technology, and ones that are mainly a product of a particular moment. It would be appropriate here to include all those actions aimed at invoking innovation as a kind of fundamental mantra, without promoting specific actions at the practical level. That is to say, for many companies, considering themselves as innovative has not been sufficient if this mentality or aspiration has not been accompanied in practice by specific resources and formulas at the newsroom level. It is understood, then, that one of the most controversial aspects in relation to media labs is the matter of their survival.

In this regard, the so-called second-generation or 2.0 labs (Hogh-Janovsky & Meier, 2021; García-Avilés, 2023), which came into being from around 2015, demonstrate a greater sustainability, by moving away from an occasional function of narrative experimentation or innovative content development (Cools et al., 2022). In fact, these labs "apply a process of constant learning and dynamic change" (Hogh-Janovsky & Meier, 2021: 361), and it has been considered that maintaining them is inherent to the scenario of continuous change that the media is facing. The current labs not only continue to create journalistic innovations at different levels—organizational, management, economic, productive, etc.—but their very presence symbolizes a bid by a media organization to update and adapt constantly.

The labs also have to submit themselves to dynamics of change and innovation, that is, to adapt to new needs, now it is known that excessively autonomous operations, or ones that are independent from the rest of the corporations, may not be the best thing in companies in which the very idea or feeling of being innovative is one that is cross-cutting, reaching all divisions, departments, and teams (Valero-Pastor, 2020). So, there is a growing commitment to interdisciplinary labs and independent working formulas, but ones that are in cooperation with other departments, which need to be responded to and supported. Let us put forward the example of a corporation that needs to innovate its contents in order to give a solution to other problems, over and above the development of novel products, such as a way of boosting brand value and, also, of doing it based on values rooted in achieving the 2030 Sustainable Development and Corporate Social Responsibility goals.

Porcu (2020) refers to this approach with a reference to a working climate that encourages professionals to cooperate and learn mutually, to be flexible, and to be aware of any opportunities that allow the corporation to adapt and survive in the long term. According to the same author, this climate requires a settled internal communication, a culture of leadership, shared goals, and professional training and recognition. Authors such as Valero-Pastor and Carvajal-Prieto (2019) talk about "knowledge transfer for innovation".

The fact that the Media Labs focus on the new technologies to design, research, and experiment (Tanaka, 2011) means that certain experts continue to back their development at a moment like the present. In fact, today ever more advanced algorithmic applications can create the need to continue in a commitment to spaces for the development of new digital narratives. In this respect, in relation to the future expectations of the Media Labs, their sustainability is also an important aspect to take into consideration (Hogh-Janovsky & Meier, 2021). In other words, it is important to bear in mind for the long term that innovation requires a large proportion of the economic and human resources of the company.

In this regard, media laboratories maintain their connection to situations of technological uncertainty but with a philosophy of action that seeks more systemic or long-term strategies (Flew et al., 2012; Storsul & Krumsvik, 2013). This has been one of the main conclusions of a recent study based on the mapping of over a hundred media labs in South America, North America, and Europe, carried out under the aegis of the World Association of Newspapers WAN-IFRa (Bisso & Mills, 2021: 654). This analysis underlines the important role played by cultural factors, in terms of the culture of innovation, something that can be seen more easily in media companies in Europe and the USA (Bisso & Mills, 2021: 655). Furthermore, it indicates the development of new profiles, such as "journalism innovator", a professional with a high degree of knowledge regarding creative processes and use of the new technologies, but with the skills to coordinate multi-disciplinary teams and the capacity to cooperate with other departments within the same company. According to the same study, in this second decade of the century, Media Labs were a cultural and technological response to the internal and external conditions that had to be dealt with in response to the digital transformation and disruption happening at the time. So, now in the third decade, they are crucial resources in terms of the creation of the future of journalism, a quality journalism that is also profitable and aiming to have a positive impact for the audiences and communities it serves (Bisso & Mills, 2021: 673).

Conclusions: Present and Future Challenges

Based on what has been said above, and considering the major differences between private innovation laboratories, laboratories that have arisen out of educational institutions (Capoano & Ranieri, 2016), and media company

laboratories (Salaverría, 2015) within a dynamic characterised by "knowledge transfer for innovation" (Valero-Pastor & Carvajal-Prieto, 2019), this text puts present and future challenges into 20 categories. These are situations that offer complications and at the same time they contribute to profiling the scope of this kind of space, which is both the result of and seeks innovation (Table 11.1).

First, it is important to point out that innovation, as a concept is variable in how it is viewed, without ever losing its original essence. However, it is a term that has gradually acquired nuances, due, in many cases, to matters related to the given moment. There is, then, in this regard, the need to maintain conceptual reflection with regard to the scope, goals, and limitations on the action of innovating, a verb which, in many cases, has been misinterpreted in terms of its contributions and possibilities. Here below, the 20 challenges identified are grouped into 5 major spheres or areas (Table 11.2).

Table 11.1 Twenty present and future challenges in laboratories for innovation in communication

1	Solutions	6	Autonomy	11	Professional profiles	16	Transfer
2	Proposals	7	Cross-cutting	12	Organizational management and culture	17	Verification
3	Trends	8	Holistic perspective	13	Business models	18	Environmental commitment
4	Tools and technology	9	Formats and contents	14	Research methodologies	19	Ethics
5	Creativity	10	Production routines	15	Divulgation	20	Educational challenges

Source: Own elaboration (2023)

Table 11.2 General areas for innovation in communication and the media

Essential components	These elements are essential supports at all times for innovative practice, with a greater or lesser presence, but being present at all times in the processes being promoted
Ingredients for innovation in communication	These are the aspects that identify and define the innovative process in the media based on parameters that range from the particular to the general by means of interdisciplinary approaches
Areas or themes	Research has made it possible to identify a stock of thematic areas, which, without being exclusive, allude to the principal matters tackled by this kind of innovation
Instruments and stages	The application of a set of tools, processes, and stages, which are key aspects for innovation.
Overarching commitments	Based on a consideration that connects with the general moment and with contextual elements, it is possible to identify a series of overarching commitments that would have to accompany the innovation process

Source: Own elaboration (2023)

Considering these terminological nuances, 20 elements are proposed which, like challenges, invite us to reflect and project a present and future scenario for research and for carrying out projects. They are the following:

Essential components:

1. Solutions: These kinds of innovative spaces are designed and structured with the main goal of building solutions to problems or needs within the industry. So, what is considered is the need to create permanent spaces for dialogue and exchange between the academy and the industry, as well as, progressively, other social sectors and actors (Manfredi et al., 2019).
2. Proposals: Taking the last point into consideration, the action of innovating demands of these kinds of laboratories a permanent exercise in raising specific proposals, projects, or products. That is, there is emphasis on the importance of materializing reflections and conceptions resulting from the creative processes that are activated within the framework of this set of spaces designed for innovation. Ultimately, this is a commitment similar to applied research which results in and generates specific applications and results after prior research processes.
3. Trends: Innovation, both in the media and generally, must be able to identify and project inertias and future developments and qualities. The identification, monitoring, and study of trends has been shown to be one of the major milestones or, more precisely, one of the demands made of the work of the innovator which, based on accumulated knowledge (past) and current experience (present), has the capacity to look into the future, anticipating scenarios, problems, challenges, and, of course, solutions.

Ingredients for innovation in communication:

4. Tools and technology: Innovation in journalism must be inexorably tied to the technological scenario by means of the monitoring, testing, and assessment of technological developments in the industry, especially in a context in which technology has unquestionably acquired a primary role (Pérez-Tornero, 2020)
5. Creativity: Innovation in journalism is understood as a constant commitment to the capacity or facility to invent or create new processes, products, models, and, in short, proposals. The innovative process connects directly with the practice of creation, renewal, and proposition, aspects which, in many cases, contradict guidelines of profitability or viability in the short term.
6. Autonomy: The magnitude of the processes of innovation in journalism demands an autonomous way of working that can guarantee periods of time and resources with which to carry out studies, proposals, and analyses, among other deliverables, of quality and value. In short, it is not possible to conceive of this kind of innovative exercise in journalism as a

dimension unconnected to the requirements needed in the sphere of project design and management. The articulation of "real" and autonomous spaces for innovation in journalism is a key requirement for the success of these kinds of dynamics and working processes.

7. Cross-cutting: More and more, innovation in journalism is demanding (and will demand) cross-cutting viewpoints, methodologies, and teams that, with journalism as an axis and connecting thread, unite professionals from different areas or disciplines. In all cases, the journalistic factor should be the focus and heart of these multi-disciplinary teams.
8. Holistic viewpoint: Based on this last point, innovation in journalism must be supported by holistic perspectives that, with a view to disrupt, will look to renewed dynamics.

Areas or themes:

9. New formats and contents: The new media panorama, characterized by the consolidation of new user profiles and by the sudden appearance of different forms of consuming content using screens, means that formats and contents are two areas that are a priority, or even intrinsic, to innovative practice (Robledo et al., 2022)
10. Production routines: Together with that just stated, the study and improvement of journalistic production routines has become one of the major challenges for innovation in journalism, especially in a context characterized by the redesign of the media's newswriting structures and content-creation dynamics which, with AI, inaugurate major professional and research challenges.
11. Professional profiles: The identification and conceptualization of new professional profiles is one of the major challenges facing innovation in journalism, in a professional context affected by the automation of tasks and processes, the importance of algorithms, and big data, among other aspects. The goal would be to identify new functionalities and, at the same time, conceptualize their characteristics, as well as the skills and abilities that result from these new profiles that emerge in the sphere of journalism.
12. Organizational management and culture: Innovation in journalism, based on its holistic scope, must enter into aspects linked to processes for managing and defining the organizational culture of media companies.
13. Business models: This is clearly one of the major challenges for innovation in journalism, since it affects the viability of an industry that has undergone, in recent decades, a constant instability from the economic point of view. What is more, it is an area that connects directly with all the different elements mentioned above.

Instruments and stages:

14. Research methodologies: Innovation in journalism must be able to empower and renew the methodological processes that accompany research in journalism and in communication. The aim is to grant these kinds of processes the substance and rigour of scientific research in all their stages, approaches, and instruments, based on already existing studies.
15. Divulgation: The work of innovation in journalism demands a rich and varied practice in terms of exposition. Without forgetting the registers and deliverables characteristic of the academic sphere (articles, theses, reports, etc.), this work must be able to create new kinds of deliverables that can reach managers and other actors in the industry and across journalism in an eloquent, persuasive, and effective way.
16. Transfer: Linked to the last point, the work of innovation in journalism must confer the resources and spaces needed to transfer knowhow and results to the affected and interested sectors.

Overarching commitments:

17. Verification: The growth of falsified content and of dynamics involving the toxification of news mean that verification is a clear overarching commitment for innovation in journalism.
18. Environmental component: Based on the guidelines of the SDGs, the environmental component, in the broad sense of this term, must be one of the commitments present in innovative practice in journalism.
19. Ethics: Both the rise of fake news as well as dangers resulting from the automation that introduces AI (Tejedor & Vila, 2021) demand an ever-present and overarching commitment in the ethical component of proposals, developments, and projects resulting from the dynamics of innovation in journalism.
20. Educational challenges: Finally, a constant challenge is that related to promoting continuous training. This aspect affects two dimensions (Sánchez-García & Tejedor, 2022). First, the importance of revising and renewing, in a permanent way, the design of the curriculums of journalism degrees and similar. Furthermore, it is vital to commit, based on work resulting from innovation in journalism, to training plans for staff in the journalism industry, especially with regard to technological, ethical, and legal aspects and those related to formats.

To conclude, innovation in journalism is a scenario with a big future and a primary role both in the academic sphere and in industry, in a context involving several challenges: the gradual automation of tasks and processes, the reconfiguration of professional profiles, the consolidation of new habits of consumption characterized by the attention economy, and the ethical challenges

resulting from digital noise and the intentional viralization of fake content, among other things. From this point of view, this text has emphasized the importance of situating innovation in journalism as a crucial milestone for a more solvent, dynamic, and viable future, one that, furthermore, will have to smoothly connect the academy and industry.

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CHAPTER 12

Hackathons and Journalism: Looking for the "Innovation of Innovation"

Jose A. García-Avilés

Introduction: Hackathons as Open Innovation Events

Originally developed in the information technology sector, hackathons (hacking marathons) first gained popularity as a creative, problem-solving challenge *designed to drive innovation and entrepreneurship* (Trinaistic, 2020), as teams compete against each other to build creative solutions in a collaborative way while facing resource and time constraints (Chounta et al., 2023). While its origins are to be found in the open-source community, the hackathon format has gradually evolved from an underground phenomenon to mainstream, and it has been widely adopted by public service organizations, NGOs, and companies to tackle challenges by means of technological solutions (Baccarne et al., 2015).

A first line in the literature describes "civic hackathons" as community-driven events which gather entrepreneurs, software developers, policymakers, journalists, educators, members of the arts community, and others representing certain clusters, working together to produce a material response to a social challenge faced by a community (Briscoe & Mulligan, 2014). Civic hackathons may contribute to public value by enhancing substantive outcomes, democratic accountability, and procedural legitimacy (Yuan & Gasco-Hernandez, 2021). However, according to these authors, such contribution is constrained by the early stage of adoption of these initiatives and by the limited participation of

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external actors. These events deal less on technology, project pitches, and semi-finished products, and focus more about bringing together a spectrum of people with varied professional and live experiences, with the goals of brainstorming and crowdsourcing alternative solutions and making all voices contribute (Trinaistic, 2020).

A second line of literature conceptualizes hackathons from a management perspective related to Open Innovation strategies for product development (Chesbrough, 2003). Scholars frame them as a process to obtain external knowledge that can be applied in the innovation development process of an organization. This approach focusses on the hackathon format as a toolkit for user innovation with an emphasis on competition. In line with Open Innovation strategies which are not limited to internal organizational processes, research has framed hackathons as events focusing on knowledge transfer, collaboration, openness, and its managerial application for innovation (Crossan & Apaydin, 2010). Scholars agree that hackathons usually develop creative processes and can be part of a broader Open Innovation strategy (Kitsios & Kamariotou, 2018; Rayner, 2018).

Research also differentiates between tech-centric and issue-centric hackathons (Briscoe & Mulligan, 2014; Lodato & DiSalvo, 2016). Tech-oriented hackathons mainly appeal to product designers or software developers and are usually held in computer science or engineering faculties, where students develop their technical abilities and learn to create technological products. These events are characterized by the capacity to quickly find tangible solutions and their compatibility with other tech-related innovative methodologies, such as design thinking (Chounta et al., 2023).

Issue-centric hackathons "are organized around themes considered as having a 'social' quality where social is used in the common, non-technical sense of denoting societal structure, relations, and effects" (Lodato & DiSalvo, 2016: 540). They aim to solve broader business or social problems and appeal to a wider range of participants from all walks of life, including teams across many disciplines (Briscoe & Mulligan, 2014). These events typically attract between 30% and 50% non-tech participants compared to about 10% to 20% in tech-centric hackathons. Issue-oriented hackathons' main advantage is their capacity to build heterogeneous teams that tend to display wider professional experience and greater creativity than homogeneous teams (Yuan & Gasco-Hernandez, 2021).

Previous research has examined individuals' motivations to participate in hackathons and its outputs, but few studies have focused on their organization, the outcomes, and the processes of implementation. Kitsios and Kamariotou (2019) found that the most significant factors accounting for hackathons' success were clear problem definition, adequate entry requirements, jury members' knowledge and experience, the level of mentors' support to participants for launching their projects to the market, and the active involvement of companies, academics, and other stakeholders.

The earliest phase of team formation, far from being a clearly delimited process, blurs with subsequent phases of joint activity, such as the design and execution of a finished technological product or solution (Jones et al., 2015). On the one hand, team formation is itself part of the design process because the reach of the collaboration during project building emerges from early conversations among prospective teammates. On the other, because commitments are open to renegotiation, members may still join or leave a team after the design process has nominally begun (Jones et al., 2015).

Briscoe and Mulligan (2014: 1) argued that hackathons "can potentially suffer from a lack of institutional memory, which is collective set of facts, concepts, experiences, and know-how held by a group of people (…) because it requires the ongoing transmission of these memories between members of the group." Their effectiveness can also diminish if participants do not engage in software development, but rather have a prototype ready before the event; this can be the case if the presentation or the demonstration appears too polished, compared to those developed within the often-short timeframe available (Briscoe & Mulligan, 2014).

The variety of hackathon's purposes and motivations reveals existing tensions during the event's design, so organizers must align its format and structure with their motivational values (Briscoe & Mulligan, 2014). The main goal of the organizing committee is to ensure the event's smooth execution, by supervising the rules and judges, the evaluation criteria, and the prizes. Mentors act as facilitators for team ideation, encouraging participants to offer multiple ideas, allowing opportunities for networking and social interaction (Remshagen & Huett, 2023). In this way, ideas that also drive participants' careers and promote their learning are more likely to emerge (Heller et al., 2023).

While the theoretical approaches outlined above use practical frameworks to describe hackathons, in the media sector this conceptual distinction has not yet been studied empirically nor confronted with the analysis of diverse types of hackathons (Heller et al., 2023). This chapter intends to fill this gap and it explores whether media hackathons foster innovation in practice and attends to establish a typology of these events.

Media Hackathons and Their Impact on Journalism Innovation

Journalism is undergoing a fundamental transformation due to the influence of technology, which has led to the emergence of complex and diverse journalistic jobs in newsrooms. The growing role of professionals who might not fit into traditional definitions of a journalist but actively contribute to the production of journalism has increasingly attracted scholarly attention (Deuze & Witschge, 2020; Doherty et al., 2022; Ekström et al., 2022). The influence of the so-called interlopers or peripheral actors, such as data scientists, artificial intelligence engineers, editorial technologists, and web developers, is increasing in

many newsrooms worldwide (Boyles, 2020b; Holton & Belair-Gagnon, 2018; Lischka et al., 2021). Journalism has thus become a dynamic and fluid space in which hackers are not only becoming relevant actors (Quian, 2013), but they often provide indispensable skills for implementing quality journalistic work (Usher, 2016). Therefore, hackers and other "interlopers" are increasingly defining the conditions and standards under which journalism is produced, in terms of both its practices and its normative framework (Lewis & Usher, 2016).

In this context, hackathons for news organizations tend to cross the boundaries among journalism, technology, hacking, and society, also involving additional stakeholders such as local governments or members of civic organizations (Boyles, 2020a). Thus, hackers have established themselves as public interest actors in a data-driven society, although their work often may seem unfamiliar in many respects (Di Salvo & Porlezza, 2020; Quian, 2022). Engagement in hackathons might provide visibility for news organizations to showcase their computational approaches to innovation and help promote shared practices in digital news work, further increasing the relevance of hackers, coders, and developers in journalistic practice (Boyles, 2020b). It could be argued that hackers' influence on journalism, its practices, epistemologies, and ethics (Quian, 2013, 2021; Quian & Elías, 2018), is contributing to the hybridization of the profession.

The media sector is well suited to hackathons when it fosters a culture of experimentation and Open Innovation (García-Avilés, 2021). De Maeyer et al. (2015) examined the outcomes of news hackathons in Belgium, where journalists and developers collaborated on data-driven journalism projects. Their results underlined the effectiveness of cross-disciplinary collaboration in producing innovative journalistic content. The projects developed by participating teams are often intended to optimize content production or facilitate distribution, and some even hope that their work will eventually be acquired by a media firm or launched in the market. To a certain extent, hackathons might be "laboratories for journalistic experimentation" (Boyles, 2020a: 1340). However, as Boyles (2020a) also notes, only 10% to 20% of the prototypes created during a hackathon make it to market, as the lack of funding and the "conservative business culture" that prevails in the industry make it difficult for these projects to reach a wider audience.

Lewis and Usher (2014) explored the transnational grassroots organization Hacks/Hackers to understand how journalists and technologists engaged through this organization and what factors might facilitate collaboration in this transitory trading zone. Both authors found that the level of engagement between the two groups "depends on a set of social and structural factors, including institutional support and the leadership of key volunteers, and the depth of that engagement depends on sufficient mutual understanding among journalists and hackers" (Lewis & Usher, 2014: 4).

Media hackathons, however, are considered a very closed environment. Although journalists try to develop strategic alliances with web developers and computer programmers in the hope of creating tools for content production

and distribution, the hackathon format itself has many limitations as it often involves long working sessions, most projects are precarious, and participants achieve little or no rewards at all (Boyles, 2020a). Hacker-journalists prefer to be autonomous, have little inclination to collaborate and dismiss direct contact with the public, traits that contradict the traditional culture in many newsrooms. Thus, Boyles argues that "the hackathon's laboratory environment is imperfect and rarely sustainable. The lightning pace of decision-making, for instance, does not align with the methodical (and often glacial) managerial culture of the newsroom" (Boyles, 2020a: 1349).

Most journalistic routines penalize errors or failures in both practitioner time and effort, so that hackathon processes could potentially damage the financial results of a news organization. Time and work conditions for product development in a hackathon stand in opposition to daily journalistic practice, so that fully integrating new ideas back in the newsroom seems very difficult. When returning to the newsroom, hackathon participants struggle to find both the time and creativity to develop their projects while working under deadline pressures (Boyles, 2020a: 1350).

This raises another critical issue, which is the temporary nature of these media events. In the case of Hacks/Hackers, the lack of consistency in institutional backing may be limiting the long-term rootedness of chapters in their local communities: just working out when and where to meet becomes a practical barrier to collaboration. The informal exchange of ideas is a valuable part of the process, presumed to increase innovative outcomes through rapid iteration and experimentation (Lewis & Usher, 2014). Nevertheless, the informality of these interactions, the heterogeneous backgrounds of attendees, the lack of consistency, and the unpredictability of events "renders it more difficult to establish a steady space for the exchange of ideas and the gradual infusion of shared culture, of the kind that may be required for cross-disciplinary understanding and collaboration" (Lewis & Usher, 2014: 8).

Exploring the Nature of Media Hackathons

This chapter attempts to cover a research gap by exploring whether media hackathons foster innovation in practice, focusing on how these events are structured and examining to what extent their outcomes correlate to the environment of Open Innovation. Eight case studies of media hackathons held in Europe, the USA, South America, Africa, and Asia between 2018 and 2023 were chosen. It was a purposive sample gathered using non-probability sampling techniques, to identify the cases that could provide the best information to achieve the study's objectives.

The selected hackathons were:

- Media Hackathon. Jaipur (India). 2018.
- *Media Hackathon. Bishkek (Kyrgyzstan). 2021.*
- RFE/RL Hackathon. Prague (Czech Republic). 2021.

- Innovation Hackathon. Paris (France). 2022.
- Hackathon for Peace Journalism. Bogotá (Colombia). 2022.
- Podcasting hackathon. Nairobi (Kenya). 2023.
- Media Party. Chicago (USA). 2023.
- Media Blend Hackathon. Vienna (Austria). 2023.

Using secondary sources, each event was first analyzed through a code sheet to identify key data such as the organizers, the year, and the city where it was held, its duration, and the number of teams and individuals participating (Table 12.1). A range of categories was also examined, such as stakeholders, goals, orientation, and outcomes (Table 12.2). Then, a total of five interviews with hackathon organizers and participants were conducted online. The interviews were transcribed and coded, identifying the key issues in the responses. All interviewees requested anonymity.

The media hackathons selected in the sample catered almost exclusively for industry professionals and were devoted to experimenting with new digital journalism solutions, formats, and products. Two leading players were identified: organizers and participants, as well as secondary players, such as mentors, judges, and sponsors. Since each player has distinct interests and motivations, it is essential to consider all stakeholders' goals and needs in the reach and scope of a hackathon. "Each team had a facilitator to boost their confidence, integrate new people and skills, keep focus on the shared outcome, and deter

Table 12.1 Main characteristics of the selected media hackathons (2018–2023)

Event	*Organizer*	*Year*	*Place*	*Country*	*N. teams*	*Participants*	*Days*
Media Hackathon	Arya College of Engineering & IncubateIND	2018	Jaipur	India	23	68	2
Media Hackathon	European Partnership for Democracy	2021	Bishkek	*Kyrgyzstan*	10	34	2
RFE/RL Hackathon	Radio Free Europe Radio Liberty	2021	Prague	*Czech Republic*	18	60	2
Innovation Hackathon	Vivendi	2022	Paris	France	9	50	2
Hackathon for Peace Journalism	EFE, Indra & Fundación Gabo	2022	Bogota	Colombia	4	18	2
Podcasting Hackathon	Baraza Media Lab & PRX	2023	Nairobi	Kenya	11	27	2
Media Party	Media Party & Hacks/Hackers	2023	Chicago	USA	16	40	2
Media Blend Hackathon	Media Development Foundation & International Press Institute	2023	Vienna	Austria	11	N. a.	3

Table 12.2 Relevant categories in the organization of media hackathons

Event	*Prize*	*Stakeholders*	*Goals*	*Jury*	*Main theme(s)*	*Framing*
Media Hackathon Jaipur	Certificate	IT and media students & professionals	Design mobile prototypes	12 leading managers	Mobile content consumption	2-month campaign
Media Hackathon *Kyrgyzstan*	Grant application	Journalists and IT professionals	Test new ideas for projects	6 local entrepreneurs and grant members		5-day previous mentor program
RFE/RL Hackathon	Project showcase	Journalists, coders, and designers	Innovate & build digital prototypes in support of media freedom	30 senior journalists and engineers	Internet freedom	Conference program
Innovation Hackathon	Internal prestige	Vivendi employees	Stimulating innovation group-wide	4 Vivendi executives	Metaverse & NFTs innovation	In-house event
Hackathon for Peace Journalism	Grant of 2.500$	Journalists and university professors	Developing an app for protecting journalists	Journalists and experts	Building a journalism for peace	Promoted by media foundations
Podcasting Hackathon	Top projects will be sponsored	Audio producers, podcasters, citizens	Access and viability for podcasters in Africa	Podcasters in Kenya	Encourage the growth of podcasting	Design sprint facilitated by experts
Media Party	Grants of 6000$, 5000$ 3000$	Journalists, software developers, designers	Developing AI for news	Media and tech experts	Future of the media	Conference and workshops
Media Blend Hackathon	3 grants of €5000	Journalists and tech. professionals	Products for users under 25	Experts and media innovators	Solving the needs of media	International Conference on Media Innovation

team members from burnout," noted interviewee 2. Team size usually was limited to three to six individuals, so that each member had a more significant learning experience and increased identification with the team. Most teams demanded mixed disciplines from participants, such as the ability to write code, analyze data, design solutions, pitch projects, and tell compelling stories. More diverse teams can work on multiple tasks simultaneously and generate more creative ideas than homogenous teams. Besides, matching more experienced participants with those with less experience tended to contribute to overall team success.

Some organizers recommended to inform participants about team composition in advance, so that they can get to know each other, understand their strengths and weaknesses, and start developing ideas before the event. The information regarding event schedule, stages, and judging phases was communicated to all players in advance. Additionally, guidelines regarding participants' ethics and copyright were issued to avoid legal incidents in post-hackathon project implementation. Most events brought physically together team members that usually work remotely, thus fostering collaboration and cross-team connections that may not always be possible in virtual work environments. "When problem statement finalized, the clock started ticking. As the hours flew by, the teams dived deep into their projects, coding, prototyping, and collaborating relentlessly. It was a rollercoaster of emotions, filled with exhilarating breakthroughs and intense collaborative work," described interviewee 1.

Judges had a variety of profiles. External judges are experts in the field, senior managers, community leaders, or company representatives; internal judges were organizations' managers or leaders. Most events included high-profile external judges with accredited knowledge and expertise. It's important to have a variety of voices on the jury to provide a more rounded assessment. "We involved local entrepreneurs who had a better sense on the business viability of a project and people with market knowledge," said interviewee 3. "Jurors had an extremely hard choice evaluating the projects, as they had to consider the conviction of a proposition, the evidence of technical feasibility, potential audience value, and how the team collaborated with the different skills involved," added interviewee 3.

The process to present the results to the judges and how winners are chosen were relevant. After teams showcased their projects, the members of the jury met and voted for the best. "The presentations were inspiring, demonstrating team members' talent and passion. We marvelled at the ingenuity behind each project, the diversity of ideas and approaches," said interviewee 4. The intent was not to build products ready to be marketed, but to prove concepts, solve technical problems, and demonstrate the possibilities of new ideas. "It's a pressure cooker where you develop concepts at rocket speed and, at the same time, you put into practice new skills, mindset and methods to execute crazy ideas with a purpose," stated interviewee 2.

Despite its work intensity and time pressure, hackathons also provide opportunities for relaxation and bonding, with meals, impromptu team huddles, and

lively discussions that extend beyond the confines of work. Despite challenging external conditions, the results were positive, with teams developing innovative and promising solutions. It was "an opportunity to break free from the constraints of daily routines and dive into a creative journey," highlighted interviewee 1. "We collectively tackled challenges, brainstormed solutions, and forged new bonds," said interviewee 5.

The analysis of the sample found five main types of media hackathons:

- Open hackathons: Any professional can register—individually or full teams—combining journalistic, technological, or hybrid profiles, regardless of the company or news organization in which they work. For example, Media Party, the largest conference on media innovation held in Latin America is open to any professional who wants to participate and awards prizes worth US$14,000.
- Hackathons for media companies: Oriented to the participation of teams formed by professionals from the same firm. This is the case of the Media Blend Hackathon organized by the International Press Institute. Teams from different media companies, composed of journalists, designers, and developers, competed against each other to generate the best prototypes based on real challenges of the profession.
- University hackathons: Students, professors, and professionals create teams across faculties, with a combination of disciplines—producer, designer, technician, business professional, and faculty facilitator—and learn to work together. The Media Hackathon held in Jaipur (India), organized by Arya College of Engineering and the start-up IncubateIND, included expert talks, working sessions, and presentations of each team's solutions. Professors and experts brought their experience to the teams and helped them to develop their projects under deadline. The winners had the chance to work with a media company. The program included lectures, workshops, and case studies in media entrepreneurship, audience analysis, project management, media business models, and marketing strategy. Participants were provided with mentor support, with regular meetings to get a sense of progress made. Also, coaches, present physically and/or remotely, helped with designing more technical parts of the projects.
- Internal company hackathons: Conceived as team building and product creation events exclusively for employees of the same company. For example, Vivendi organized its own hackathon involving developers, designers, and managers from their staff. Beyond professional achievements, internal hackathons allow to connect on a personal level, improve work climate in the organization, and showcase the participants' talent. However, they tend to lack team diversity.
- Civic Hackathons: These far-reaching events bring together entrepreneurs, educators, software developers, politicians, journalists, community members, and other representatives of specific areas of interest, working

> together to develop a solution to a social challenge. The Podcasting Hackathon held in Nairobi, organized by Baraza Media Lab and the start-up PRX, was not confined exclusively to journalists and fostered a broad community involvement, with the participation of podcasters with no media background and citizens interested in the phenomenon.

Hackathons usually include rewards and prizes (see Table 12.2). Since the number and quality of prizes affects participants' extrinsic motivation, a competitive atmosphere with high-value awards makes extrinsic motivation stand out; besides, an atmosphere of open collaboration leads to improved creativity, better teamwork, and intrinsic motivation. "A quick win after a few sleepless days of non-stop work is another huge motivator for hackathon participants. You need to get creative and find other ways to motivate people," explained interviewee 5. Besides their financial support, prestigious and sought-after sponsors can significantly influence people's motivation to participate. But the media sector doesn't have the same investors' capability as the IT sector, as there are fewer sponsors who can play a similar role to IT investors. Nonetheless, economic sustainability, event continuity, and financial awards remain a challenge. Many institutions have administrative restrictions and only provide funds based on detailed applications; innovative ideas alone at a pitching session are not enough.

Journalists met programmers to test the use of digital tools for journalism, focusing on experimental testing, not only by sharing new possibilities and developments, but also by trying them out together. This setting facilitated the joint experimentation of journalists and programmers, with the possibility of concrete results. "Hackathons foster innovation because they create the space for interdisciplinary collaboration," noted interviewee 1. "Most dynamics spur creativity and storytelling techniques. They force us out of our comfort zones and encourage us to work with tech experts," underscored interviewee 5.

Competition is part of the media hackathon's DNA. People compete to get in, to get on-stage to present their ideas, and to make sure potential investors pick their solution. Prizes fuel the competitive juices. Rapid prototyping and experimentation are constant, with high-quality pitches. As interviewee 2 argued, "hackathons allow us to fail fast, learn from our mistakes, and iterate quickly. Expect projects to change significantly from the time of application to the moment they are presented." These events can allow building on entrepreneurial spirits with tools and knowledge that are applied to real-life situations.

Media hackathons bridge the gap between journalism and technology by offering concrete solutions to pressing industry issues. Hackathons are described as "a space for experimentation and innovation that is often lacking in newsrooms. We can experiment with cutting-edge technologies, with the potential to revolutionize how we engage audiences," explained interviewee 1. The process helps make projects stronger by providing extra time to work on development and iteration, and not just fill in a last-minute job. Besides, post-hackathon celebrations with team activities also provide a networking opportunity.

Conclusions

The hypothesis of this chapter was that media hackathons play a significant role in promoting technological journalistic experimentation and disseminating innovation. Over the last decade, these events have consolidated as dynamic platforms where journalists, developers, designers, and other professionals collaborate to address contemporary challenges in the industry. Diverse teams share their perspectives, thriving on the collaborative synergy of participants, each contributing unique skills. This interdisciplinary collaboration can lead to creative solutions that might not emerge through the traditional journalistic process alone.

Media hackathons provide a creative environment where journalists can rapidly prototype and experiment with new products, formats, and ideas. Participants are often given limited timeframes, typically ranging from several hours to a few days, to develop and present their projects. This constraint encourages to experiment with emerging technologies or explore new storytelling formats, thus pushing the boundaries of what is possible. The culture of experimentation and problem-solving is a catalyst for innovation. Interviewees agreed that hackathons were an opportunity to experiment and innovate, as they focus on addressing current challenges in the media industry, such as misinformation, the media's sustainability, or news distribution for younger audiences, searching for relevant and practical solutions.

These spaces allow the open intersection of the values of journalism, technology, hackers, and innovation. Team collaboration among journalists, designers, developers, data experts, and other professionals can often lead to new ideas and approaches that would not have been developed otherwise. The diversity of skills and mindsets allows for the creation of solutions that combine journalist practice with advanced technology. News values such as accuracy, fairness, and transparency are incorporated, ensuring that the outcomes do not compromise journalistic ethics. Continued collaboration beyond hackathons can lead to long-term solutions and the spread of best practices (Zukin & Papadantonakis, 2017).

The results show that while new products or solutions are sometimes accomplished through these events, media hackathons more significantly produce experiences of collaboration among technologists and journalists (Lodato & DiSalvo, 2016), so that the worlds of journalism and technology intersect around a common cause of news innovation (Lewis & Usher, 2014). However, media hackathons are most successful when collaboration integrates media outlets, civic organizations, and community leaders (Boyles, 2020a), which is still not the case in the events we analyzed. The processes of project development and collaborative work shared by programmers and journalists create an opportunity for the implementation of experimentation in the everyday life of news professionals.

Hackathons also display some weaknesses as a format. They tend to have a short duration, often 1 or 2 days, that might limit the quality of solutions developed, as not enough time is allowed for full research and development

(Medina Angarita & Nolte, 2020). These events can sometimes focus too much on technology to the detriment of other critical aspects of journalism, such as research, ethics, and news quality. Solutions developed may be exciting and novel but struggle to sustain and scale in the long term, especially if funding and feasibility issues are not considered. In the search for quick fixes, participants may oversimplify the challenges of journalism, overlooking the complexity of the real problems faced by the industry (Shevchenko, 2021).

Media hackathons serve as incubators of journalism innovation in practice by bringing together professionals with different skills and perspectives to address common problems in the industry. Through collaborative cross-disciplinary approaches, rapid prototyping, and problem-solving, these events offer a unique space for journalists and technologists to rethink and reshape the future of journalism. The diffusion of innovation allows media companies to remain relevant in competitive markets and face current business, social, and technological challenges (García-Avilés, 2020). As evidenced by the literature on media hackathons and the insights of the interviewees, these events not only foster innovation but also contribute to the ongoing transformation of journalism in a digital age. Embracing hackathons as a vital component of journalistic practice can help the industry stay resilient and relevant in an ever-changing media landscape.

Since media hackathons have only gained academic attention in recent years, more in-depth research is needed to expand the knowledge around the implications of this phenomenon. For example, virtual hackathons, which saw a significant surge during the COVID-19 pandemic, have seldom been investigated. Another interesting issue is the unexplored relationships between hackathon organizers and the sponsoring companies. Finally, internal organizational decision-making processes that lead to selecting specific topics for hackathons are also relevant for future research.

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CHAPTER 13

High-Tech Journalism on the R&D&i Map in Europe (2013–2023)

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Introduction

Since the early 2000s, new technologies and digital developments have challenged the mass media, which has had to constantly adapt to new formats, services, and production routines. This 'mediamorphosis' (Fidler, 1997) is taking place in an increasingly liquid scenario (Bauman, 2000), what has been termed the 'fourth industrial revolution' (Granell-Trías, 2016), which has little in common with the landscape depicted by McLuhan (1998) and Postman (2000). Amongst the changes that are redefining journalism and its practice, a set of sophisticated emerging technologies are attracting a significant amount of attention (Pérez-Seijo et al., 2020). These include artificial intelligence and algorithms, unmanned aerial vehicles (UAVs or drones) and virtual reality. The establishment of what is now termed high-technology—or high-tech/hi-tech—journalism (Salaverría, 2015) confirms that this phenomenon can no longer be considered 'next generation' (Newman, 2022).

These tools have become increasingly visible in the world's major newspapers, which have not hesitated to incorporate them to produce pieces with

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greater added value and that are also more attractive to younger users (Van-Damme et al., 2019). The use of drones for journalistic purposes dates back to the mid-2000s, and since then, outlets such as *CNN, The Daily Dot, Manchester Evening, BCC, Russia Today, CBS* and *TF1*, amongst others, have made use of this technology to offer images of difficult-to-reach areas from an aerial perspective, quickly moving from place to place (Pavlik, 2020), thus triggering the emotions and grabbing the attention of viewers (Hamilton, 2020). Regarding artificial intelligence, in turn, Prisecaru (2016) has shown that the leading media outlets have adopted the technology, while Tejedor (2023) compiled a list of 103 outlets around the world that have integrated bots and algorithms in a variety of products and models and for a wide array of aims, demonstrating that technological innovation is not exclusive to the big players in mass communication. Finally, in the field of virtual reality, De la Peña (2014) and Jones (2017) found that the first journalism projects began to appear in 2014, although as of 2023, outlets from *The New York Times to CNN, BBC, USA Today, The Economist, The Guardian, Wall Street Journal, Associated Press, Deutsche Welle, Russia Today, Euronews, National Geographic, Discovery, Al Jazeera, HuffPost, FOX Sports, Sports Illustrated* and *LIFE* magazine, along with many more, are taking advantage of this technology to offer the public the chance to immerse themselves in the story.

For the Future Today Institute (FTI, 2020), efficient communication is the common theme of high-tech journalism, which must accept innovation as permanent (Diakopoulos, 2019), if it is to avoid running the risk of disappearing or, at the least, becoming irrelevant. Innovation at present no longer corresponds to the result of isolated activities, but to a complex process of co-creation that involves a new or improved product—or a combination of the two—that impacts the market, making the product available to potential users, or that impacts the company or organization producing it, by introducing the product into its own processes (OECD/Eurostat, 2018). At the same time, high technology is playing an increasingly important role in the institutions that prepare media professionals (Lacy & Rosenstiel, 2015), which are slowly beginning to include more technology skills in their study programmes, albeit without neglecting humanistic and social considerations (Ufarte Ruiz et al., 2020). Other authors like Doherty and Worthy (2020) have gone further, proposing a new method of teaching, and learning the emerging technologies in journalism based on sketching, a process that produces quick outlines with minimal detail aimed at stimulating creative thought. The result is better interdisciplinary preparation for professionals joining the journalism job market.

However, during recent years, scholars have questioned the opportunities provided by the communicative ecosystem anticipated by Rheingold (2002), due to growing ethical, deontological (Drumwright, 2014; Franklin, 2016; Kool, 2016; Wahl-Jorgensen et al., 2016), labour and social (López-García & Vizoso, 2021) challenges that require an enormous financial investment, with transformations that go well beyond mere nuances to profound changes at different points in the journalism process. In this context, the impact, possibilities

and challenges that artificial intelligence, drones and virtual reality have introduced into the world of communication have motivated academic institutions and various sectors of society to request public funds to devise a comprehensive overview of the primary findings related to this field. This type of assistance is widely used by a large number of states as a tool to boost investment in research, development and innovation amongst public and private companies and organizations (Mote et al., 2011; Nagesh & Thomas 2015).

This study provides an introduction to the research, development and innovation map of high-tech journalism in Europe during the last 10 years, in order to help academic institutions produce more assertive proposals for future calls. To that end—and after revising the academic literature on the topic produced in recent years—the EU Horizon Europe Framework Programme for Research and Innovation (R&D) database is analysed, particularly the section on projects funded. This particular framework programme was selected because it comprises the main European initiative to promote R&D&i, from the initial phases to development and market entry, and complements national and regional financing. This programme also has the largest budget to date, with the potential to generate significant financial, social and scientific benefits. This advanced search was done using a set of keywords, like 'drones', 'UAV', 'virtual reality' and 'augmented reality'. In the case of artificial intelligence, the keywords were 'artificial journalism' (Túñez-López et al., 2019), 'robot journalism' (Burrell, 2016; Kim et al., 2007; Lee & Kim, 1998; Levy, 2012; VanDalen, 2012), 'algorithmic journalism' (Anderson, 2013), 'automated journalism' (Caswell & Dörr, 2018; Clerwall, 2014), 'computational journalism' (Coddington, 2015; Cohen et al., 2011; Gynnild, 2014) and 'augmented journalism' (Pavlik & Bridges, 2013), which are the word elements that the scientific bibliography uses to define the application of artificial intelligence to news production. These searches were combined with other terms like 'digital journalism', 'high technology'/'high-tech'/'hi-tech', 'digital transition' and 'journalistic metamorphosis'. To guarantee the reliability, the searches were done in parallel by the researchers after defining the criteria and reviewing any possible contradictions in earlier meetings.

Horizon Europe, the Key European Initiative to Promote R&D&i

Since 1982, research and innovation activities in the European Union have been coordinated through the framework programmes. By European Union law, the programmes are divided into two major blocks: (1) those directly dependent on the European Commission, with Horizon Europe having the largest budget and therefore being the most used; and (2) those administered by the Member States, governed by the State aid scheme, and regulated by the European Commission Competition Department. Specifically, the EU Horizon Europe Framework Programme for Research and Innovation (2021–2027) is a continuation of the Horizon 2020 programme. Its aim is to strengthen the scientific and technological foundations of the EU, in addition to providing

assistance to reach the Sustainable Development Goals and advance competitiveness and growth.

The programme is structured around three different pillars that accommodate all the fields of knowledge and the associated research and innovation activities. The first pillar, Excellent Science, finances projects designed and directed by researchers through the European Research Council (ERC). This pillar also supports professional development and researcher training through the international and intersectoral mobility activities of the Marie Sklodowska-Curie Actions (MSCA) programme, in addition to improving and optimizing transnational access to research infrastructures around the world. The second pillar, Global Challenges and European Industrial Competitiveness, finances research into social challenges, reinforces industrial technological capabilities and establishes missions with ambitious goals targeting major global challenges. This pillar also supports the creation of European associations to work jointly on R&D. Finally, the third pillar, Innovative Europe, aims to make Europe a pioneering power in market-creation innovation and the growth of innovative small and medium-sized enterprises (SMEs) through the European Innovation Council (EIC). Thus, the programme supports leading innovators, entrepreneurs, SMEs and scientists, with the ambition to create at the international level. All these funding opportunities are available at the Horizon Europe website, which has an advanced tool where applicants can search for the calls for proposals for the different working programmes.

This framework programme serves as a benchmark for science projects around the world, making it highly competitive. The EC has publicly stated that it is looking to fund cutting-edge, world-class level technology and science projects that adopt public policies and benefit the economy, the environment, science, and innovation in order to provide solutions to society's challenges (European Commission, 2019). Accordingly, the European Union is investing public money in science and its research and innovation activities (European Commission, 2016) to obtain new knowledge and develop innovative products and services, as well as achieve technological and social innovation (European IPR Helpdesk, 2016). Poppy (2015) argues that this situation has created a growing demand for interdisciplinary research designed to respond to the need to tackle the complex challenges facing society today.

Horizon Europe proposals compete with each other for funding, based on an exhaustive evaluation conducted by experts in the subject, who analyse and score the applications for excellence, impact and implementation. For their part, the scientific teams must make their results available to the scientific community and public at large, even though advances in sciences no longer attract traditional media attention as they once did (Cortiñas & Alonso, 2014). Indeed, it is for that reason that the impact of the projects is crucial; they provide an opportunity to promote science and innovation not only in Europe, but across the world. There is no question that the philosophy of the European Commission is helping researchers cross and expands the frontiers of knowledge, fostering multidisciplinarity and the internationalization of research into communication.

Projects Funded

The synergies that drive Horizon Europe (and Horizon 2020 before that) between science, technology, production, and innovation in the funded projects have led to an increase in participation in the various calls for proposals. The high number of applications related to journalism—198 R&i projects funded from 2013 to September 2023—demonstrate the intensity of the competition around this European framework programme for research teams representing a significant portion of the globe.

However, after eliminating repetitions and filtering the projects that do not belong to the areas of Social Sciences and Information and Communication Technologies, the number of results related to high-tech journalism is relatively low, with only 36 R&D&i projects funded in the last 10 years (Table 13.1). This circumstance is due to the tendency of researchers to study and analyse high technologies on a one-by-one basis, instead of looking at the phenomenon in general. For this reason, new ways of approaching and tackling the gaps in this area are imperative.

By subject matter, artificial intelligence received the most grants, with 29 projects funded, showing that research into this tool in communications is not relegated to the past, despite having been thoroughly analysed since roughly 2010 (Dickerson et al., 2014; Flew et al., 2012; Graefe & Bohlken, 2020; Lemelshtrich-Latar, 2018; Mittal & Kumaraguru, 2014; Napoli, 2014; Papadimitriou, 2016; Thurman et al., 2017; Wölker & Powell, 2018; Wu et al., 2019, among others). Specifically, these projects offer proposals to examine the impact of algorithms on political discourse, intelligent tools for start-up companies and SMEs wanting to maximize the results of their press releases, and various proposals to combat disinformation and fake news, amongst other subjects. During the same period, five research and innovation initiatives related to virtual reality received funding, along with just two on unmanned aerial vehicles.

By geographical area, the leading grant recipients between 2013 and 2023 were the United Kingdom, with eight projects, Italy with four, and Greece, Finland, Austria and Spain with three projects funded each. These were followed by Ireland, the Netherlands, Germany and Belgium, with two projects each. Regarding the host universities and institutions, seven stand out for having each received funding for two projects: Ethniko Kentro Erevnas Kai Technologikis Anaptyxis (Greece), Reti Televisive Italiane SPA (Italy), Engineering-Ingegneria Informatica Spa (Italy), The Chancellor Masters and Scholars of the University of Cambridge (United Kingdom), the University of Edinburgh (United Kingdom), Aalto Korkeakoulusaatio SR (Finland) and Dublin City University (Ireland).

By budget, the projects funded between 2013 and 2023 that focused on the impact and possibilities of artificial intelligence, drones and virtual reality in the sphere of communications received a total of 94,103,397.01 euros, with the European contribution totalling 87,024,341.60, equal to 92.48 per cent of the funding. Specifically, Finland's Aalto Korkeakoulusaatio SR led with

Table 13.1 List of projects funded by the European Union Research and Innovation Framework Programme, 2013–2023

Period	*Project*	*Project no.*	*Framework programme*	*Total cost/EU contribution*	*Host institution/country*
2015–2021	Profiling and targeting news readers – implications for the democratic role of the digital media, user rights and public information policy	638514	ERC[a]	€1,479,515.00/€1,479,515.00	Universiteit Van Amsterdam, Netherlands
2016–2018	Real-time Content Analysis and Processing (ReCAP) for Agile Media Production	732461	ICT[b]	€1,306,125.00/€990,037.50	NMR Consultancy Ltd., United Kingdom
2016–2019	Reverse Engineering of Social Information Processing	691152	Marie Curie[c]	€1,314,000.00/€1,273,500.00	Politechnika Warszawska, Poland
2016–2019	Scalable Understanding of Multilingual Media	688139	ICT	€7,963,951.25/€6,193,361.25	The University of Edinburgh, United Kingdom
2016–2020	Computational Propaganda: Investigating the Impact of Algorithms and Bots on Political Discourse in Europe	648311	ERC	€1,980,112.00/€1,980,112.00	The Chancellor, Masters and Scholars of the University of Oxford, United Kingdom
2017–2018	Innovative Journalism: Enhanced Creativity Tools	732278	ICT	€993,270.38/€993,270.38	City University of London, United Kingdom
2017–2018	PeRsOnalized DocUmentary Creation based on Automatically Annotated Content	731893	ICT	€1,496,875.00/€992,062.50	Reti Televisive Italiane SPA, Italy
2017–2019	The European Commission in Drone Community: a New Cooperation Area in the Making	747947	Marie Curie	€160,800.00/€160,800.00	Vrije Universiteit Brussel, Belgium
2017–2019	Innovation in Investigative Journalism	746899	Marie Curie	€195,454.80/€195,454.80	Cardiff University, United Kingdom
2017–2019	MediaRoad – European Media Ecosystem for Innovation	761412	ICT	€994,187.50/€994,187.50	EBU-UER/Belgium
2017–2019	Finding Bots, Detect Harassing Automation, and Restoring Trust in Social Media Civic Engagement	767454	ERC	€149,921.00/€149,921.00	The Chancellor Masters and Scholars of the University of Cambridge, United Kingdom

2017–2020	Enriching 360 media with 3D storytelling and personalisation elements	761934	ICT	€4,464,292.50/€3,736,254.75	Engineering-Ingegneria Informatica Spa, Italy
2017–2020	Blockchains in the new era of participatory media experience	762091	ICT	€3,283,616.08/€2,757,662.50	Wordline Iberia SA, Spain
2017–2021	Opinion Dynamics and Cultural Conflict in European Spaces	732942	FET[d]	€5,817,276.25/€5,817,276.25	Max-Planck-Gesellschaft Zur Furderung der Wissenschaften EV, Germany
2018–2019	Artificial Intelligence for a new generation of Public Relations (PR): smart digital assistant for start-ups and SMEs to maximise results of press releases within the EU-28 and beyond	836279	Innovation In SMEs[e]	€71,429.00/€50,000.00	Comunicae Seedrelease Network SL, Spain
2018–2021	Co-Creating Misinformation-Resilient Societies	770302	SC6[f]	€4,110,758.75/€4,110,758.75	Stockholms Universitet, Sweden
2018–2021	Fake News Discovery and Propagation from Big Data Analysis and Artificial Intelligence Operations	780355	ICT	€3,583,125.00/€2,879,250.00	Engineering-Ingegneria Informatica Spa, Italy
2018–2021	Open Distributed Digital Content Verification for Hyper-connected Sociality	825477	ICT	€3,178,110.00/€2,505,027.00	Erevnitiko Panepistimiako Institouto Systimaton Epikoinonion Kai Ypologiston, Greece
2018–2021	Wider and enhanced verification for you	825297	ICT	€2,931,000.00/€2,499,450.00	Sirma AI EAD, Bulgaria
2018–2021	Methods for Managing Audiovisual Data: Combining Automatic Efficiency with Human Accuracy	780069	ICT	€3,431,593.75/€3,431,593.75	Aalto Korkeakoulusaatio SR, Finland
2018–2022	Harnessing Data and Technology for Journalism	765140	Marie Curie	€3,912,451.72/€3,912,451.72	Dublin City University, Ireland
2018–2022	Providing Verification Assistance for New Content	825227	ICT	€2,696,454.08/€2,438,810.00	Dublin City University, Ireland

(*continued*)

Table 13.1 (continued)

Period	*Project*	*Project no.*	*Framework programme*	*Total cost/EU contribution*	*Host institution/country*
2019–2019	Fake news recognition applying Service-based Cross-Media Analytics	854497	Innovation In SMEs	€71,429.00/€50,000.00	Hensoldt Analytics GMBH, Austria
2019–2019	First real-time fact-checking tool to fight against the fake news and disinformation	855556	Innovation In SMEs	€71,429.00/€50,000.00	Newtral Media Audiovisual SL, Spain
2019–2021	Unraveling the persuasive power of 360°-video Virtual Reality narratives	838427	Marie Curie	€175,572.48/€175,572.48	Stichting Vu, Netherlands
2019–2022	Cross-Lingual Embeddings for Less-Represented Languages in European News Media	825153	ICT	€2,998,850.00/€2,998,850.00	Institut Josef Stefan, Slovenia
2019–2022	smART socIal media eCOsytstem in a blockchaiN Federated environment	825134	ICT	€4,166,877.50/€4,166,877.50	Universitaet Klagenfurt, Austria
2019–2022	Global Under-Resourced MEedia Translation	825299	ICT	€2,906,098.75/€2,906,098.75	The University of Edinburgh, United Kingdom
2020–2022	Datafication, Media and Democracy: Transformation of news work in datafied society	895273	Marie Curie	€214,158.72/€214,158.72	Universitet I Bergen, Norway
2020–2023	A universe of media assets and co-creation opportunities at your fingertips	957252	ICT	€5,995,612.50/€4,932,997.50	Ethniko Kentro Erevnas Kai Technologikis Anaptyxis, Greece
2020–2023	Participatory Communication of Science	872500	Interactions between scientists, general media and the public[g]	€1,379,772.50/€1,379,772.50	Lappeenrannan-Lahden Teknillinen Yliopisto Lut, Finland
2020–2023	In/Tangible European Heritage - Visual Analysis, Curation and Communication	101004825	SC6	€2,984,987.50/€2,984,987.50	Universitat Fbildung Krems, Austria

2021–2025	Automated Verification of Textual Claims	865958	ERC	€1,982,824.00/€1,982,824.00	The Chancellor Masters and Scholars of the University of Cambridge, United Kingdom
2022–2025	vera,ai: VERification Assisted by Artificial Intelligence	101070093	Digital, Industry and Space[h]	€5,691,875.00/€5,691,875.00	Ethniko Kentro Erevnas Kai Technologikis Anaptyxis, Greece
2022–2025	European Media and Immersion Lab	101070533	Digital, Industry and Space	€7,449,850.00/€7,449,850.00	Aalto Korkeakoulusaatio SR, Finland
2023–2028	Modelling Text as a Living Object in Cross-Document Context	101054961	ERC	€2,499,721.00/€2,499,721.00	Technische Universitat Darmstadt, Germany

Source: Horizon Europe Website (https://www.horizon-eu.eu/); Authors' compilation

[a] European Research Council (ERC)

[b] ICT: Horizon 2020. Industrial Leadership, Leadership in enabling and industrial technologies; Information and Communication Technologies

[c] Marie Curie: Marie Skłodowska-Curie Actions

[d] FET: Excellent Science, Future and Emerging Technologies

[e] Innovation in SMEs, Horizon 2020: Industrial Leadership, Innovation in SMEs

[f] SC6, Societal Challenges, Europe in a Changing World; Inclusive, Innovative and Reflective Societies

[g] Horizon 2020: Interactions Between Scientists, General Media and the Public; Improving Knowledge on Science Communication in order to Improve the Quality and Effectiveness of Interactions Between Scientists, General Media and the Public

[h] Horizon Europe (Digital, Industry and Space)

7,449,850.00 euros, followed by the University of Edinburgh in the United Kingdom with 6,193,361.25 euros; Ethniko Kentro Erevnas Kai Technologikis Anaptyxis in Greece with 4,932,997.50 euros, Max-Planck-Gesellschaft Zur Furderung der Wissenschaften EV in Germany with 5,817,276.25 euros and, once again, Ethniko Kentro Erevnas Kai Technologikis Anaptyxis, in Greece, with 5,691,875.00 euros.

Regarding methodology, there is a trend towards non-experimental research, with a large number of works using content analysis as the predominant research technique, either alone or in combination with other tools. This marked trend towards using perspectives and tools that are already consolidated in the field to investigate new subjects suggests a certain degree of difficulty when it comes to methodological innovation or adopting approaches from other areas.

Finally, with respect to the framework programme, almost half the R&D&i projects financed, a total of 16 were within the area of 'Industrial Leadership, Leadership in Enabling and Industrial Technologies' and 'Industrial Leadership, Information and Communication Technologies (ICT)', although six grants fell under the bailiwick of the Marie Skłodowska-Curie Actions programme, five the European Research Council, three Innovation in SMEs, and two in 'Digital, Industry and Space, Societal Challenges'. Finally, the 'Future and Emerging Technologies' and 'Interactions between Scientists, General Media and the Public' framework programmes each funded one R&D&i project.

Suggestions for the Future

The growing challenges and difficulties posed by high-tech journalism have set a new research agenda for academic institutions. The R&D&i projects funded between 2013 and 2023 contain precise and important proposals, but research into possible solutions and strategies to correctly manage the ethical, labour and social issues raised by high technologies in the field of journalism is still necessary. For instance, there are no proposals on the quality of artificial journalism in the sample, even though prior research has shown that the narrative structure of texts generated by algorithms is reiterative, and it is possible to identify a constant pattern in the sequential order of the data (Murcia-Verdú et al., 2022).

In this respect, research into high-tech journalism during the last decade lacks both action plans and suggestions for how to face the challenges implicit in this way of doing journalism, meaning that future R&D&i projects must stress finding solutions and ways to handle the current obstacles created by the use of artificial intelligence, drones and virtual reality. This is fundamental to guarantee a well-informed citizenry. By the same token, future applications must also include the real perceptions and criticisms of the audience in order to rigorously analyse the quality and characteristics of the content created by high technology. Finally, the line of research should consider other elements, like the emergence of new job profiles. In short, many challenges lie ahead in the years to come, in a scenario that remains uncertain.

Strategies for Tackling the Challenges

The current status of high-tech journalism, which is modifying the productive routines of the media, poses more than a few difficulties. Although some studies have identified and defined how high technology affects the dynamics of producing news and how this develops in real situations, these works remain superficial, despite offering precise proposals. Thus, research into possible strategies to adequately manage high technology in the field of journalism is more imperative than ever. To tackle and handle this state of affairs, future research must study the new problems that threaten the status of the media and their adverse effects in depth. Earlier experiences indicate that future research lines must study the primary failures in this regard, in order to propose new implementation processes.

Innovation in journalism offers one last challenge. Knowledge transfer must be established in the journalism industry, which is in dire need of new ideas, focuses and solutions. This is particularly significant, because investment in R&D&i must result in the reinvigoration of the journalistic enterprise. In the European tradition, journalism is an overall public good that must be provided, both on the side of supply (companies, audiovisual licenses, a single market) and demand (media literacy, access to newspapers, public service journalism). Ensuring these services will benefit society as a whole, facilitate accountability and consolidate liberal democracy.

Conclusion

This chapter has analysed the paradigm shifts taking place in the field of communication with the application of artificial intelligence, drones and virtual reality. The grants funded by the Horizon Europe Framework Programme for Research and Innovation in the last 10 years offer a snapshot of the internationalization capability of communication researchers. Considering the total number of R&D&i projects related to high-tech journalism funded between 2013 and 2023, the percentages are irrelevant, despite the impact, possibilities and challenges introduced by high technology in the field of journalism. Specifically, the grants increased progressively beginning in 2017. However, the important R&D&i results were in the areas of basic or applied science. Nonetheless, looking at the last decade, 198 projects were funded that include the term 'journalism' and it is significant that 36 of them, or 18.18 per cent of the total, analysed computational journalism. This is especially noteworthy given that, before 2015, no project of this type had received funding. Therefore, the interest in automated journalism is becoming increasingly far-reaching.

Two particular factors favour knowledge transfer in this context. The first consists of recovering local journalism, the natural space to control public policies and the experience of democratic life. Here, the fundamental concepts of the theory of democracy and civil culture converge. When a direct relationship is established between journalism, technology, public communication and democracy, news coverage improves, electoral integrity improves and cases of

corruption are pursued. Technological solutions foster the link between local public communication, accountability, management and citizen participation. This improvement in the industry will require a change in the sources of information—especially with regard to public administrations—that to a large extent sustain political journalism.

The second area of transfer is related to professional journalism and continuous training. Through the publication of public information, journalists are trained in new subjects: open-source journalism, data-driven journalism, viewing and reviewing political proposals (and the degree of compliance). Technology is the germ of innovation in the production of news. Companies and universities must work hand in hand to support professional upskilling and reskilling. Experienced journalists need to consider a training model based on continuous improvement that allows them to incorporate new professional skills and abandon practices with little added value for the industry. If artificial intelligence or data science make it possible to cease to perform certain exercises, these professionals will be able to dedicate themselves to other work in the production of news. There will be no shortage of human work. Transfer value begins by reviewing job descriptions and ends with the incorporation of technologies to improve citizen service. In short, the digital transformation consists of identifying the functions, areas or tasks in the journalism sector that can take advantage of the technological wave.

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PART III

New Communicative and Journalistic Actors

CHAPTER 14

Empowering Citizens Through Informative Apps: Open Access to Digital Platforms for Social and Innovation Changes

Carolina Moreno-Castro

The New Digital Landscape: A Closer Look at Informative Apps and Platforms

In an era where the digital landscape continuously evolves, shaping how we perceive, interact with, and understand the world around us, this chapter delves into a pivotal aspect of our digital lives: the influence of apps and platforms on citizen engagement and empowerment, as highlighted by Reforgiato Recupero et al. (2016), Janowski et al. (2018), and Ahmet Gün and Burak (2020). These authors stated that the rapid proliferation of digital technologies has transformed how we consume information (mediatised o nor) and has redefined our roles as active participants in various domains of public life, such as health, education, and politics. About decade ago, McNutt (2014) explored the transformation of e-participation due to social and collaborative technologies, highlighting various prominent engagement methods. His study revealed that the primary obstacles to adopting social media in this context were organisational, cultural, and administrative rather than technological. McNutt emphasised that while Web 2.0 and related social media tools held great promise for enhancing public participation, their effectiveness depended on acknowledging that

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influence would be garnered through social reputation rather than traditional bureaucratic authority in digital spaces.

One year later, in their study, Jepson and Ladle (2015) recognised that apps could harness the combined strengths of smartphones' computational and sensory abilities, cloud computing, social networking, and crowdsourcing. This integration could revolutionise human interaction with nature, greatly enhance the quality and amount of biodiversity data, make environmental knowledge more accessible, and enrich nature appreciation experiences. To evaluate how well this potential was being utilised in the context of nature, the authors conducted an automated search in the Google Play Store using 96 nature-related terms, yielding information on approximately 36,304 apps, with about 6301 being nature-themed. Their findings indicated that only a few apps maximised technological capabilities or captured widespread public interest. Achieving significant breakthroughs in this domain would require enhanced collaboration frequency and quality among environmental scientists, information engineers, computer scientists, and an engaged public.

Additionally, in 2016, Reforgiato Recupero et al. published a study about an innovative citizen engagement cloud platform for smart government. The study presented a cloud-computing-based citizen engagement platform designed to streamline administrative processes in public administrations and enhance citizen participation. It was developed through the three-year Italian national project PRISMA (Interoperable cloud platforms for smart government); the platform represented a new digital ecosystem model facilitating interactions between public administrations, citizens, businesses, and other country stakeholders. Characterised by its flexibility and openness, this Italian 'cloud' system allowed public administrations to access and utilise a comprehensive linked open data knowledge base. A community of stakeholders could leverage this data to create custom 'Cloud Apps' that addressed specific citizen needs. The platform was implemented in Catania and Syracuse, two major cities in Sicily, and local developers used its application programming interfaces (APIs) to craft additional services for citizens and administrations. Given its success, there was growing interest in its adoption across other Sicilian provinces and Italy. It was relevant that the platform was open-source, available online, and provided APIs for full utilisation, marking a significant step in the evolution of digital governance and citizen engagement.

In the same direction, Borkowska and Osborne (2018) examined the role of innovative city technologies in addressing urban challenges, particularly in the context of the Future City Demonstrator Initiative in Glasgow, UK, a high-profile government-funded project. The authors assessed Glasgow's approach to smart urbanism, questioning its commitment to socially inclusive innovation and learning. They implemented the quadruple helix model (government, academia, industry, and civil society) as a framework, focusing on four key areas:

- citizen participation in decision-making
- positioning citizens as active users in technological innovation

- community benefits of such innovations
- evaluating these technologies based on citizen experiences and needs

The study uniquely emphasised civil society's role, the helix's fourth element, and the authors critiqued Glasgow's smart city narrative for its potential to overlook aspects of human agency. They argued that the city's technological advancements would be more effective in promoting active citizenship, social inclusion, and learning opportunities if they aligned more closely with the broader concepts of learning cities. The study emphasised that aligning technological advancements with broader learning city concepts would be crucial for solving urban problems, promoting active citizenship, and fostering an inclusive, learning-oriented environment that ensures technological progress contributes positively to society.

Similarly, Janowski et al. (2018) discussed the evolution of citizen-administration relationships in governance, transitioning from a 'bureaucratic paradigm' focused on rule enforcement to a consumerist paradigm emphasising service provision and finally to a participatory paradigm involving shared responsibility. The authors defended the 'platform paradigm', which would empower citizens to create a realistic public value through socio-technical systems integrating data, services, technology, and people, addressing societal needs. The authors presented a conceptual framework for understanding these relationships under the 'platform paradigm'. Unlike existing models, which often focused on specific relationship types, such as trust or satisfaction, this framework would encompass a comprehensive range of relationships. It would show how mutual decisions and policy environments shaped by citizens and administration would contribute to sustainable development.

In the same way, Mbah (2019) emphasised the need to re-evaluate university community engagement for sustainable development, highlighting the critical role of incorporating local voices and adopting an operational approach that fosters co-creation and co-integration of knowledge. It underscored that in a development-focused university setting, especially in the developing world, local communities should not be viewed merely as recipients of knowledge, but as active participants in co-creating and integrating knowledge for sustainable outcomes. Mbah's approach recognised the intrinsic value of local knowledge systems, where community members contributed their experiences and insights to develop solutions tailored to their needs. Moreover, the study suggested that effective community engagement required proximity and direct interaction with local people, enabling them to articulate their perspectives on community issues and potential solutions. Lastly, it advocated for targeted collaborative engagement based on mutual trust, which can bridge power gaps between universities and local actors, facilitating open communication and the sharing of ideas for the achievement of shared developmental goals. This collaborative approach was seen as essential for co-creating a knowledge base that truly supports sustainable development.

In addition, Ahmet Gün and Burak (2020) focused on the implications of urban tools, identifying the critical factors for better design practices for ICT-based civic participation platforms, and agreed with several studies that reported that using participatory platforms led to positive outcomes for the general audience. However, they found their potential and limits for facilitating different levels of design empowerment. In this context, the aims of their study were (1) to determine how these platforms empowered and restricted citizens' engagement by analysing a variety of ICT-based participation platforms in Europe and (2) to determine the factors that could facilitate better participation practices. Their research analysed 25 ICT-based participation platforms that went beyond one-sided information exchanged. They chose from a database of 106 platforms. They evaluated them according to their objectives, the design phases, the usability, the levels of design empowerment and functionalities. The findings indicated that a majority of those platforms (76%) focused on two particular objectives: problem identification and feedback collection. Only three platforms (12%) enabled users to create their plans and visions since empowering citizens to design independently is challenging. Many platforms aimed at higher levels of design empowerment but failed to provide the required functionalities users needed. In addition, 40% of the platforms had the necessary tools for citizens to track whether they wanted to implement their ideas, plans, and projects. In conclusion, they identified the critical factors for better design practices for ICT-based civic participation platforms.

In summary, these studies and authors provided a comprehensive understanding of the new digital landscape, highlighting the evolving nature of ICT-based civic participation and smart governance. They emphasised the importance of implementing platforms that enable deeper citizen engagement and integrating various socio-technical systems. This approach underscored the need for collaboration across different fields and sectors to effectively harness the potential of digital platforms and apps. Such integration, encompassing technological, social, organisational, and environmental considerations, is crucial in enhancing public participation, governance, and human interaction with the natural world and media outlets.

Empowerment Through Information: Health and Politics

One essential point about being well-informed is that it empowers citizens to make decisions in health and politics. In this sense, it will look at the transformative power of these digital tools in enabling individuals to access, process, and utilise information in previously unimaginable ways until now. It will delve into how digital information platforms and technologies empower individuals in critical areas of daily life. This exploration will be enriched by various studies and authors who have significantly contributed to understanding the role of digital technology in these domains.

In the health sector, in Western countries, healthcare systems are being improved qualitatively in two ways; on the one hand, artificial intelligence (AI) has improved patient care and quality of life (disease diagnosis, treatment selection, and clinical laboratory testing), as stated by Alowais et al., 2023. Integrating AI into healthcare promises to revolutionise various aspects of patient care, from disease diagnosis and treatment selection to clinical laboratory testing. By leveraging large datasets, AI tools would have the potential to surpass human performance in identifying patterns, offering increased accuracy, cost reductions, and time savings while minimising human errors. This technology would be set to transform personalised medicine, optimise medication dosages, enhance population health management, establish guidelines, and improve patient education (Alowais et al., 2023). AI could also provide virtual health assistants, support mental health care, and influence patient-physician trust. Beyond automating tasks, AI would aim to develop technologies that enhance care across healthcare settings, including diagnosing diseases, developing personalised treatment plans, and assisting clinicians with decision-making. However, the responsible and effective implementation of AI in healthcare would address challenges related to data privacy, bias, and the need for human expertise to ensure its benefits are fully realised (Alowais et al., 2023).

On the other hand, in the last 5 years, mobile health applications and online platforms have revolutionised patient care and health information dissemination. International studies highlighted that these technologies not only provide users with easier access to health-related information but also empower them to manage their health proactively (Himes et al., 2019; Chan et al., 2020; Liu et al., 2021; Galetsi et al., 2023). The research emphasised the importance of user-friendly interfaces and privacy concerns in health app design. In general, technologies would support patients with information accessible through apps and platforms and vice versa, from patients to physicians. For example, Sarwar et al. (2018) stated that the increasing use of smartphones and mobile devices offered a promising avenue for mobile health (mHealth) in cardiovascular care. They put value on this issue because cardiovascular disease remains the principal cause of death and illness worldwide. This involves transmitting physiological data and patient-reported symptoms to healthcare providers and researchers and delivering reminders and care plans to patients (Sarwar et al., 2018). The author concluded that technology would have the potential to transform clinical care and clinical trial conduct through enhanced designs, more efficient data capture, and possibly reduced costs. Early-phase randomised studies focusing on lifestyle interventions would have shown that mHealth technology could improve outcomes. However, small randomised controlled trials in heart failure patients had yielded inconsistent results, possibly due to methodological shortcomings like inadequate sample sizes, quasi-experimental designs, and subpar health equipment. Consequently, there was a pressing need to establish systematic, evidence-based guidelines and standards for effectively integrating mHealth in cardiovascular clinical trials.

Regarding politics, the contributions of Boulianne (2020) are significant. His contribution provided a condensed overview of the relationship between digital media and civic and political citizen engagement, as revealed through a meta-analysis of over 300 studies. This study delved into the evolution of this relationship over 20 years, across 50 countries, analysing survey data from more than 300,000 respondents. The key finding was a shift from small to substantial positive correlations between digital media use and civic/political engagement. This change was attributed to the widespread adoption of digital technology and the evolution in its usage, particularly the increase in social networking sites and online political participation tools. Furthermore, Boulianne (2020) acknowledged variations in the relationship across different nations but underscored a general upward trend. Maybe attributed to the progressive technological innovations by civic groups, as Karpf (2016) stated. Such innovations, transcending national boundaries, could account for the minimal cross-national differences observed in the meta-analysis. In addition, the influence of key international organisations and elites in the civil sphere was also highlighted as a possible reason for the observed similarities in effects across various political contexts. While individual countries exhibited fluctuations in their trends linking digital media use and participation, a level of consistency was observed at the global scale. Boulianne (2020) cited that while country-specific trend lines, particularly during elections, were of interest, detailed analysis in this area remained limited, as evidenced by the works of Bimber and Copeland (2013), Bimber et al. (2015), Copeland and Bimber (2015), Strandberg and Carlson (2017), Tolbert and McNeal (2003), and Vaccari (2013).

Moreover, Haro-de-Rosario et al. (2018) analysed how social media platforms, specifically Twitter and Facebook, were being utilised by citizens in their interactions with Spanish local governments. The authors examined how those platforms facilitated different levels of citizen engagement in political and social matters and also explored various factors influencing this engagement, including online transparency, public mood, social media activity levels, and the interactivity of local government websites. The findings revealed a preference for Facebook over Twitter for participation in local government issues. This research contributed to understanding the impact of the choice of social media platform on citizen engagement, highlighting the growing importance of these digital channels in fostering interactive participation in the political and social spheres. Besides, different international studies that examined the role of digital platforms in community engagement and local governance demonstrated how local governments use social media and online forums to interact with citizens, gathering feedback, and increasing transparency in decision-making processes, arguing that these digital tools could bridge the gap between citizens and government officials, fostering a more participatory democracy.

In conclusion, authors and studies painted a comprehensive picture of the transformative impact of digital information platforms and politics. They highlighted these technologies' empowering potential while acknowledging the

challenges and responsibilities of integrating them into these critical areas of our active lives. Also, most of them analysed the influence of social media and online platforms on political engagement and public discourse. Furthermore, their findings suggested that these digital channels have opened new avenues for political participation, particularly for younger generations, and have played a crucial role in mobilising public opinion and activism (e.g. Change.org). However, they also cautioned about the risks of misinformation and the need for digital literacy.

The Role of the European Commission in Fostering Digital Engagement

This section introduces the core concept of the chapter: the emergence of apps and platforms as integral components of our digital ecosystem. It will explore how these technologies have become indispensable tools for individuals seeking to stay informed and engaged in the last decade. The focus will be on understanding how apps and platforms provide personalised content, real-time updates, and a platform for active engagement, enhancing the citizens' feeling of being well-informed. Since 2020, the European Commission has been promoting the implementation of technologies that enable citizens to be better informed in all spheres of their lives. In particular, this interest increased during the COVID-19 pandemic and afterwards due to misinformation spreading in the public sphere. This period coincided with the programming of some European funding programmes to improve people's quality of life. Being well-informed is considered a fundamental axis. Thus, in different work programmes, funding has been promoted for consortiums that have proposed open and accessible designs to improve different aspects of life. In this section, we will examine some of these applications as examples of what has been developed so far and of great social value (European Commission, 2020). This selection of apps responds to the search for thematic and logistical diversity that has enabled citizens to better control certain aspects of their lives, from identifying fake news and dangerous smells to easily finding their way around a city with public transport.

TUeTO

TUeTO is the application name developed by the OPTICITIES European project, funded by the European Commission (FP7-SST-2013-RTD-1- Grant agreement ID: 605727). It was designed as a multimodal urban navigator, consolidating information on various modes of transport within the metropolitan area of Turin, encompassing urban public transport such as buses, trams, and the metro, as well as intercity buses, regional and national trains, bicycles, private cars, and parking structures. The development of TUeTO, a collaborative effort by all public transport operators (GTT and RFI) and car traffic

managers (5T), enabled citizens to access comprehensive information on these transportation modes. This aligns with OPTICITIES' mission to assist European cities in addressing complex mobility challenges by optimising transport networks. The strategy OPTICITIES involved fostering public/private partnerships and experimenting with innovative Intelligent Transport Systems (ITS) services. Additionally, OPTICITIES addressed passenger and freight transport, advocating for a user-centred approach. The project delivered significant innovation breakthroughs, including a new governance scheme enhancing public-private collaboration, establishing a European standard for urban multimodal datasets, and developing decision support tools employing predictive data for proactive transport management. In addition, the project has pioneered a multimodal real-time urban navigator interfaced with in-car navigation systems and an urban freight navigator to optimise deliveries.

The consortium project, led by public authorities, emphasised the effectiveness of solutions with deployment perspectives within 5 years, the scalability of services to suit various European urban typologies, and the transferability of results to promote further deployments in other European cities. Finally, OPTICITIES aimed to achieve significant impacts, including a 6% modal shift resulting in a yearly reduction of 1.5 million tons of CO_2, an increase in market size (€211 million per year) due to the new governance scheme and innovative services, and a 10% decrease in private car usage, potentially freeing up 3.6 million square metres of public space. These outcomes reflected OPTICITIES' commitment to sustainable urban mobility and its significant contribution to improving European cities' quality of life (https://cordis.europa.eu/project/id/605727).

Europeana

Funded by the European Commission under the Connecting Europe Facility (CEF), Europeana is a digital gateway to Europe's rich cultural and historical heritage, serving enthusiasts, professionals, teachers, and researchers (https://digital-strategy.ec.europa.eu/es/policies/europeana). The platform mission is to inspire and inform through fresh perspectives and open conversations about history and culture, facilitating the sharing and enjoyment of Europe's diverse cultural heritage, and provide access to millions of cultural items from institutions across Europe, ranging from art, music, and literature to scientific and historical artefacts. This accessibility enriches cultural understanding and sparks creativity, as seen in the innovative uses of Europeana's resources, such as classroom materials, game development, and digital storytelling. The strength of Europeana lies in its collaborative framework, relying on the contributions of thousands of galleries, libraries, archives, and museums across Europe. These institutions are committed to making cultural heritage accessible and transformative, contributing to a vast and varied collection of European cultural content. Europeana showcases materials from about 2000 institutions, harmonising this data through a partner network that meticulously reviews and enriches it

with additional information like geo-location and thematic links. For professionals in the cultural heritage sector, Europeana Pro offers insights into how digital transformation can be harnessed. The platform is instrumental in Europe's digital cultural collection, promoting responsible, accessible, sustainable, and innovative tourism. Amidst challenges like the COVID-19 crisis, which has severely impacted the tourism sector, the European Commission was intensifying support for the industry and Europeana played a crucial role in promoting local, sustainable tourism and enabling the discovery of Europe's cultural and natural diversity. Digital technologies like virtual and augmented reality are becoming increasingly important in attracting tourists. Europeana, with its extensive digital collection, including 3D images, aids in this by inspiring people to explore Europe's cities, landscapes, and historic sites. For example, its "Discovering Europe" section allows virtual tours across Europe, supporting tourism by showcasing the continent's cultural and natural beauty. Additionally, Europeana Pro is developing a 'Tourism Hub' to aid heritage professionals in finding initiatives and opportunities to drive tourism in the EU. This hub encourages sharing examples and initiatives within the Europeana Network and Aggregator Forum, broadening the reach of Europeana's tourism initiatives.

The Commission's expert group on Digital Cultural Heritage and Europeana (DCHE) serves as a platform for publicising this initiative and sharing best practices at the national level. Since its launched-on November 20, 2008, Europeana has provided access to over 58 million digitised cultural heritage records from more than 3600 institutions, serving as a free resource for teachers, students, and the general public. The European Commission funded Europeana under the Connecting Europe Facility (CEF), demonstrating its commitment to building a resilient and competitive tourism ecosystem in the EU.

OdourCollect

This citizen science application represents a significant advancement in addressing odour pollution issues by empowering citizens who are affected by it. In 2019, Science for Change, Spanish company based on Barcelona, launched OdourCollect as outcome of the D-NOSES project (H2020-SwafS-2017-1-Grant agreement ID: 789315). Odour pollution, as the second leading cause of environmental complaints globally, following noise, accounts for over 30% of environment-related complaints. The impacts of frequent exposure to odours include headaches, lack of concentration, stress, and respiratory problems. Despite its significance, odour pollution has historically been underrepresented in environmental regulations, leaving citizens vulnerable and often leading to socio-environmental conflicts within communities. In response, OdourCollect has been developed to employ a bottom-up approach, combining citizen science, Responsible Research and Innovation (RRI) tools, and co-creation. This approach transforms citizens into active participants and agents

of change in their communities, allowing them to highlight their experiences and engage in local decision-making processes that directly impact their daily lives (https://cordis.europa.eu/project/id/789315). A key initiative within this framework is the NEOTEC project, which focuses on co-designing new technologies for real-time monitoring of odour pollution through citizen science. Funded by the CDTI and supported by the Ministry of Science and Innovation through the NEOTEC programme, this two-year project aims to finance innovative business projects based on research-derived technologies and knowledge. The project's objectives include enhancing the business strategy of the odour unit to increase the visibility of odour pollution issues and integrating citizen science into public agendas. Technologically, the OdourCollect app is set to achieve a new level of professionalisation tailored to meet client needs. Real-time odour mapping through OdourCollect is gaining international attention, highlighting odour pollution issues worldwide. The European D-NOSES project has been instrumental in developing and validating the OdourCollect methodology in 10 pilot studies across various countries. Additionally, in Spain, five localities were actively mapping odour pollution through OdourCollect, with residents trained by Science for Change (the company in charge of the project) to collect and analyse valid scientific data on odours.

Moreover, OdourCollect is being integrated into educational settings: The OdourCollect to Schools project, developed in collaboration with the Spanish Foundation for Science and Technology (FECYT) of the Ministry of Science and Innovation, has produced a Didactic Unit to educate students about odours and pollution. This initiative enables the practical application of citizen science and facilitates discussions about current environmental issues in classrooms. Summarising, these initiatives aim to educate citizens about the importance of monitoring odours in their environment and the role of citizen science in addressing environmental challenges. This multifaceted approach, encompassing technological development, educational integration, and community involvement, positions OdourCollect at the forefront of innovative solutions for managing and mitigating odour pollution.

Ametic.es

This organisation dedicated to maximising efficiency in service provision to its members operates within a diverse sector encompassing a wide range of activities. To effectively achieve the objectives set by its Associates and optimise their various approaches, AMETIC employs a structured approach consisting of commissions that span all business activities. These commissions are central to representing the sector's interests within the association. They facilitate decision-making and management of specific issues by appointing chairpersons and vice-chairpersons and establishing Working Groups to execute specialised tasks within each commission. In addition to its internal structure, AMETIC has established Territorial Councils, such as the Council of Catalonia, to

enhance regional and local government representation. These councils aim to improve communication between companies and regional bodies and institutions, fostering the development of advanced and efficient regional or territorial public policies, and encompass various sectors and technologies, such as media and audiovisual, video games, animation, digital publishing, e-commerce, 3D internet, virtual and augmented reality, interfaces, simulation, e-learning, applications, transmedia, interactivity, and big data. As an integral part of the European platform NEM, eNEM maintains significant national relationships in R&D&I, primarily with entities like the Ministry of Science and Innovation, CDTI, and the Ministry of Culture and Sport. The mission of eNEM, as delineated on their website (www.enem.ametic.es), is to champion and support research, development, and innovation in digital content and cultural and creative industries (CCIs) within national and European programs. By promoting R&D&I in these areas, eNEM aspires to enhance Spanish companies' international standing and cohesion in these sectors. This comprehensive approach by AMETIC and its divisions like eNEM underscores the organisation's commitment to fostering growth and innovation across a broad spectrum of digital and creative industries.

No Rumour Health

This Erasmus+ project represents a collaborative effort among three European countries: Spain, Greece, and Poland. This initiative, funded with a grant of European Commission and spanning 2 years, was focused on developing a mobile application specifically designed for elderly (2019-1-ES01-KA204-064037). The main objective of this application was to assist the elderly in discerning the veracity of news they encounter on social networks, distinguishing between genuine information and falsehoods. Since December 2019, the project team has been diligently developing tools that will equip citizens with the necessary resources to identify and counteract fake news, particularly in health information. The 'No Rumour Health' mobile app, aimed at combating health misinformation, is being tailored with a user-friendly interface to accommodate elderly users, particularly those with primary or low IT skills. The app's development incorporates a co-creative approach involving the end-users in its design. Progress and updates on the app can be tracked in the project's news section (https://norumourhealth.erasmus.site/es/). The application is available (Android and IOS) in four languages, English, Spanish, Greek, and Polish, enhancing its accessibility and utility across different linguistic groups. In addition to the mobile application, the No Rumour Health consortium was also creating four e-modules. These modules were designed to educate users on identifying health-related fake news and recognising reliable sources. The first module served as an introduction to common health misinformation. The subsequent modules focused on spotting health-related misinformation, strategies for dealing with such misinformation, and guidance on using the No Rumour Health application effectively. These e-modules are freely accessible through

the project's website (https://norumourhealth.erasmus.site/es/) and offered in English, Spanish, Greek, and Polish, reflecting the project's commitment to widespread educational outreach. Through these combined efforts, the No Rumour Health project aimed to empower older citizens, enhancing their ability to navigate the digital world safely and critically. This initiative underscored the importance of digital literacy in the modern age, particularly in combating the spread of misinformation in the health sector.

Conclusions

In conclusion, this chapter has provided a comprehensive analysis of the transition from traditional methods of knowledge dissemination such as conventional indicators, guidelines, protocols, and standards (basically through media and social networks), to more dynamic, interactive digital solutions. By examining various case studies, including apps and platforms like TUeTO, NoRumourHealth, ametic.es, Europeana, and OdourCollect, we have gained insights into these digital tools' significant impact on citizen empowerment. These applications facilitate access to essential information on relevant issues such as pollution, health, nutrition, and socio-cultural events and contribute to a deeper, more nuanced understanding of these topics. The effectiveness of these digital solutions can be attributed to features such as personalised content delivery, customisation options, and the provision of real-time updates. These functionalities allow citizen to tailor their information consumption to their preferences and needs, promoting a more engaged and informed citizenry. This personalisation is critical to digital platforms' enhanced utility and relevance in everyday life.

Furthermore, the chapter has explored the role of digital tools in the public sector, particularly in the context of local governments. Studies have shown that these entities increasingly use social media and online forums to interact with citizens, solicit feedback, and enhance the transparency of decision-making processes. This use of digital platforms helps bridge the gap between citizens and government officials, fostering a more participatory and inclusive form of democracy. Expanding the scope, the chapter also delved into various digital tools, ranging from news aggregators to specialised knowledge repositories. This exploration aimed to provide a holistic view of the diverse information sources accessible through digital channels, underscoring their crucial role in facilitating public access to scientific knowledge and other areas of public interest.

Finally, the chapter aimed to articulate a holistic understanding of how digital apps and platforms have evolved into indispensable tools for empowering citizens. These digital resources enable individuals to consume information and actively participate in shaping their worldviews and making informed decisions. This shift signifies a profound transformation in how information is accessed and utilised, highlighting the importance of digital literacy and engagement in

the modern world. In this scenario, flooded by the bombardment of informative and disinformative messages, the media must develop innovative gadgets so that citizens can consume truthful information on demand for their follow-up. Otherwise, citizens may stop consuming information from media outlets.

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CHAPTER 15

Knowledge Transfer: From Corporations to the Media and from the Media to Society

Marius Dragomir

Embracing Industry 4.0 Technologies

The developments made possible by Industry 4.0 have sparked numerous significant transformations in the interplay between the media and the private sector.

In corporate affairs, Industry 4.0 has heralded significant transformations. Over the past decade, private sector entities have been grappling with the digital transformation triggered by Industry 4.0. Academics have discerned distinct facets within this process. Firstly, there is digitization, a concept denoting the conversion of analogue commodities into digital ones, accompanied by all the ensuing alterations. Secondly, digital engagement encompasses a wide array of subjects, spanning from social media to intricate matters like leveraging digital data and technologies to automate data administration and optimize workflows.

Digital transformation has become an entrenched concept in the corporate world. It is defined as "changes that digital technology causes or influences in all aspects of human life" (Stolterman & Fors, 2004a, 2004b) or "the use of technology to radically improve companies' performance or reach and create new business opportunities through the use of data and digital technologies" (Westerman et al., 2011).

In today's corporate landscape, the digital transformation encompasses various crucial aspects. First and foremost, the technological facet of this

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transformation includes the emergence of innovative digital technologies such as social media, mobile devices, analytics, and embedded devices (Horlach et al., 2017; Westerman et al., 2011). Secondly, the organizational perspective of digital transformation pertains to the profound shifts occurring within organizational processes and business models (Liu et al., 2011; Westerman, 2016). Lastly, the social aspect of digital transformation comprises the wide array of changes that influence human life, with the customer experience being a prime example (Luna-Reyes & Gil-García, 2014).

The amalgamation of these various elements within digital transformation (de Bem Machado et al., 2022) has paved the way for the rise of a knowledge-centric economy, serving as the bedrock for what is now recognized as Industry 4.0. This concept encompasses the use of smart systems, alongside automated and digitized manufacturing processes (Ouamer-Ali et al., 2017), facilitating seamless and autonomous interaction among devices (Wang, 2018).

In Industry 4.0, certain components[1] hold particular significance for the media industry. Among these, Big Data Analytics emerges as a pivotal tool, facilitating the examination and extraction of valuable insights from extensive data sets. The progress made by the 3D technology represents a significant breakthrough for audiovisual content producers, particularly in the television broadcasting segment. Furthermore, location detection technologies have assumed a crucial role in specialized forms of journalistic inquiry. Lastly, data visualization stands as an indispensable asset for numerous media outlets, enhancing their storytelling techniques and content presentation.

The rapid progress in artificial intelligence (AI) has emerged as a major technological breakthrough with far-reaching implications for the media and journalism sectors (Peña-Fernández et al., 2023). Automation and AI have given rise to a plethora of applications that media companies have increasingly integrated into various stages of information collection and processing (Wu et al., 2019; Sánchez-García et al., 2023).

Already, AI has found utility in diverse ways within the media landscape, such as generating insightful analyses, identifying trends from social networks, and even detecting disinformation (García-Marín, 2022). Moreover, AI tools are increasingly being employed to minimize human intervention in content creation within the media industry (Carlson, 2015). However, despite the productivity and usefulness of AI in this domain, concerns regarding job insecurity, particularly in journalism, have become subject of recent debates (López-Jiménez & Ouariachi, 2020). This apprehension holds significant weight in a profession that has traditionally thrived on the strong social bonds forged between journalists, their sources, and their audience (Riedl, 2019).

To summarize, an important milestone in the evolution of Industry 4.0 lies in the departure from conventional mass production towards mass

[1] They include Big Data Analytics, 3D Technology, Smart Factory, Internet of Things Platforms, Location Detection Technologies, Advanced Algorithms, Augmented Reality, Smart Sensors, Authentication and Fraud Detection, Blockchain Technology, Customer Interaction and Profiling, Cloud Computing, Advanced Human-Machine Interfaces, Mobile Devices.

customization. This shift carries profound implications for the field of media and journalism.

Together, these changes have profound implications for journalism, completely transforming the methods and necessary skill sets in the journalistic field. A crucial aspect of this transformation is the evolution of media content, following new patterns of knowledge transfer from institutions and individuals to society. The question remains: Are people, seen as citizens or consumers, better informed and empowered to engage with and contribute to society due to the latest technological advancements?

In the ever-expanding field of knowledge transfer, extensive research is still needed. This chapter aims to delve into the primary trends that shape the transfer of knowledge from companies to society through media, amidst the rapid advancements in technology. The chapter does not cover the quality of knowledge or its impact on audience reception and use. Instead, it scrutinizes the power dynamics between the corporate world and the media. More specifically, it analyses the transformation in the transfer of knowledge between corporations and society, with the media acting as a principal intermediary.

Typologies of Corporate Media Engagement

Corporate communication plays a crucial role in shaping a company's image and brand presence in the world (Oltarzhevskyi, 2019). It holds the power to forge long-lasting relationships with partners and secure a firm foothold in the market. The quality and effectiveness of this communication are paramount, serving as the cornerstone for private companies to maintain their stable market position.

In the ever-evolving landscape of corporate communication, the methods have undoubtedly become more refined and intricate over time. However, the main channels of communication have remained relatively consistent, particularly in the pre-internet era. These channels primarily encompass media relations, which involve company executives and experts providing their valuable insights and information to journalists without any financial compensation. Additionally, public relations played a crucial role in shaping a company's image and advancing its interests by employing skilled communication professionals who specialized in paid interactions with media entities. Nevertheless, the demarcation between these two forms of corporate-media engagement, media relations and public relations, has frequently become indistinct in the past decade.

Over the past two decades, corporate communication has undergone a considerable transformation due to unprecedented technological disruption that has completely reshaped the media industry, among other factors. The digital era has ushered in a rapid proliferation of communication tools, available to almost everyone, presenting both opportunities and challenges for corporate entities. What was once merely a source of entertainment, social media has now become an integral component of the communication strategies employed by most companies.

Technological breakthroughs have revolutionized communication, leading to a significant shift in the media landscape. Organizations no longer rely on traditional media outlets as intermediaries to convey their messages to the masses. Instead, they can now directly reach their target audience without any external assistance. Although media companies in several countries still possess the ability to enhance communication and information dissemination, the decentralization of the media field has rendered them less crucial. Thus, corporate entities swiftly embrace any available tools that facilitate audience engagement, incorporating them into their extensive communication toolkit.

As a result, the mix of corporate communication channels has experienced a rapid transformation, with a notable shift away from traditional media outlets such as television, radio, print publications, and brochures, and a heightened emphasis on a diverse array of channels. These channels include, but are not limited to, social networks, online forums, and wikis (Lee & Kotler, 2011).

The corporate communication channels have undergone significant transformations, which have impacted the company's proprietary communication tools designed to effectively engage with both internal and external audiences. This includes company and employee magazines or house journals (Oltarzhevskyi, 2019).

Various efforts have been made to classify the channels used by companies to transfer knowledge to the media and society. Todorova has identified four distinct types of corporate channels, each aligned with specific company goals. These include HR channels, which aim to enhance employee loyalty and bolster the company's reputation; PR channels, which are dedicated to improving the overall image of the company; marketing channels, which primarily focus on driving sales; and commercial channels, which serve the dual purpose of boosting sales and enhancing PR efforts (Todorova, 2010).

Oltarzhevskyi distinguishes between two types of channels: outsiders and insiders. The former encompasses non-company channels such as public events, mass media, and advertising. In this scenario, the company may choose to sponsor a conference, which is an opportunity to showcase the company's expertise by providing a company speaker and displaying its logo on event materials. On the other hand, insider channels are deliberately established by companies for the purpose of communicating with stakeholders. They consist of content that is exclusively produced by the company itself, such as corporate news or annual reports. Unlike outsourced content, insider channels are created internally at the company's own discretion, ensuring the utmost control and accuracy in their messaging (Oltarzhevskyi, 2019).

How Companies Are Leveraging Media to Reach Society

Over the past decade, private companies have witnessed a substantial shift in their approach to corporate communication channels, which has had a profound impact on the dissemination of knowledge from these companies to society, particularly through the media.

The rise of social media has significantly altered the communication patterns between private companies, institutions, and their audiences. Traditional media companies, once the primary intermediaries, have been dismantled as leading media content players by the influence of social media, a shift that has allowed corporate players to forge direct connections with their target consumers through newly designed forms of engagement. However, this new era also brings forth unforeseen risks, such as the proliferation of uncontrolled disinformation. The waves of false information documented in recent years have posed a substantial threat to companies' image, sales, and overall financial stability.

Stronger Connections Through Direct Communication

In recent years, companies have undoubtedly gained significant benefits from constructing direct communication channels with their audiences. By utilizing various social media platforms, which range from professional networking sites like LinkedIn to interpersonal platforms like Facebook, and even those with immense marketing potential like Instagram, corporations can transmit their messages in an unfiltered and unadulterated way (Scott, 2015). This shift in paradigm provides multiple advantages for businesses, including unparalleled flexibility and freedom to interact with audiences without any obstacles or financial limitations (although companies must allocate resources to efficiently manage their social media presence).

On the other hand, social media has not provided the silver bullet to corporations' search for total independence in their communication with audiences, as they rely on many components and rules within the communication chain. For example, to boost their reach, corporations need to advertise on social media, relying entirely on the algorithms designed by these companies to reach selected audiences.

The Private Sector and the Media: A Resurgent Relationship?

The dissemination of knowledge from corporations to society has also been affected by the rampant spread of misinformation and the declining financial sustainability of news outlets.

The flow of false information, amplified by the internet, has had unintended consequences for private companies, particularly in countries where independent journalism has been targeted and captured by government bodies and affiliated businesses (Acloque, 2021). In such heavily biased information environments, corporate entities face significant challenges in communicating with their audiences as the media landscape is dominated by the government's narrative, perpetuated by captured media outlets. Conversely, the journalism industry has faced immense hardships in recent years, grappling with disruptions caused by tech companies and increased government investment in propaganda media. These factors have resulted in substantial market distortions.

Prompted by these developments, attempts have been made at enhanced collaboration between media entities and corporations, with both parties actively pursuing closer ties. Independent media companies, recognizing the significance of partnering with the private sector, have intensified their efforts to entice businesses to financially support them in their struggle to achieve financial stability. In turn, private companies are actively searching for avenues to navigate the treacherous waters of disinformation, seeking alliances with media outlets capable of safeguarding their reputation and effectively disseminating information about their operations, products, and services.

A global mapping conducted between 2021 and 2022 revealed three distinct levels of corporate assistance to independent media and initiatives combating misinformation in the private business sector.[2]

The first tier, referred to as "tokenistic" support, entails modest financial contributions, often in the form of targeted awards for specific events or individuals. Moving up the ladder, the middle tier showcases more substantial investments made by corporations to facilitate the production of journalistic content centred around specific themes. Finally, the top tier encompasses funding that is allocated on a broader sectoral scale, providing substantial and sustainable support to the journalistic field over an extended period of time (Dragomir, 2023).

The research also uncovered a thought-provoking debate taking place within the media industry, with experts and practitioners highlighting the urgent necessity of restructuring the advertising spending system. This restructuring is needed to bolster support for independent media outlets through commercial resources, which continue to serve as the primary financial lifeline for the industry.

What all these trends indicate is a growing recognition among private companies of the essential role played by independent media in safeguarding the integrity and transparency of the corporate sector. In 2016, 12 businessmen in Czechia founded the Endowment Fund for Independent Journalism (NFNŽ) as a mechanism to address the baneful impact of media oligarchy on the nation's democratic fabric. The businessmen firmly believe that a robust journalism

[2] The research project "Investing in Facts: How the Business Community Can Support a Healthy Infosphere" was carried out between November 2021 and June 2022 by a team of eight researchers under the leadership of Marius Dragomir, the author of this chapter. The project was based on data and information collected through secondary research and 57 interviews. The project was conducted in two phases: Phase 1: Global scanning (November 2021–January 2022): secondary research and interviews in 61 countries to identify examples of private business engagement with journalism and fact-checking initiatives; Phase 2: Country case studies (January 2022–May 2022): based on the findings from the project's first phase, Czechia, Romania, and Serbia were selected as in-depth country case studies. Using the same methodological mix as in the first phase (secondary research and interviews), researchers in the three countries collected data and information about cases of engagement between private companies and journalistic/fact-checking initiatives. See more at https://www.cima.ned.org/publication/investing-in-facts-how-the-business-community-can-support-a-healthy-infosphere/#cima_footnote_61.

sector is indispensable for fostering meaningful political discourse, the absence of which can have adverse consequences for the health of the business sector.[3]

These trends also shed light on the shifting forms of knowledge dissemination from corporations to the public via the media. Corporate support for independent media remains relatively scarce. However, the growing engagement of the private sector with media underscores a noteworthy development within the industry. Namely, businesses, despite having the means to directly engage with their target audience, increasingly recognize the significance of media outlets as a reputable platform to disseminate information regarding their operations and products.

The Emergence of a New Referentiality System

The proliferation of news and information sources made possible by Industry 4.0 was expected to improve diversity and pluralism within the media landscape. However, technological advancements have also unintentionally enabled the rapid growth of media outlets specializing in propaganda and disinformation. This has resulted in a chaotic mix of voices in an apparently wide variety of content. Social media platforms have become channels for a strange combination of factual news, well-researched journalistic investigations, opinions, distorted facts, manipulative commentaries, and outright falsehoods.

In an effort to address mounting concerns raised by authorities, particularly in the wake of a series of elections marred by rampant propaganda and misinformation, tech giants have finally taken action to cleanse their platforms. Meta, the parent company of popular social media platforms Facebook and Instagram, has partnered with an increasing number of fact-checking organizations to combat and eliminate the spread of disinformation (Hutchinson, 2021). The fact-check industry (Bell, 2019), which includes various institutions and groups dedicated to debunking and uncovering false news, has experienced exponential growth over the past decade.

The response of private businesses to these trends, however, has been inconsistent. Only a few private enterprises have shown support for initiatives aimed at countering disinformation, primarily due to their limited awareness of the risks it poses to their own well-being. Although further research is necessary to fully understand the impact of disinformation on private corporations, existing studies indicate that misleading information can have dire consequences for businesses (Petratos, 2021). There have been documented cases of disinformation campaigns negatively affecting the business and financial industries, as well as other sectors (Saunders, 2022). Such campaigns can damage the reputation and brand of private companies by subjecting them to unfounded criticism or associating them with negative trends or actions, such as illegal activities, corruption, or environmental harm (Borecki, 2017).

[3] See more at "Why We Were Established," NFNŽ, n.d., https://www.nfnz.cz/o-fondu/proc-jsme-vznikli/, accessed 15 July 2022.

As concerns over disinformation continue to surge, companies are increasingly taking notice and actively supporting civil society organizations dedicated to combating this issue. Although the overall backing for fact-checking initiatives remains limited, these developments underscore the growing need for a new system of reference in the information landscape. Such a system would involve the recognition and identification of information sources through markers such as ownership, funding sources, and information collection methodologies. In practice, that would mean labels attached to media outlets on social networks or on internet browsers, telling readers who owns and funds each media outlet. This would serve as a valuable guide and transparency mechanism for audiences navigating the vast sea of news and information they encounter daily. The corporate sector is increasingly drawn to the idea of a referentiality system as a means of enhancing the dissemination of knowledge by targeting this content to media sources defined as independent and objective in such reference databases.

The media and journalism sector has taken a keen interest in this trend and has begun to build reference databases aimed at assisting private companies in their knowledge transfer strategies.

Several such initiatives have emerged to address the credibility and transparency issues in the advertising and news media industries. One example is Ads for News,[4] a nonprofit coalition of industry leaders and experts whose aim is to offer private companies a comprehensive list of trusted local news media outlets where they can safely place their ads. Another noteworthy endeavour is NewsGuard,[5] a journalism and tech company established in 2018 by two American media experts, which uses a set of journalistic criteria to evaluate the credibility of news portals. Lastly, Check My Ads,[6] an independent watchdog organization, is actively working towards enhancing transparency in the advertising marketplace.

Despite the potential risks of fostering a cartel-like environment in the media industry, these initiatives have gained significant traction among private companies. While their motivations may not always be solely focused on supporting the media, they have been seen as valuable tools for enhancing communication strategies through reputable media channels.

However, since these media outlets are prevalent among an elite audience of well-informed and financially privileged individuals, private companies know that relying solely on them excludes a significant portion of the population. This is especially true for individuals who are less connected and have lower educational attainment, with whom many companies still need to effectively communicate.

[4] See more on the initiative's website: https://www.adsfornews.org/.
[5] See more at https://www.newsguardtech.com/.
[6] See more at https://checkmyads.org.

Is Ethical Advertising Feasible?

Advertising plays a central role in the success of private enterprises, serving as a vital form of commercial communication. Traditionally measured by sales and customer numbers, advertising has taken on a new role in recent years: facilitating engagement with communities and expanding a company's following. In Slovakia, a group of influential publishers and marketing experts established Konšpirátori,[7] a database of troublesome websites that disseminate misinformation and disinformation. This initiative has successfully discouraged businesses from advertising on digital platforms with questionable content, ultimately impacting the private sector's approach to advertising.

In today's digital economy, the advertising sector is undergoing a significant transformation due to the influence of Industry 4.0. With the current forms of communication in the digital economy, advertising has become an element of corporate knowledge transfer. As competition for attention and engagement intensifies, companies must develop increasingly compelling communication products to attract and engage their customers. This, along with the search for credibility in the vast information landscape, has sparked discussions about the importance of ethical advertising, which supports the producers of factual content. They play a vital role in disseminating corporate knowledge, as companies increasingly recognize.

But for such a shift to occur, a massive change in the dominant commercial logic that has historically guided the advertising market is necessary. When it comes to ad placement, private businesses only engage with media buying agencies, privately owned companies that collect and use audience data to identify the media outlets that can attract the desired size and type of consumers for advertisers. Unfortunately, independent journalism is often overlooked in this selection process, which is why this model of ad revenue distribution is seen as an insurmountable obstacle to promoting high-quality reporting. Therefore, a growing debate has emerged regarding the need to allocate parts of the ad budgets to independent, high-quality media outlets that do not contribute to the "self-replicating consumption pattern" specific to mainstream ad spending distribution mechanisms (Avadani, 2023). This "self-replicating" pattern incentivizes creators to solely focus on producing untrustworthy or sensationalist content, as it receives more ad money the more viewers it attracts (Avadani, 2023).

In the face of growing market pressures and intensified competition, advertisers remain hesitant to revamp their advertising strategy to allocate a portion of their marketing budget only on quality of journalism grounds. The fear of jeopardizing market share and losing customers leaves little room for experimentation. However, as artificial intelligence continues to fuel the production of easily replicable content, private companies are anticipated to become increasingly open to specialized forms of packaging and distributing knowledge, which can eventually open a niche for ad spending targeted at independent, high-quality journalism.

[7] See more at https://konspiratori.sk/dovod-vzniku/en.

Taking Customization to a New Level

The significance of customization in Industry 4.0 is becoming increasingly apparent, as indicated by these trends. Tech companies are successfully implementing customization strategies in various sectors. Notably, social media platforms have been at the forefront of this movement, pioneering algorithm-based content distribution systems that tailor information to individual users based on their online behaviour and demographic data (Dizikes, 2020). While these customization systems have reached impressive levels of sophistication, they have also faced harsh criticism in recent years. Media critics and journalists, in particular, have voiced concerns that the social network model prioritizes low-quality and sensationalistic content over in-depth, contextualized journalism.

As the logic of independent media does not align with the interests of private enterprises, the commercially driven pattern of content consumption is expected to continue its upward trajectory. With AI technology making content generation more efficient and cost-effective, mass-targeting techniques and formats are likely to become even more prevalent. However, as competition intensifies, private companies will increasingly seek improved customization systems and technologies to gain a competitive edge. Understanding individual audiences will be crucial in this pursuit. However, the implementation of more stringent data privacy laws and restricted access to locked databases may lead to increased costs for customization. Yet, when it comes to effective outreach, customization is likely to be central to how corporations design their strategies for the transfer of knowledge to the general public via media.

Conclusions

The digital transformation has sparked significant upheaval in both the corporate world and the media landscape, reshaping the dynamics between private enterprises and media platforms. In the Industry 4.0 era, private companies have harnessed the immense potential of social media, which enables them to directly engage with their target audiences without any intermediaries, a luxury not afforded in the pre-internet era. However, this newfound power comes with its own set of constraints that, in some cases, may prove more restrictive than the traditional reliance on media outlets as communication channels, which is a staple for the private sector.

The evolving relationship between the private sector and the media has had a profound impact on the dissemination of knowledge. Private companies have fully embraced the influential capabilities of social networks, using them as a means to communicate with the public. Simultaneously, private companies are also gradually acknowledging the significance of media outlets in providing accurate information to audiences about their corporate operations, offerings, and products.

The media ecosystem is on the brink of a new frontier: the integration of AI. According to a recent survey funded by Google and conducted between April and July 2023, 85% of 105 news professionals from 46 countries, including journalists, technologists, and managers, said that they have already tested generative AI. They have experimented with various tasks such as writing code, generating images, and producing content. In the same survey, 80% of respondents anticipate a surge in the use of AI within their newsrooms (Beckett & Yaseen, 2023).

While the emergence of AI in newsrooms holds the potential for positive outcomes, such as freeing up time for creative and investigative endeavours, it also carries negative implications. One such concern is the potential for another wave of false and manipulative content in the online sphere, which further complicates the efforts of factual journalism to reach its intended audience.

These emerging trends are expected to have a significant impact on how corporations engage with their target audience through the media. The exchange of information between companies, the media, and society is a major subject that warrants further investigation and examination. Although there have been noteworthy academic studies exploring the potential effects of the fourth industrial revolution on journalism, especially from a business and structural perspective (Micó et al., 2022), there is a pressing need for more granular research on how journalism is influenced in terms of its content production, particularly in relation to how corporations convey their messages through them.

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CHAPTER 16

The Role of AI in Citizen Journalism, Human Rights Activism, and Monitoring: Limits and Possibilities

Óscar Espiritusanto, Leila Nachawati-Rego, and Raúl Magallón-Rosa

Introduction

The advent of the technological revolution has placed a powerful tool in the hands of ordinary citizens, enabling them to document events and circumstances previously overlooked by mainstream media. Human rights violations, war and conflict, terrorist attacks and environmental crises are now captured by individuals through their mobile devices. This, as Barnes points out in his research, has reinstated the role of "democracy in the hands of individuals" (Barnes, 2016: 24). These new forms of narrative building allow for real-time access to diverse perspectives, providing visibility to marginalized voices that have historically been absent from traditional media discourses. As Roberts (2019) observes, "citizen participation in information sharing not only involves disseminating information and potentially influencing the public agenda but also empowers individuals to represent themselves, instead of relying solely on professional journalists for representation" (Roberts, 2019: 6).

The proliferation of such citizen informants, facilitated by the technological revolution, opens up exciting prospects for collaboration between human rights organizations and civil society, with technology as a common thread. AI

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holds the potential to streamline solutions and processes, especially in repetitive tasks, making this type of work more agile. At the same time, the surge in information technologies has given rise to challenges, including information overload and the dissemination of mis/disinformation. These issues require dedicated efforts towards content verification processes and attention to contextual factors, including language, history, culture, and political nuances to undermine the risks of AI.

In this context, developing algorithms that support democracy and safeguard human rights has proved critical, along with regulatory measures to protect and monitor our rights and freedoms. "The challenge of the modern human rights movement" is, according to Gabriel et al. (2008), "to create accountability: using independent, transparent, and enforceable mechanisms to ensure that human rights standards are maintained and that citizens have a right to participate in civil society on equal terms" (Gabriel et al., 2008: 38).

Even though implications of AI extend beyond the organizational realm, affecting a diversity of fields and actors, understanding how the work of human rights organizations intersects with these technologies is key. By drawing on insights from international organizations dedicated to human rights and social and environmental justice, this chapter showcases risks and best practices to mitigate potential negative impacts, particularly those related to disinformation and misinformation.

State of the Art

The emergence of citizen journalism in the fields of communication and human rights advocacy has revolutionized the landscape of information exchange and dissemination, providing once passive audiences with the ability to become content creators, effectively "initiating a massive conversation" (Gillmor, 2004). This transformation from vertical to horizontal information flow not only democratizes the dissemination of information but also fosters societal democratization as a whole. The introduction of smartphones, among other uses, could potentially reshape the landscape of criminal justice (Shaer, 2015).

Technology plays a paramount role in empowering citizens, transforming them from passive consumers of content to active, horizontally integrated agents who not only contribute to content generation but also participate in its distribution. As Howard Rheingold develops, "Digital media in the hands of millions of people are reshaping the institutions and professional practices of journalism and, consequently, the very essence of democracy itself" (Espiritusanto & Gonzalo, 2011: VII).

These smart crowds or intelligent multitudes (Rheingold, 2002) transcend the realm of leisure thanks to the technological revolution, enabling the amplification of messages on a global scale. They give voice to those silenced by mainstream media, thereby contributing to citizen empowerment.

This transformation holds particular significance in various domains, including "attacks, natural disasters or war conflicts" (Suárez-Villegas, 2017: 2), as well as in the defence of marginalized groups, acting as watchdogs of authority, or operating at the local and hyperlocal levels.

From this point of view, contemporary research on the intersection of technology and human rights organizations has primarily focused on the following:

- The evolving role of human rights organizations and their increased capacity to address human rights issues facilitated by technology.
- The proliferation of user-generated content and citizen journalism through mobile devices, in terms of both quantity and quality, enabling the global denunciation of human rights violations.
- The critical role of video content as evidence in human rights court cases.
- The impact of emerging technologies like augmented reality, virtual reality, and artificial intelligence on human rights organizations and defenders.
- The challenges related to disinformation within the context of human rights and technology.

When exploring the domain of disinformation, the absence of a universally accepted definition becomes evident. According to the UN Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression, disinformation is false information that is intentionally spread to cause serious social harm (Khan, 2021: 3). This aligns with UNESCO's conceptualization of the term. Notably, disinformation has evolved into a highly organized and well-funded phenomenon, bolstered by amplification techniques, including the deployment of automated technology.

In the same vein, the "Joint Declaration on Freedom of Expression and 'Fake News,' Disinformation, and Propaganda" addresses interference of disinformation and propaganda in the public sphere. This interference aims to "mislead the public and impede the public's right to seek, receive, and impart information and ideas of all kinds, across borders, as safeguarded by international legal guarantees of the right to freedom of expression and opinion" (OSCE, 2017).

User-Generated Content and Human Rights Activism

User-generated content has been analysed from the perspective of citizen journalism, the defence of minorities, the monitoring of electoral processes or hyperlocal journalism.

In the context of increasing difficulty to access war and conflict zones, citizen journalism has proved key in providing footage. Attacks, conflicts, and natural disasters also configure an environment in which user-generated content is key to human rights advocacy, according to various experts (Gillmor, 2004, 2010; Singer et al., 2011; Roberts, 2019; Barnes, 2016; Rheingold, 2002).

Citizen Journalism and the Coverage of Authoritarianism, Conflicts, and Natural Disasters

A significant case of the relevance of this phenomenon in the context of war and authoritarianism is the Arab Spring or Arab uprisings, considered "the largest geopolitical movement that has rocked the Arab world since the 1960s" (Albostangy, 2020: 325). In this context, citizen journalism and user-generated content became "an effective media and political player in the Arab world" (Albostangy, 2020: 329).

In addition to the prominent case mentioned, it is relevant to underscore the significance of technologies geared towards generating geolocalized information maps through user participation in the context of natural disasters. Organizations such as OpenStreetMap, CrisisCommons, CrisisWiki, and CrisisMappers have been pioneers in experimenting with innovative information formats. These formats not only allow for the swift assimilation of a substantial volume of data but also facilitate collaborative and immediate engagement with on-site informants. These mapping technologies, dedicated to disaster-affected regions, have effectively facilitated collaborative efforts in search and rescue operations, mapping of affected areas, victim assistance, and providing a platform for the expression of those affected.

Notable precedents, like the tsunami in Southeast Asia and the Indian Ocean earthquake, proved the potential of geolocalized information maps in efficiently and intuitively aggregating vast datasets (Espiritusanto & Gonzalo, 2011: 40). This knowledge proved invaluable in enhancing responses to subsequent crises, such as the aftermath of Hurricane Katrina in New Orleans in 2005 (Balana, 2012).

GPS geolocation systems played a pivotal role in the immediate aftermath of disasters by providing precise coordinates for locating missing individuals. In this context, citizens played a vital role in providing real-time updates. The effectiveness of such user-generated content prompted the Google Crisis Response (GCR) team to develop the Google People Finder (Google Crisis Maps), which leverages satellite imagery to enhance response efforts, as exemplified during the 2010 earthquakes in Haiti and Chile.

Citizen Journalism and Advocating for the Rights of Minorities

The strengthening and consolidation of citizen journalism is intertwined with the defence of minority rights. Notably, the use of citizen-generated content has emerged as a powerful tool in safeguarding the interests of indigenous communities.

An illustrative case is the documentary *Júba Wajiín*, which portrays a community nestled in the Guerrero mountains of Mexico. Created in collaboration with Witness Latin America, this documentary serves as an inspiring model for indigenous populations striving to protect their cultural heritage and ancestral lands. *Júba Wajiín* showcases their struggle against mining companies seeking to exploit their territory for gold extraction. The video played a pivotal role in

securing an unprecedented legal victory, recognizing their right to consultation in response to the Mexican Federal Government's decision to grant land concessions to transnational mining corporations (Witness, 2016b).

Another compelling instance of citizen-generated content advocating for minority rights is exemplified by the Black Lives Matter (BLM) movement, deeply rooted in social networks and the dissemination of user-generated content within the African American community. Allissa Richardson, a professor of Communication and Journalism, delves into the transformative role of mobile phones in enabling this community to document incidents of police violence. This documentation sparked a global discourse through the international Black Lives Matter (BLM) movement. The movement's inception can be traced back to the dissemination of the video capturing the tragic murder of Trayvon Martin on February 26, 2012. A year later, following George Zimmerman's acquittal, this decentralized movement emerged, empowering citizens to expose a silenced reality, thereby becoming a decisive force in the fight against police violence.

Richardson emphasizes the value of eyewitness-recorded content shared on social networks, where smartphones function as instruments of moral persuasion and social change (Tameez, 2020). In a similar vein, research by Mundt et al. (2018) underscores the pivotal role of these networks as essential tools for the twenty-first century social movements.

Citizen Journalism, Election Monitoring, and Hyperlocal Journalism

In the field of citizen-driven technology, Ushahidi marked a turning point, coming into being during the tumultuous electoral crisis that gripped Kenya in 2008. Conceived as an instrument for citizens to ensure the transparency and efficiency of the election process, Ushahidi allowed citizens to report real-time incidents of violence and suspicion, geolocating these events on a map. This technology enabled a crucial shift towards citizen-driven content generation and participation (Sandoval-Martín & Espiritusanto, 2016). In an interview with Periodismociudadano.com, co-founder David Kobia discussed Ushahidi's Crowdmap and Swift River tools, which were developed to validate citizen-generated information before publication. This marked a significant advancement in the field of user-generated content and participation (Espiritusanto, 2012). We will explore this tool further in this study.

The Ushahidi-Haiti Project serves as a striking demonstration of the power of online volunteer networks and the potential of new technologies in humanitarian response, as highlighted on its official website (Ushahidi, 2010). This dedicated platform, established to aid in the wake of a catastrophe, effectively harnessed geolocated citizen information concerning rescue efforts, emergency situations, and updates on missing persons.

Similarly, the organization Video Volunteers stands out in championing the rights and freedoms of rural communities and underserved neighbourhoods in India. This organization stands as a testament to citizen empowerment through

user-generated content, amplified by the transformative capabilities of technology. Video Volunteers has not only garnered significant recognition for its innovative approach but also transcended local boundaries to feature prominently in international media.

The Significance of Video as Legal Evidence in the Defence of Human Rights

The contributions provided by video in the development of the work of human rights organizations is key to understanding aspects around the use of technology for the reporting and defence of human rights.

International human rights organizations provide a compelling illustration of the growing quantity and quality of citizen-generated videos contributing to the documentation of human rights violations on an international scale. The work of Witness adds value to these visual records with the explicit goal, as emphasized by Priscila Neri, of leveraging these invaluable cinematic resources, captured by eyewitnesses at the scene of events, as legally admissible evidence to shed light on such violations and potentially hold the responsible parties accountable.

Witness director Sam Gregory stresses the society-transforming potential inherent in the dissemination of recorded images, as it reshapes the legal landscape to promote a more just society (Gabriel et al., 2008). Video possesses a "candid authority that the written word lacks, and it serves as a powerful evidentiary tool" (Gabriel, et al., 2008: 38), particularly crucial in the documentation and advocacy processes of human rights campaigns. Along the same line, Stuart Allan underscores the significance of video as a catalyst for social transformation, particularly concerning its evidentiary importance in advancing human rights causes (Allan, 2017: 348).

Video evidence has played a pivotal role in the particular case of the African continent, enabling prosecuting war crimes, monitoring elections, combating gender-based violence and discrimination against LGBTQ communities, as well as documenting abuse by extractive industries (Witness, 2021). Notable instances include the successful prosecution of Thomas Lubanga Dyilo, who received a 14-year prison sentence for war crimes, including the recruitment of child soldiers under the age of 15 (Witness, 2016a).

Video content, and live streaming in particular, has proven invaluable in championing human rights and social justice. From the Occupy movement protests in 2011 and their global repercussions to the revolts in Libya and Syria documented through Bambuser, as well as the Umbrella Revolution in Hong Kong and the Ferguson riots during the Black Lives Matter movement, these events cannot be fully understood without the citizen-driven video streaming with their mobile devices.

However, these acts of citizen journalism also expose individuals to significant risks. Madeleine Bair, the director of Witness Media Lab, emphasized the importance of "minimizing the risks" faced by video activists (Gonzalo, 2015).

The digital footprint left by our online data can pose grave risks for both the person recording and the subject of the recording. Therefore, it is crucial to develop technologies that enable the anonymization of our online footprint, including browsing habits, metadata, and search histories. As Sam Gregory emphasizes, it is essential to consider not only the visual and auditory content of a recording but also the associated metadata or underlying data that provides crucial information about "what, where, who, and when" (Gregory, 2015).

To summarize, user-generated content plays a central role in monitoring digital rights violations, enabling human rights organizations to incorporate informed testimonies of human rights abuses.

Methodology

To conduct this study, we sent a questionnaire consisting of five questions to a selected group of organizations that are members of the Association for Progressive Communications (APC). From the inception and design stage, it was key for us to ensure gender parity and diversity in terms of geographical areas and backgrounds (Table 16.1).

APC, a membership-based network of organizations and human rights defenders founded in 1990, is the oldest network focusing on the use of information and communications technologies (ICTs) to build strategic communities to contribute to equitable human development, social justice, participatory political processes, and environmental sustainability. With its deep-rooted presence at the grassroots level, APC has continually adapted and grown in step with the ever-evolving digital landscape, establishing itself as a prominent figure within the internet rights community and therefore providing a valuable framework that defines the scope of our analysis.

The organizations/individuals that were interviewed are: Colnodo, Derechos Digitales, Media Awareness and Justice Initiative (MAJI), Pollicy, Servelots, May First, Greennet, Sulá Batsú, 7amleh-The Arab Center for Social Media Advancement and Nodo Tau.[1]

The open questions were:

1. How do you think AI will change/is already changing the work of human rights and environmental/justice organizations?
2. What are the main risks you see regarding the defence of human rights?
3. Besides the risks, can AI assist in the defence of human rights? How?
4. How should human rights and environmental justice organizations use this type of technology?
5. How does the organization you work for use AI, or how could it use it to improve its work?

[1] Another organization requested to remain anonymous.

Table 16.1 Organizations specialized in technology and human rights interviewed

Organization/ individual	*Scope*	*Countries*
Colnodo	Colnodo is an association of non-profit and non-governmental organizations founded in 1994. Its goal is to facilitate communication and the exchange of information and experiences among Colombian social organizations at the local, national, and international level through low-cost electronic networks. IIn pursuing this goal, Colnodo has developed programmes that place priority on issues such as human rights, women's empowerment, governability, democracy and public participation, sustainable development, the democratization of knowledge, digital inclusion, and the strategic use of ICTs for development	Colombia
Derechos Digitales	Derechos Digitales is a non-governmental organization that fights for a more open, secure, and respectful internet of human rights. They carry out research, public advocacy, campaigns and propose public policies	Chile
The Media Awareness and Justice Initiative (MAJI)	The Organization is an independent media initiative that supports independent media projects, development of innovative ICT technologies for community use, and promotes participatory citizen journalism initiatives to increase transparency and accountability	Nigeria
Pollicy	Pollicy is a portmanteau that stems from Opinion polling and Policy making. Pollicy was founded and registered in 2016 with a mandate to redesign service delivery for citizens	Uganda
Servelots	Servelots was founded in 1999 by a group of Computer Scientists who wanted to provide a highly cost effective but user-friendly software for SME's with a special focus on the organizations working in the social development sectors	India
May First	May First Movement Technology is a non-profit membership organization that engages in building movements by advancing the strategic use and collective control of technology for local struggles, global transformation, and emancipation without borders	United States and Mexico
GreenNet	GreenNet is a not-for-profit collective established 1985, providing internet services, web design and hosting to supporters of peace, the environment, and human rights	United Kingdom
Sula Batsu	Sulá Batsú is a social economy company that was created with the objective of encouraging and strengthening local development through joint work with organizations, social companies, community networks and social movements. The cooperative focuses on strengthening local development in the context of the digital society	Costa Rica

(*continued*)

Table 16.1 (continued)

Organization/ individual	*Scope*	*Countries*
7amleh-The Arab Center for Social Media Advancement	A non-profit NGO that works to advocate for Palestinian digital rights with the aim of reaching a safe, fair and free digital space. The Center works through the publication of studies and research on digital activism, digital rights and digital security, training and capacity building of Palestinian activists and NGOs, and planning and managing local and international advocacy campaigns	Palestine
Florencia Roveri, member of Nodo Tau	Nodo TAU is a non-profit civil society association made up by information and communications professionals, educators and social activists. Its aim is to facilitate access to new information technologies for community organizations in the region (including neighbourhood groups, church-based, gender-rights, environmental and grassroots organizations, cooperatives, schools and community centres) as a means of institutional strengthening, as well as fostering communication and coordination among all sectors committed to the fight against poverty and social exclusion, the protection of the environment, and the defence of human and social rights	Argentina

Source: Compiled in-house

6. And one last question: Is user-generated content important in your organization, from the local communities you work with? Do you think AI will impact this area?

AI and Human Rights Organizations: Results

Although AI solutions have the potential to drive growth and development across major sectors such as finance, agriculture, and healthcare, biases around its design and deployment are a major concern for human rights organizations and defenders. "The AI industry is currently still based in North America, Europe, and Asia, with Africa, unfortunately, still underrepresented" (Jungblut, 2020).

Interviewees from Nigeria-based organization Media Awareness and Justice Initiative pointed out that "AI can revolutionize the work and approach of human rights and environmental justice in innovative ways. Campaigns, advocacy and engagement, especially in the global South, with particular focus on Africa, have been based on narrative, key informant interviews and witness-based report content. These contents (video, press, research, audio) provide the needed information on which most campaigns and advocacy strategies are hinged."

The same interviewee adds that "the adoption of AI will provide the basis for the development of digital tools and analysis that can further improve the quality of human rights campaigns and advocacy. For example, the use of data analysis tools in the DATACAB website provides clear and informative air quality data analysis that can support evidence-based campaigns and advocacy around the impacts of oil pollution in The Niger Delta, region of Nigeria. Research and policy frameworks can also be based on purely empirical facts and data derived from user generated content and real time data."

Interviewees from Palestine-based organization 7amleh-The Arab Center for Social Media Advancement pointed out that "it is imperative to be very mindful of who has designed and developed these models to prevent the perpetuation of discrimination, not only within their own communities but also across global communities and movements."

Several interviewees agreed that critical appropriation of these technologies is key for them to be used in favour of human rights, including through investing in community-owned and open-source solutions.

AI and the Defence of Human Rights: The Impact of New Technologies

The technological revolution has significantly altered our perspectives on the world and, naturally, our modes of communication. Technology in the hands of engaged citizens has unequivocally emerged as an empowerment force, shedding light on issues that were previously concealed or overlooked.

However, the constant evolution of these technologies forces us to remain attentive to certain circumstances such as augmented or virtual reality, since they make it possible to generate content so hyper-realistic that, as Sam Gregory points out, we can confuse it with real news and media. This kind of content generated artificially thanks to these new technologies can reverse the democratizing potential that underpinned citizen journalism in its early days, amplifying the problems related to the overabundance of information.

Filmmaker Jordan Peele and Jonah Peretti, CEOs of BuzzFeed, aimed to highlight the dangers associated with artificial intelligence-based technologies for creating deep fakes, generating a video of former President Obama in which he stated, "We are entering an era where our enemies can make it look like anyone says anything, at any time. Even if he would never have said it" (Mozilla Foundation, 2019: 59). In the same vein, interviewees from Colombia-based Colnodo outlined the use of deep fakes in Colombia's regional electoral process, "which people with little knowledge of technology take as true."

Specialists in this field, such as UN rapporteur David Kaye, view with particular concern the way in which such technologies can affect racial and religious minorities, political opposition, and activists. Kaye warns that states must implement external accountability mechanisms as well as regulatory measures to "prevent the concentration of AI expertise and power in the hands of a few dominant companies" (Kaye, 2018: 22).

Although the limits and limitations are yet to be properly defined, as interviewees from The Media for Justice and Awareness Initiative point out, "AI can assist in the defence of human rights by the use of data analytics and the development of digital tools that are tailored for the work they do."

Similarly, interviewees from GreenNet found that "LLMs are useful for coding and generating images, as we do on our organization's blog. We have only used it on a small scale so far, but it's exciting to see how fast it's developing. The future might depend on wider availability/accessibility of AI tools. Open-source AI tools exist and are less likely to be subject to technical limitations and restrictions on content but are hard to set up and use. It's important that the new tech is not monopolized by corporations, but it seems like that's not happening so far."

For interviewees from Uganda-based Pollicy, "integrating locally developed tools with full involvement of the target communities can open new opportunities for tackling pressing issues relating to human rights in different societies. This means having tools with representative datasets that are documented and of high quality, and with intended use being clear from their inception. I believe such an approach to AI adoption can assist human rights organizations in realizing greater positive outcomes in regard to their work."

From the point of view of advocacy, AI could help to provide insights that can support evidence-based campaigns, advocacy, and interactive engagements. It could also help to collect key data to support campaigning around climate change and its level of impact on vulnerable communities. This idea is shared by several of the interviewees, including from 7amleh, who highlight that "with human supervision, automating the detection and management of such incidents proves immensely beneficial. It not only saves considerable time and effort, but it also enables organizations and human rights defenders to respond promptly and efficiently." For this to be achieved, 7amleh stresses the need to design fair and inclusive AI for all scenarios, "which is challenging because we need to teach computers to analyse cases like human experts, considering ethical factors."

From their experience working on environmental protection, interviewees from Colombia-based Colnodo outline that "we use AI tools to configure environmental sensors that we plan to deploy in rural areas for monitoring natural resources. These tools have made it easier for our group of engineers to configure the devices, reducing implementation times."

As interviewees from Chile-based organization Derechos Digitales outline, while there is huge potential to these technologies for human-rights work, "resources and capabilities are lacking, particularly in global South regions such as Latin America." Some already existing initiatives that could be expanded and replicated can be found on the Feminist AI Research Network,[2] which focuses on finding ways to make AI and related technologies "more effective, inclusive, and transformational, as opposed to just more 'efficient.'"

[2] See: https://aplusalliance.org/about-fair/.

AI and Risks to Human Rights Defence: Disinformation, Surveillance, and Biases

Several interviewees highlighted the potential for AI to be used as a tool against human rights, including the creation of activist data sets, facial recognition, and the dissemination of misinformation, among others. Among the primary risks that have been identified are:

- Surveillance supported by AI tools
- Disinformation
- Civic disengagement and division, potentially resulting in apathy or reluctance to exercise freedom of expression
- Technology that enables violence, such as cyberbullying

The widespread availability of affordable technology, the ubiquity of social networks, and the proliferation of mobile telephony have ushered in notable developments in the realm of human rights. However, they have also given rise to an overwhelming influx of content, making it considerably easier to disseminate false and fabricated information (Nielsen & Graves, 2017). Addressing this information overload stands as one of the paramount challenges of our time. Disinformation and misinformation pose critical challenges to which robust content verification processes are imperative.

Research conducted by the Association for Progressive Communications underscores that disinformation is a multifaceted, global, and intricate issue. It should be seen as a symptom of broader information disorders. "Disinformation is not a new phenomenon, but it has acquired new dimensions—in terms of reach, speed, and volume—with the expansion in the use of digital technologies and, in particular, social media. Technologies also allow a diversification of actors who produce and disseminate disinformation" (APC, 2021).

This research also indicates that disinformation campaigns frequently target marginalized and vulnerable groups, human rights activists, and environmental advocates, among others. From a gender and intersectional perspective, gendered disinformation is a phenomenon that not only targets women but also feminist movements and gender-related discourse. It is used to silence women, promote self-censorship, and restrict their civic space. According to APC, female political leaders, and activists from racial, ethnic, religious, or other minority groups are targeted far more frequently than their white counterparts.

According to Pollicy, "digital ID systems are increasingly being adopted through public-private relationships between governments and Big Tech companies. This makes it possible for governments to acquire any information they may want without the say or even knowledge of the individuals or organizations."

In the same vein, 7amleh pointed out that "AI relies on data often gathered from the internet, which tends to reflect the views of dominant groups,

potentially leading to biases and even new forms of violence." Another concerning aspect of AI is the potential consolidation of power within tech giants because they are primarily developed and implemented by private sector entities.

Several of the interviewees agree that the increase in surveillance and mass surveillance mechanisms based on the advancement of technologies such as facial recognition and object recognition pose the biggest threats in the coming years.

Interviewees from Nigeria-based Media Awareness and Justice Initiative pointed at data security and digital privacy as the most affected areas. "At the moment, there are vast amounts of data that are collected within the sphere of human rights defending and protection."

According to 7amleh, "the primary concern in AI's impact on the defence of human rights lies in its potential to perpetuate structural discriminations." Similarly, interviewees from May first pointed out that "AI has had a huge impact on groups fighting police abuse, as police departments have been using it to target poor people and people of colour more effectively. Algorithms that are supposed to identify likely crimes or criminals are biased, unfairly singling out people based on their race or class identities."

In words of Colnodo, "AI systems with biased data can also affect communities. For example, the implementation of systems that determine if a person has access to subsidies or benefits. If an AI system makes these decisions, it will be complex to guarantee the rights of people who are excluded by these automated systems."

Addressing these risks and challenges requires appropriation of technology from a critical perspective by human rights organizations and other actors involved. As several interviewees, including Derechos Digitales outline, "to escape the logic of techno-optimism promoted by global technological monopolies is essential when considering the idea of developing systems of public interest. Valuing and choosing open-source software and engaging with the free software movement can be valuable in this process, as well as with human rights organizations that focus on technology issues, like members of the APC network."

Conclusion

The advent of AI poses more challenges than certainties. Nevertheless, academic definition of the ways in which human rights organizations use AI can help identify strategies to tackle these challenges. In this context, one of the key ideas emerging from our research is the need to map AI-related trends to enhance our understanding of mechanisms that promote the best uses and practices of this technology, all from a social justice and rights-centred perspective.

Table 16.2 provides a summary of the main risks and possible uses of AI that civil society organizations identify in their work:

Table 16.2 Risk and uses of AI for human rights organizations

Main risks	*Main uses*
The rise of surveillance mechanisms, fuelled by technological advancements like facial recognition	To bolster the exercise of rights, including access to information, freedom of association and gender justice
Algorithms designed to identify crimes or criminals often exhibit bias, particularly in relation to race or class identities	Potential applications in coding
Data security and data privacy	Automated monitoring of public functions to combat corruption
The deployment of AI systems for propagating disinformation and defamatory content and spreading false narratives about women, human rights defenders, and various groups	Organization of data pertaining to decisions on gender-based violence in a systematic manner
Potential to perpetuate structural discriminations	The aftermath of significant events can usher in societal changes and transformations
Consolidation of power within tech giants	LLM proves valuable in tasks such as note-taking, meeting summaries, as well as translation and editing

Source: Compiled in-house

As we have observed in the last decade with the deployment of surveillance technologies, AI is more likely to assist authoritarian regimes in suppressing dissident voices than to aid human rights organizations in reporting crimes. Furthermore, the automation of biases can create gaps that, if not clearly identified and mitigated with effective measures, are currently in the process of being reduced.

From this perspective, it is evident that technological organizations wield significant influence on public policies at a transnational level. There is a pressing need to implement measures that safeguard democratic principles against the potential dysfunctions they may generate. This is especially critical in the context of disinformation, where personal attacks or harassment on specific groups can become increasingly easier to carry out without revealing their origin.

Addressing these risks and challenges requires appropriation of technology from a critical perspective by human rights organizations and other actors involved. This entails escaping the logic of techno-optimism promoted by global technological monopolies, valuing, and choosing open-source software and engaging with the free software movement and human rights organizations that focus on technology issues.

Despite the risks and threats associated with AI, it is crucial to acknowledge the positive uses of these technologies by human rights organizations, such as ensuring the right to access information, conducting pattern identification tasks, or using them to assess the impact of specific initiatives. Failure to do so could lead to the widening of the gap created by AI.

In conclusion, human rights organizations should employ AI strategically, embracing the benefits of automated tasks while retaining a critical role in content creation. The issue of accessibility to AI tools, particularly open-source solutions less subject to technical constraints and content restrictions, will continue to be a key concern in the upcoming years.

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CHAPTER 17

Journalistic Actors in a Gamified Media Context

David Parra-Valcarce and Salvador Gómez-García

Introduction: The Ludic Turn of Media in the Forth Industrial Revolution

Schwab (2016) popularized Fourth Industrial Revolution (4IR) concept in order to refer to an environment that involves "the staggering confluence of emerging technology breakthroughs, covering wide-ranging fields such as artificial intelligence (AI), robotics, the internet of things (IoT), autonomous vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy storage and quantum computing, to name a few" (Schwab, 2016: 7).

Beyond the doubts about the accuracy of the name (Moll, 2021) and the precision of the expression (Morgan, 2019; Ross & Maynard, 2021), what is certain is that its implications affect all productive sectors including, among many others, education (Kraft et al., 2020; Oke & Pereira, 2020) or economy ones (Balog, 2020; Chalmers et al., 2021) but also cross-cutting issues such as employability (Koh et al., 2019; Nardo et al., 2020) or environmental sustainability (Cheng et al., 2021), and, of course, 4IR also affects the information industry, ushering in an era of media transformation (Vázquez-Herrero et al., 2020).

Raessens (2006) uses the expression the gamification of culture to focus attention on a concept which involves the incorporation of gaming culture into fields previously considered antithetical, such as education, politics or warfare. From a chronological point of view, its origin dates back to 1947 when Thomas

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Goldsmith Jr. and Estle Ray Mann filed with the United States Patent and Trademark Office (USPTO) the embryo of the first video game and his application was positively reported by this agency a year later, although it was not until 1952 that the famous video game Noughts and Crosses (OXO) appears, developed by Alexander S. Douglas as part of his dissertation on the interaction between humans and the operational computing machine EDSAC (Electronic Delay Storage Automatic Calculator), the first computer that could store electronic programs.

Gutsche and Hess (2020) call this reality placeification and conceive it as "the array of processes and practices in which digital news spaces transform into places of meaning and significance" (Gutsche & Hess, 2020: 588), combining mobile applications, interactive infographics or immersive facets of virtual and augmented reality, among many other possibilities.

This playful turn of culture is embedded in an interpretive framework known as the playful society (Mäyrä, 2017) or the video gamification of society (Muriel & Crawford, 2018), which has been incorporated into journalistic activity to varying degrees in recent decades (Gómez-García & de la Hera, 2023) and in general terms must be related to the paradigm shift in the acquisition and transmission of knowledge, which has occurred particularly rapidly at the beginning of the twenty-first century and which we identify as the zoon tecnologi.com in epistemological homage to the Aristotelian zoon politikon outlined twenty-five centuries earlier by the Stagirite philosopher (Parra & Álvarez, 2004).

The classical learning pattern, based on printed text readings primarily learned in school, has given way to the emerging standard that is constructed through a wide range of multimedia content watching in an unregulated environment (Clark & Marchi, 2017). The remarkable speed of this transformation is even provoking certain cognitive distortions that had already been anticipated by McLuhan (1994) and Castells (2001) in their respective analyses focused on television and the Internet, outlined by Gee (2003)

> because the views about thinking current in cognitive science stress the importance of active inquiry and deep conceptual understandings, things that are not politically popular any longer in schools, driven as they are today by standardized tests and skill-and-drill curricula devoted to the basics. (Gee, 2003: 3)

and then systematically analysed by Coleman and Levine (2008), Caruso (2018), Hughes et al. (2019), or Clauss et al. (2020), among others.

This social gamification is inserted into an environment such as Web 2.0 reinforced by the consolidation of the manual semantic web, considered not only as a strategic way of showing how the network to which users were accustomed is being transformed both in their interfaces and in the contents' visualization (DiNucci, 1999) but also as its conversion as a great agora where Internet users from all over the world establish a conversation on a global scale in which they share all kinds of topics including journalistic ones (O'Reilly, 2005).

In the case of the information industry, this scenario means that new formulas must be sought for content development that take into account the coexistence of different population groups with very different accessing information skills: analogue men (Silent Generation), digital converts (Baby Boomers), digital immigrants (X Gen), basic digital natives (Millennial) and advanced digital natives (Centennial), who in the short term will be joined by the Alpha Gen, whose digital skills have yet to be studied and understood. Indeed, some of these digital natives are increasingly critical of the media and the professionals who work in them (Gajardo & Costera, 2023) and often refuse to be informed by them (Bontcheva & Posetti, 2020).

The gamified media context facilitates the creation of an ecosystem with a very different productive structure (Picard, 2014) characterized by a great plurality of business models (Omidi et al., 2022; Gómez-García & Vicent-Ibáñez, 2022) in an increasingly competitive context and with a strong trend towards decreasing commercial margins that is especially clear in the most developed countries (Waisbord, 2019). We are witnessing media disintermediation through social media expansion and audience fragmentation (Whibey et al., 2019; Tomyuk & Avdeeva, 2022), as well as the blurring of the boundaries between the production and the consumption of news content (García de Torres & Hermida, 2017) or the consolidation of an environment in which the dissemination and acceptance of all kinds of hoaxes and false content is facilitated (Lück & Schultz, 2019; Rhodes, 2022), in interconnection with the post-truth phenomenon (Carrera, 2018), which contributes to the loss of the credibility of the media that on many occasions echo these contents without the necessary verification (Apuke & Omar, 2021; Ceron et al., 2021).

This situation is accelerated since October 2019 with the arrival and expansion of the COVID-19 global pandemic, which involves the proliferation of all kinds of hoaxes and false content about the epidemic disease itself, laying the foundations for a process of global information warfare (Papadopoulou & Maniou, 2021; Gaber & Fisher, 2022) and must be completed by the real effects of the United States' economic depression in 2007 (Fu et al., 2021), which subsequently spread to most Western economies putting some of their financial systems in serious trouble (Hein et al., 2021), underpinned by the collapse of the real estate bubble in 2006 (Griffin et al., 2021), which led months later to a subprime mortgage crisis (Jones & Sirmans, 2019) and the decapitalization and subsequent disappearance of some banking corporations (Mieszala, 2019).

A Ludic Prism to Interpret the Gamified Media Context: The Game Thinking

In the previous context, the integration of game culture within the media landscape prompts an inquiry into their impact on contemporary culture. Furthermore, one of the fundamental applications of the mentioned gamification of culture in the field of journalism is game thinking, which refers to the

use of games and similar approaches to solve problems and improve experiences (Marczewski, 2015). In digital journalism, game thinking has manifested itself in four main categories: playful design, gamification, simulation and newsgames. These formats, rooted in game thinking, leverage two logics particularly adept at fostering user participation and engagement: a robust visual component and narrative techniques founded upon procedural rhetoric (López-García, et al., 2020).

Coined by Ian Bogost, the term procedural rhetoric stands as a compelling theoretical framework framing video games as mediums intertwining narrative and ludic elements. Derived from the classical concept of rhetoric as a transdisciplinary practice governing language use—written, visual, etc.—for persuasive or aesthetic ends, Bogost defines procedural rhetoric as "an interpretative practice of arguments through processes" (Bogost, 2007: 28). Within this framework, procedural rhetoric embodies

> the art of persuasion through rule-based representations and interactions, replacing spoken word, writing, still or moving images. This persuasion model is linked to the core processes of an informational device: it executes processes, conducts calculations, and manipulates symbols based on rules. (Bogost, 2007: ix)

In this chapter, we are going to explore the presence of the game thinking in the media ecosystem and its intensity to determine their integration, influence, and risks in addressing the challenges facing audiences in the Fourth Industrial Revolution.

Playful Design

Playful design strategies purposefully harness enjoyable and interactive elements to heighten the conveyed message. Within this framework, information assumes a game-like essence, leveraging the visual attributes intrinsic to games as a metaphorical tool to enhance both informative and editorial content. Recent research (Karels & de la Hera, 2021) exploring the intersection of cultural ludification and the competitive attention economy has delved into how advertisers utilize playful communication strategies in print advertising to distinguish themselves. Their investigation revealed distinct different uses: visual designs intended to evoke a playful mindset, strategies integrating pleasurable interactive elements to encourage engagement and the use of playful design to broach sensitive or sombre topics.

An illustrative instance of the combination of these strategies can be found on the front page of *Sunday National*, a pro-Scottish independence newspaper, on February 6, 2022.[1] Here, the integration of the Wordle game interface served as a distinct vehicle to underscore their stance on Boris Johnson's position following the PartyGate scandal, coupled with critiques regarding his

[1] To consult it, please visit http://bit.ly/46zHgg9

management of the COVID-19 crisis during his tenure as the Prime Minister of the United Kingdom.

The visual utilization of the web-based word game, with a global player base exceeding two million, was appraised by the newspaper's editor, Roxanne Sorooshian, who remarked,

> the PartyGate story has been going on for so long now that it demanded a fresh treatment for Sunday […] Wordle is so of the moment, it was definitely worth harnessing its popularity for our splash. And the page was immensely fun to do. (as cited in Sharman, 2022)

These strategies converge at the nexus of cultural ludification and the competitive attention economy as stated by Wu (2017), aiming to emphasize a media outlet's perspective on a subject, seeking to connect with its audience by borrowing gaming codes and adapting them to shape their perception of an informative proposal. The aforementioned ludification of culture presents here its expansion beyond digital media outlets, signifying the inception of this cultural shift.

Gamification

Gamification in digital journalism has been a pivotal approach, engaging audiences and fortifying journalists' capacities, prompting an ongoing negotiation within journalism's boundaries (García-Avilés et al., 2022; Ferrer-Conill, 2017). The discourse surrounding this practice scrutinizes criticism that views gamified news as a drift towards infotainment, advocating instead for gamification as a form of serious journalism rooted in norms of audience engagement. While perceived as an extension of existing institutional norms and beliefs rather than a catalyst for institutional change (Vos & Perreault, 2020), gamification use relies on competitive leaderboards for assessment and user engagement.

The integration of game elements into BBC News' gamified survey during the UK general elections stands as a prime example. Presented as a "How would you vote?" quiz, this interactive approach prompted users to engage by responding to policy-related questions without revealing associated parties. This innovative fusion of game mechanics within news media exemplifies a trend that blurs the traditional boundaries between news and games, a shift observed from traditional newspaper puzzles to contemporary digital journalism. This convergence characterizes the gamification of journalism within the context of the Fourth Industrial Revolution, operating at two distinctive levels. This transformation involves news organizations embedding game elements within individual news stories or their overall digital platforms.

Raul Ferrer-Conill offered the more comprehensive framework about this practice in his PhD. Dissertation titled "Gamifying the news: Exploring the introduction of game elements into digital journalism". In his research,

Ferrer-Conill (2018) points out *The Redding Record Searchlight*, a Californian daily newspaper, as an early adopter of gamification strategies. Faced with an expertise gap in managing user comments, the newspaper sought external assistance in 2011. Partnering with gamification consultant Bunchball, they innovatively integrated game mechanics as digital incentives to encourage readers' engagement in moderating user comments, fostering a civil online discourse. This dynamic system empowered users to vote on peer comments, employing "rewards and recognition (...), and reputation, providing users with a stake in their online identities" (Lyons, 2011, as cited in Ferrer-Conill, 2018: 22). Notably, those receiving the most votes earned a badge, symbolizing their standing within the community. The initiative resulted in a 10% upsurge in comments, a 25% increase in time spent per site session and a noticeable reduction in the need for comment deletions, despite the overall increase in comments (Wood, 2012, as cited in Ferrer-Conill, 2018: 22).

Simulation

Some experiences within the realm of game thinking in journalism diverge from traditional gameplay and lean more towards simulations. Simulations, renowned for their emulation of real-world processes or situations, prioritize accuracy and authenticity over elements of competition or challenge often associated with games. They serve as representations of complex systems, enabling users to observe, experiment or predict outcomes within controlled environments. Unlike conventional games, simulations are prevalent in fields like science, engineering, economics and training programmes, intending to provide insights, training or understanding without necessarily embedding playful or competitive elements.

An illustrative example is "Could you be a cricket umpire?" published by *The Times* in 2018. This simulation comprises a series of videos replicating the training regimen of professional cricket umpires, offering insights into their decision-making process, often scrutinized and debated. Players engage by anticipating whether a batsman should be given out LBW (leg before wicket) in each video. Notably, this simulation blurs the lines between game and non-game elements, inviting users to explore a video gallery in an innovative and reflective manner.

Simulations within journalistic contexts prompt users to interact with real-life scenarios, fostering deeper reflection and understanding while engaging them in an immersive yet educational experience. These simulations, sitting at the intersection of game thinking and informative engagement, offer an avenue for audiences to comprehend complex topics through interactive exploration.

Play the Message: News in Games' Guise

The inception of the "play the message" formula (Frasca, 2007) within mass media found its early manifestations in interactive entertainment, exemplified

by projects such as *Fojba2000* (published by the Slovenian weekly magazine *Mladina* in 2000), and within the realm of multimedia infographics, as evidenced by *Can you spot the threats?* (published by the website *MSNBC.com* in 2001). These instances were complemented by independent creations operating distinctively from the official discourse of mass media. Notably, *September 12th* (developed by the video games company, Powerful Robots, in 2003), conceived by Gonzalo Frasca, introduced the term 'newsgame' to delineate a nascent genre: video games rooted in news. Frasca proposed a shift from the traditional focus of video games on fantasy towards leveraging them as potent tools for enhancing our comprehension of the world (newsgaming, 2003). While this conceptualization bears certain theoretical limitations, it underscores a fundamental aspect of newsgames: the amalgamation of video game mechanics with contemporary events, thus merging ludic simulation with pertinent subjects of our current reality.

The initial forays of traditional media into newsgames commenced in 2007 when *The New York Times* introduced them in its digital edition, notably contributing to the development of titles like Food Import Folly (launched on May 24, 2007) and Points of Entry: An Immigration Challenge (June 22, 2007). While these projects lacked continuity, they signalled a burgeoning trend of such content in traditional media and sparked numerous studies aimed at defining this emerging phenomenon. The rising popularity of newsgames has prompted increased academic scrutiny, resulting in scholarly works attempting to delineate the concept (Bogost et al., 2010; Burton, 2005; Meier, 2018; Gómez-García & de la Hera, 2023) or propose development strategies (Grace et al., 2016; Siitonen et al., 2019).

Nevertheless, the lack of an accepted definition for the concept of newsgames. Some scholars claim that this is caused by the heterogeneity of this practice and its continuous evolution (Plewe & Fürsich, 2018). The definitions provided by Plewe and Fürsich (2018), on the one hand, and Wolf and Godulla (2018), on the other hand, focus on the identification of traits as a primary way to develop an analytical perspective of the informative strategy of newsgames. Table 17.1 provides an overview of the traits identified in both definitions, which both converge and diverge in several features.

Table 17.1 Newsgames' traits as identified by Plewe and Fürsich (2018), and Wolf and Godulla (2018)

Plewe and Fürsich (2018)	*Wolf and Godulla (2018)*
Created in response to current events	Reference to current events
Easy to access	Easy to access
Persuasive intention	Procedural rhetoric
Supplementary to traditional news	Produced by media organizations
–	Communication of information

Source: Own elaboration

Recent research endeavours have sought to distinguish newsgames from other serious games, highlighting their distinctive role within journalistic practice. Newsgames are characterized by their connection to events with news value, serving as a complement to conventional news formats (Plewe & Fürsich, 2018; Rojas-Torrijos, 2019). Beyond the theoretical discourse, these propositions inaugurate a novel relationship between information dissemination and media audiences. They acknowledge that the delivery of information need not solely rely on presenting raw data; instead, it should facilitate diverse interaction modes with information. This approach allows users to create personalized routes for consuming information and engaging with news content. Recently, some analytical approaches offered a systematic way to identify and classify newsgames from their journalist nature and hybrid genres (Gómez-García & de la Hera, 2023) or news quality (García-Ortega & García-Avilés, 2020).

Nevertheless, over a decade since *The New York Times* embarked on its initial foray into newsgames, observing the positive impact on web traffic, the effectiveness of this strategy remains ambiguous. Some researchers have explored aspects such as behavioural patterns concerning gender, graphics, and contextual information within newsgames (Lin & Wu, 2020), pedagogic aspects (García-Ortega & García-Avilés, 2021) or their role in media literacy process (Glas et al., 2023), yet comprehensive insights remain limited.

Conclusions: Game Thinking as a Strategy in the Gamified Media Context

The debate surrounding the integration of game thinking into journalism underscores the imperative to redefine this practice in the context of the Fourth Industrial Revolution. The informative procedures regarding new formats, contexts and thinking frameworks, like the ones we are exploring in this text. The implementation of informative products under the Game Thinking umbrella demands collaborative efforts between diverse languages (such as informative, visual and game programming) and varied professional profiles, presenting new challenges in and of itself. These considerations gain depth when reflecting on Reed Hastings' notable statement—Netflix's CEO and co-founder—asserting that their company's competitor was Fortnite, not HBO, Amazon or Disney Plus. This remark echoes the shifting battlegrounds within media industries, striving to integrate the convergence and deconvergence processes shaping contemporary media conglomerates. Netflix's inclusion of games in its catalogue in November 2021 represented a logical progression in the company's evolution amid the current media landscape.

While the relationship between digital games and communication has been enduring, its evolution has been substantial (Meier, 2018). Presently, the prominent position of video games as a twenty-first-century cultural industry renders them a fertile ground for indoctrination and propaganda and was identified as "the future of media studies is game studies" (Chess & Consalvo, 2022). The innovative application of game thinking to journalism (or to media

in a broader sense) represents one of the key challenges in comprehending this phenomenon within academic frameworks, a challenge that this text endeavours to explore. The diversity of these products spans from visual inspiration to relatively rudimentary games, akin to animated jokes like The Lone Denier (featured in *The Guardian*'s digital edition in 2016), to productions aiming to convey highly complex issues comprehensibly within limited timeframes.

The tension surrounding the narrative formula of newsgames has often sparked criticism, particularly concerning the use of playful formats in sensitive issues such as racism and migration. One notable case is Syrian Journey published by the BBC in 2015, a newsgame that faced backlash from publications like the *Daily Mail* and *The Sun* for "transforming the human suffering of literally millions into a children's game beggars belief" (Gillman, 2015; Sales & Payne, 2015). Responding to this criticism, the BBC and refugee charities defended the game as "a method of raising awareness about the bloody conflict" and "a tool for those interested in learning more about the situations Syrian refugees face" (Gander, 2015). This debate sheds light on the polarized reception some of these new journalistic formats receive. These instances underscore both the immense potential and the difficulties in presenting an unequivocal or overly simplistic view of informational phenomena, be it intentional or unintentional.

Lastly, while the most advanced manifestation of Game Thinking—newsgames or branded games—might not claim a hypothetical journalistic prime time or dedication, their manifestation and evolution over two decades bear witness to a process of hybridization and incorporation of elements among various actors within the digital ecosystem. As articulated at the outset of this chapter, this integration stands as a representative element of the Fourth Industrial Revolution. Therefore, despite newsgames maintaining a niche logic due to the identified challenges, their presence as journalistic actors in a gamified media context signifies an interplay between permeable elements that both influence and are influenced by the evolution of digital journalism.

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CHAPTER 18

Impact of Generative Artificial Intelligence on Journalism: Practice and Deontology

Wafa' Atieh Mohammad Harb and Mohamed Qabajeh

Introduction

The Fourth Industrial Revolution represents an important change in our daily life, in our work, and it impacts all disciplines including economy and industry. It creates a dramatic change in the human development, human work, and communication (de-Lima-Santos et al., 2022). This development combines the digital, physical, and biological worlds to open the way to modern technologies and applications. To deal with this promising development, we need to rethink of the ways to develop our organizations and communities, and to explore beyond technology (Fui-Hoon Nah et al., 2023).

Traditional artificial intelligence (AI) is a known technology that has been used to identify patterns using a training dataset and to make predictions based on the training data. Recently, generative AI models emerged by using a complex computing process known as deep learning. It has been used to investigate common patterns and arrangements in large datasets. This data is then used to create new and convincing outputs including text, images, data, code

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generation, video, speech, and other data types. The generative AI models do this by incorporating machine learning techniques known as neural networks. Also, generative AI can generate outputs in the same medium in which it is driven (e.g., text-to-text) or in a different medium from the given prompt (e.g., text-to-image or image-to-video) (de-Lima-Santos & Ceron, 2021). Automotive industry, healthcare and scientific research, media and entertainment, education, and climate science are examples of fields that can benefit from using generative AI. Other application models include translation, academic and business writing, genetic sequencing, grammatical analysis and correction, infographics, creative design, and image editing (Canavilhas, 2022).

The explosive growth of generative AI has already created profound changes in how people live, work, and communicate. This revolution can result in lower labor costs, and greater operational efficiency and productivity. However, it creates new challenges for citizens and governments around the world (Chen et al., 2020). A significant risk of using generative AI models is their potential for spreading misinformation and harmful content. The impact of doing so can be inclusive and severe, from perpetuating stereotypes, hate speech, and harmful ideologies to damaging personal and professional reputation, and the threat of legal and financial repercussions. It has even been suggested that the misuse or mismanagement of generative AI could put national security at risk (Ali & Hassoun, 2019).

Evolution of Generative AI in Journalism

Generative AI has emerged from the realm of science fiction and has become a very real tool that can help societies in addressing different issues, including the challenges faced by the journalism industry. In journalism, AI can be used in various stages from news creation, production, distribution of news products and services, to collection and organization of information and the automatic production of texts. Other applications of generative AI in journalism include fact-check, report writing and summarization, news translation, news access, and accurate content. For this purpose, vast field of applications emerged to enable journalists to work faster, smarter, and better (Kothari & Cruikshank, 2022).

Although the interest of using AI in journalism is growing, its use is still quite small and limited to large production companies and in specific countries. The delay in the deployment of this technological innovation is due to the insufficient funding and knowledge regarding its potential, both among journalists and decision-makers. Additional challenges include resistance to change, the institutional landscape, historical competition, lack of skill, and complementary ambitions (Pavlik, 2023).

One of the challenging aspects of journalism and writing is content creation since it is a time-consuming and labor-intensive process. Generative AI can play a significant role here in enhancing the content creation process by providing journalists with assistance, inspiration, or feedback. Content creation is a

challenging aspect for journalists since it requires research and creativity, accuracy, and the ability to produce informative texts for various audiences and purposes. Generative AI can help journalists and writers with tasks such as ensuring that the content is consistent, coherent, and grammatically correct. Also, AI can generate and customize content for topics such as reports, recommendations, reviews, or advertisements. Additionally, AI can generate content in different languages, for multiple platforms, or formats to meet specific needs or preferences (Carlson, 2015).

Generative AI cuts across all journalism fields (press, radio, TV, Web) and offers a wide range of possibilities to improve quality and efficiency of journalists' work. For example, AI helps to create short summaries or teasers for articles, improve texts and articles in terms of search engine optimization by generating relevant keywords and meta tags. Also, AI can be used to automate image information by create fitting and meaningful captions for photos and graphics in articles and reports by considering the image's context and the article's content. Generative AI can rapidly analyze large datasets which helps in fact-checking and verification processes, fighting the spread of misinformation and fake news. This will be helpful for journalists in debunking false claims and ensuring the accuracy of their reporting (Broussard et al., 2019).

The Suitability of AI in Journalistic Tasks

When examining the potential for applying generative AI to journalistic tasks, we start with a comprehensive exploration of the various journalistic tasks that would benefit from this technology. At the same time, we delve into the basic journalistic principles that underpin the development of AI solutions and their integration into news production processes.

An Associated Press (AP) report discusses the ways in which artificial intelligence (AI) and related technologies have been harnessed in creating news stories by interviewing workers in more than a hundred American newsrooms (Rinehart & Kung, 2022). Most of the study sample tends to agree on two points:

1. Human-supervised artificial intelligence systems.
2. Compatibility with Source Confidentiality and Privacy

The report also noted a collective preference for solutions characterized by "low cost, low learning curve, and low maintenance" (Rinehart & Kung, 2022: 15).

It is also apparent that AI fits naturally into an interactive model of building human elements and feedback. However, text generation models have been able to preserve sensitive information and to reveal it unintentionally to users in general and to journalists. This process may pose a challenge because users will seek to obtain the best outputs from these models, which requires extensive experimentations and expenses that may exceed the capacity of newsrooms

with limited financial resources to develop and maintain AI tools (Rinehart & Kung, 2022).

According to AP report, automation can empower four areas of journalism: newsgathering, production, distribution, and business. Within the scope of this concise analysis, the focus will be primarily on the pivotal roles of journalists and editors, particularly in the domains of newsgathering and production.

News Gathering

The process of collecting data and information is fundamental and foundational in the world of journalism. Certainly, artificial intelligence promises to have a profound impact on journalism. For example, ChatGPT is one of the most important tools that artificial intelligence provides for data collection. It revolutionizes data collection and analysis. This helps journalists sift through huge datasets quickly and consistently.

> The data necessary to support the automated writing of such stories could be gathered from a combination of automation and manual reporting, perhaps managed by news organizations for use in generating multiple forms of text output, interactive content, and other data-centric news products. (Caswell & Dörr, 2018: 11)

The data required to facilitate the automated generation of news articles can be sourced through a dual approach, combining automated mechanisms and manual journalistic efforts. News organizations often take on the role of curators, overseeing the collection and management of data for generating diverse forms of textual content, interactive features, and other data-driven news products. This approach acknowledges the synergy between automated data retrieval and traditional journalistic reporting, highlighting the collaborative nature of data collection in the context of automated journalism.

News Production

In the changing world of journalism, artificial intelligence (AI) has become a game changer providing creative solutions to long-standing challenges. Its impact spans aspects of journalism including text-based reporting, multimedia content creation, and even social media.

This section explores the suitability of AI in journalistic tasks and the specific tools it offers for audio, video, text, and social media content.

Tools

As AI technologies continue to develop, a group of tools has been created to assist journalists in their job tasks. These tools use AI's capabilities, such as pattern recognition, language correction and understanding, and data analysis, to simplify processes and enhance the quality of content produced. The Knight

Center for Journalism in the Americas at the University of Texas categorized generative AI tools to four general purposes: text, images, audio, and research. This provides a clear insight to show how AI is transforming the journalism landscape.

Text

Generative artificial intelligence (AI) tools for text have emerged as a source of power not only in the world of natural language processing but also in journalism and media. These tools are designed to generate professional text as ordered, making them invaluable for various applications, from content creation to news editing, creative scenario writing, and chatbots. ChatGPT from OpenAI, Bard from Google, Bing Chat from Microsoft, and Claude from Anthropic AI are AI generative tool examples for text according to The Night Center for Journalism.

(a) OpenAI developed ChatGPT as one of the pioneering AI generative tools for text and a prime example of AI's transformative impact on journalism. It is built upon the GPT (Generative Pre-trained Transformer) architecture, which enables it to generate coherent and contextually relevant text. "Transformative artificially intelligent tools, such as ChatGPT, designed to generate sophisticated text indistinguishable from that produced by a human, are applicable across a wide range of contexts" (Javaid et al. 2023: 1). Journalists can use ChatGPT to streamline their writing process, generate article summaries, or even assist in drafting initial versions of news stories. ChatGPT's ability to understand context and engage in meaningful conversations distinguishes it.

(b) Google's Bard is another notable AI generative tool. It benefits from powerful neural networks and extensive training on vast datasets to generate text that is both informative and engaging. Bard's applications range from content creation for websites and blogs to assisting users in generating natural-sounding emails. It excels in generating text that feels genuinely human, making it a valuable tool for various writing tasks (Google, 2023a).

(c) Bing Chat from Microsoft is designed for interactive conversational experiences. It offers journalists a versatile tool for content generation and curation. It can assist in drafting news articles, providing suggestions for headlines, and even curating relevant images and multimedia content to accompany stories. Bing Chat's ability to aggregate and present information from various sources helps journalists stay updated and informed (Microsoft, 2023).

(d) AnthropicAI created by Claude is a certification to the growing influence of AI in journalism. This tool leverages deep learning techniques to analyze and synthesize complex information. For journalists, Claude can simplify the process of researching and summarizing large volumes

of data, making it invaluable for investigative reporting. Its natural language processing capabilities also facilitate real-time analysis of social media trends, aiding in the identification of emerging stories (Anthropic, 2023).

Images

AI generative tools for images are becoming indispensable assets for journalists. They streamline content creation, enhance storytelling, and enable the visualization of complex data. DALL-E 2 and Midjourney exemplify the transformative capabilities of these tools, which, powered by advanced AI algorithms, empower journalists to enhance their storytelling through innovative visual content.

(a) "DALL·E 2 is an AI system that can create realistic images and art from a description in natural language" (OpenAI, 2023). It is a groundbreaking AI model developed by OpenAI. This innovation offers journalists a powerful tool to visualize stories, concepts, and data-driven narratives. Journalists can provide textual prompts, and DALL-E 2 responds with vivid, contextually relevant images, revolutionizing the way visual content is produced for news articles. The key features of DALL-E 2 are:

1. Data visualization: journalists can use DALL-E 2 to convert complex data into intuitive visual representations, making statistics and trends more accessible to readers.
2. Concept visualization: abstract concepts or metaphors can be brought to life through DALL-E 2's ability to create imaginative and symbolic images, enriching storytelling.
3. Enhanced creativity: DALL-E 2 sparks creativity by offering an expansive array of visual interpretations for textual prompts, allowing journalists to explore different visual angles for their stories.

(b) Midjourney is another notable AI generative tool for images that caters to the journalistic landscape. This AI-driven platform focuses on creating immersive and interactive visual experiences. Journalists can utilize Midjourney to craft engaging multimedia content, such as interactive infographics, data-driven visual narratives, and augmented reality (AR) components (Midjourney, 2023).

Audio

In today's ever-evolving journalistic landscape, the integration of artificial intelligence (AI) generative tools for audio is paving the way for revolutionary storytelling. These tools, driven by advanced AI algorithms, empower journalists to reshape audio content creation and transcription, spotlighting ElevenLabs for voice generation and Trint for transcription as exemplary examples.

(a) ElevenLabs for voice generation is at the forefront of AI-driven voice generation. This tool harnesses innovative technologies to synthesize human-like speech, enabling journalists to enhance their audio storytelling. Journalists can input text, and ElevenLabs transforms it into natural-sounding speech, providing an asset for podcasts, news broadcasts, and multimedia content. The most important features of it are the ability to generate voice that closely mimics human speech and the ability to fine-tune parameters such as tone, pace, and accent to tailor the generated voice to the specific requirements of their narrative and multilingual support (ElevenLabs, 2023).
(b) Trint for transcription is a powerful AI tool designed to transform audio and video content into accurate and editable transcripts. This tool is a significant change for journalists, simplifying the transcription process and enhancing the accessibility and searchability of audio recordings such as interviews (Trint, 2023).

Research

In the digital age, journalists face the challenge of information overload. AI generative tools designed for research, such as Google Pinpoint and Semantic Scholar, are becoming invaluable assets in the search for knowledge.

(a) Google Pinpoint is a sophisticated AI-powered research tool that empowers journalists to sift through vast volumes of information efficiently (Google, 2023b). Its advanced algorithms analyze complex datasets and pinpoint relevant information, streamlining the research process. The key features of Google Pinpoint are:

  - Contextual understanding: Google Pinpoint utilizes natural language processing to comprehend context and identify nuanced relationships between words and phrases, allowing journalists to uncover hidden connections within their research.
  - Multi-source integration: It aggregates information from a multitude of sources, including academic databases, news articles, reports, and more, providing a comprehensive knowledge base.
  - Customized recommendations: The tool offers personalized recommendations based on a journalist's research history, aiding in the discovery of relevant content.

(b) Semantic Scholar is an AI-driven research platform designed to facilitate access to scholarly articles and papers (Allen Institute for AI, 2023). It employs machine learning to categorize and recommend research papers, enabling journalists to stay updated with the latest academic insights in their field.

By using these AI tools, journalists can produce in-depth reports by accessing academic research that informs their investigative reporting. They can check facts and sources through AI-driven research tools that contribute to the credibility of journalistic content. Also, they empower journalists to integrate data-driven insights into their narratives, enhancing the depth and accuracy of their reporting, and they extended the expectations by suggesting research topics and trends, assisting journalists in identifying newsworthy stories.

Effects of Generative AI on Journalism

AI refers to a field of computer science with a focus on animating human intelligence (Broussard et al., 2019). In addition, as AI is spreading in all fields of science, it affects journalism in all domains. Due to that, the implications of AI for journalism must be prioritized in the wide context of the digitization of media and journalism. However, generative AI affects journalism in four main aspects:

Improved Content Creation Efficiency

Generative AI tools have made journalism more dynamic and efficient. They can automatically create specialized texts such as articles, reports, and summaries using data and templates. This means newsrooms can produce quicker and more adequate content, especially for routine and data-driven tasks as news reports on the hour. Journalists can then spend more time on in-depth reporting and analysis such as investigative journalism while AI manages repetitive work.

In the context of content creation, disruptive technologies like ChatGPT are not developed with a particular content type or purpose in mind. Instead, they provide users with a versatile toolbox of capabilities, allowing them to explore and apply these technologies in novel and creative ways for content generation. This feature allows journalists and content creators to deep dive in the language and methods of writing to create various contents. Accuracy and quality of any content have become the focus of education about ChatGPT (Rudolph et al., 2023).

Personalized Content Delivery

Generative AI studies through algorithms how users behave and what interests them. That helps news organizations to give personalized content to their readers as they recommended.

This not only boosts reader engagement but also ensures that readers get content they care about, making them happier and more loyal. In addition, this makes audiences continuously visit to read social media platforms, websites, or applications.

Media outlets pragmatically shift the way it conceptualizes and classifies their audience after the rise of digital media (Fisher & Mehozay, 2019). This process might not be as accurate as the old methods of studying audiences such

as combining social theory and empirical research. The algorithmic episteme assumes a performative individual, based on behavioral data, which makes it see the audience differently.

Data-Driven Insights

Generative AI can analyze massive amounts of data fast and find valuable insights. Journalists can use AI to discover trends, patterns, and connections in big datasets, which is particularly helpful for investigative journalism. This helps journalists uncover hidden stories in complex data.

Humans and machines pairing is the power of AI. According to Zagalsky et al. (2021), human learning and machine learning are reciprocal.

Automation of Repetitive Tasks

Generative AI automates repetitive jobs in newsrooms, like transcribing, editing, translating, and summarizing content. This automation shortens time and saves effort, allowing journalists to focus on creativity and novelty.

According to Frey and Osborne (2017), employment is on elevated risk due to automation, or computerization as they called it, and as technology races ahead, "For workers to win the race, however, they will have to acquire creative and social skills" (Frey & Osborne, 2017: 269).

These effects of generative AI show that it can make journalism more efficient, improve content, and enhance the news-reading experience. However, they also raise concerns about ethics, fairness, and how the role of journalists is changing in a world with more AI.

Ethics of Using Generative AI in Journalism

As the use of generative AI rises, its impact on society becomes increasingly evident. Therefore, it is important to consider the potential consequences of using AI in journalism to weigh the benefits with the potential risks and to ensure that its development and deployment line up with society's values. There are ethical codes for journalism and there are ethical codes for AI, but there are not widely known codes of ethics when it comes to the use of artificial intelligence in journalism. With journalism, using Al requires some considerations as to how to use AI tools responsibly and ethically (Ali & Hassoun, 2019).

A significant obstacle facing the deployment of AI in journalism is the lack of clearly defined standards in critical areas, including intellectual property rights, authenticity, data privacy, security, and accuracy of the generated content. Generative AI tools can generate different contents including text, music, images, and other content, which create several copyright challenges (Lucchi, 2023).

Copyright protection for training data can be supported through the successful implementation of effective policies by policymakers. This can ensure the smooth integration of generative AI systems. Also, the use of training data that contains biases and errors can affect the accuracy of their responses,

leading to unplanned consequences and discriminatory outcomes (Broussard et al., 2019).

Another ethical aspect is transparency. It is essential to ensure the data sources and uses of copyrighted works are properly documented and disclosed. Transparency increases responsibility and trust and allows content creators and AI system users to track the use of copyrighted works and resolve potential concerns or disputes. Content falsification and misinformation are other ethical concerns that are related to the deployment of AI in journalism. Generative AI can contribute to the spread of misinformation and fake news, which have profound security implications. This fake news can influence public opinion and the reputation of organizations and individuals (Rojas-Torrijos, 2021).

AI as a Tool, Not a Replacement

In the field of journalism studies, generative AI refers to the application of artificial intelligence techniques that involve automatically producing news articles, summaries, and other forms of content, newsroom automation, automated content generation, analysis of large datasets, identifying patterns, and deriving meaningful insights for journalistic purposes. Such automation demonstrates valuable work for tasks like data analysis and insights, report summarization, and news updates, which save time and effort and enable journalists to focus on more intricate investigative work (Carlson, 2015; Gondwe, 2023).

With technological advancements, the labor market will be reshaping soon; it may reduce the need for certain jobs, but they do not necessarily eliminate them. Applying generative AI in journalism can create job displacement in the labor market due to the use of algorithms to generate productive work and reduce redundancy. On the other hand, applying generative AI can create new jobs in various industries (Mustak et al., 2023; Uzun, 2023).

Generative AI and humans should collaborate harmoniously, and the AI algorithms should be guided by human needs and values. Humans play a vital role in assisting AI algorithms. This collaboration has a lot of advantages including bias reduction, augmenting rare data, maintaining human-level precision, incorporating subject-level experts, ensuring consistency and accuracy, making work easier, improving efficiency, providing accountability and transparency, and increasing safety (Fui-Hoon Nah, et al., 2023). Also, human-AI collaboration can bind the strength points of both entities. AI systems can expand journalistic capabilities and journalists can provide critical thinking, contextual understanding, and ethical judgment. Additionally, this collaboration has the potential to improve the quality and efficiency of journalism, while also preserving the human touch and creativity that is essential to good journalism. Human journalists can provide the critical evaluation, correction, and verification that AI algorithms lack, to ensure that the generated news and reports are accurate and trustworthy.

Briefly, the role of human journalists is changing in the era of AI, but it is far from becoming obsolete. Human journalists bring unique skills and perspectives, and their role in journalism will remain to be essential, even with the

widespread of AI algorithms. By collaboration between human and AI algorithms, human journalists can help to produce better and more accurate content.

Accountability and Responsibility

The latest developments in generative AI will revolutionize the way journalists do their jobs and will affect their daily work. To ensure that this development will support human values, designing methods for AI algorithms is needed that incorporate ethical principles and address societal concerns with greater responsibility. There are known codes of ethics for journalism, and there are codes of ethics for AI, but there are no widely known codes of ethics for the use of artificial intelligence in journalism. So, there is a need to introduce new ethical codes to ensure that AI systems are responsibly designed, and that accountability and transparency are attained. Generated AI is a challenging issue for journalistic integrity and accuracy. It may damage the credibility of respected news organizations, as the technology is not bound by the same ethical codes as humans (Novelli et al., 2023).

Accountability and responsibility are key ethical issues in the development and deployment of AI systems. As AI technologies become more sophisticated and autonomous, it is essential to ensure that there are mechanisms in place to hold the relevant stakeholders accountable for the AI system's actions and outcomes. One of the important aspects of accountability and responsibility is trust and public acceptance. This will create clear outlines of responsibility and accountability, which helps in building trust in AI systems and facilitating their social acceptance and adoption. Trustworthy AI systems can enhance user's confidence and encourage the use of AI tools across various fields, leading to more significant benefits and advancements (Loi & Spielkamp, 2021). Another aspect of accountability and responsibility is legal compliance. This will ensure that the used AI systems and their developers adhere to governmental and applied laws and regulations to avoid legal disputes and penalties. Understanding who is responsible for the design and the deployment of an AI system's actions can help to understand the complex legal environment surrounding AI technologies, which leads to a more stable environment for AI development and deployment. Additionally, considering ethical development will be important for AI accountability and responsibility. Holding the stakeholders of AI systems accountable will help in developing responsible practices and guarantee that AI systems align with ethical codes and societal values. This leads to a more reliable vision of AI development, which can reduce the potential harm and maximize positive outcomes (Barclay & Abramson, 2021).

Accountability and responsibility face different challenges due to political decisions, legislative agreements, and policymaking. To tackle these challenges, some approaches can be considered. First, the development of legal frameworks to define the clear responsibilities of various stakeholders and establish mechanisms for holding them accountable. This may involve creating new and clear laws specifically for AI systems or adapting existing legislation to better

accommodate AI technologies. Second, developing clear standards and guidelines for ethical AI systems development and deployment can help to ensure that AI systems follow ethical principles and uphold responsible practices among all stakeholders. These standards and guidelines can define a clear and legal framework for AI developers and other stakeholders to follow. Third, defining transparent and explainable AI can facilitate the attribution of responsibility. This can provide greater insight into potential biases and flaws in the developed system, which enables developers to address these issues more effectively. Addressing these challenges helps to maintain the trust on which the public democratic usefulness of journalism depends (Cooper et al., 2022).

Conclusions

Based on the discussions presented in this chapter, several recommendations can be made for the professional development and deployment of AI systems in journalism.

First, the adoption of AI systems in journalism organizations presents both challenges and opportunities. While there are important investments required in technology, training, and infrastructure, there are also significant benefits to be gained, including increased efficiency, improved content quality, automation of routine and repetitive tasks, and the ability to reach new audiences. By implementing this technology and addressing the deployment challenges, journalism organizations can gain success in the rapidly evolving media landscape.

Second, adopting AI systems in journalism organizations needs outstanding skills and expertise to effectively use this technology and to know the theoretical and practical awareness about AI; this requires large investments in training and education to be aware of the responsibilities of the development of AI systems and their direct impact in society, as well as the hiring of experts in AI and data science.

Third, for adapting AI systems, it is important to ensure that AI systems are transparent, ethical, and accountable in their development and deployment. This depends on collaboration among developers, journalists, policymakers, and industry professionals to develop guidelines and regulations to ensure that AI systems are used ethically and to encourage the fostering of innovations in AI tools in the field of journalism.

Fourth, generative AI uses a large and trustworthy substantial number of sources to generate automated content in a fleeting time, which makes it difficult or even impossible to trace the sources of the information and determine whether they are correct or fake. Also, it is difficult to distinguish between true and fabricated information, which may potentially harm societal trust in media and institutions.

Finally, generative AI is not a replacement but a complement to human writers and journalists. It can offer new possibilities and opportunities for content creation and journalism, but it also needs careful considerations and regulations to ensure its ethical and beneficial impact.

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CHAPTER 19

Professional Competencies for Journalism in the Fourth Industrial Revolution

John V. Pavlik

Introduction

From the advent of the Internet to advances in artificial intelligence (AI), digital technologies have fuelled a disruption of journalism across the globe. This disruption brings enormous consequences for the field, including a sea-change in the professional competencies for journalism in the Fourth Industrial Revolution. This chapter examines four broad sets of essential professional competencies in the digital age of journalism. These are new competencies for: (1) news gathering or reporting, (2) producing news content, (3) managing news media organizations, and (4) engaging the public. These emergent professional competencies intersect with a four-part framework in the application of digital technologies to the journalism industry. These are: (1) the Internet and other networking technologies, (2) artificial intelligence (AI), (3) mobile media, and (4) multi-sensory media of communication. This chapter critically examines the nature and consequences of this transformation in journalistic professional competencies in the Fourth Industrial Revolution. The chapter begins by outlining the four journalism competencies that are emergent in the digital age and then considers their intersection with the four arenas of application of digital technologies to the journalism industry.

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News Gathering

News gathering, or reporting, is the foundation of journalism. It is the process by which journalists, or reporters, collect the facts that constitute news content. The news ecosystem would collapse without original reporting. A set of fundamental competences for news gathering emerged in the analogue age of journalism. These include interviews, direct observation of news events and venues, and an examination of records, especially the transactional records of governments and other organizations. In the digital age, these basic skills continue to be essential, but they have evolved into new forms that are increasingly computerized, online and dynamic.

In the Fourth Industrial Revolution, journalists need digital news gathering skills that include an advanced capacity to use digital devices such as smartphones to collect audio, video, and other materials from interviews and direct observations as well as AI to help in the analysis of information gathered, especially large data sets. A self-study by *The New York Times* (Chen, 2019) found that an overwhelming portion of its reporters already rely heavily on digital devices as an aid in their news gathering. Among the uses are to create real-time transcriptions to help supplement or even replace human note-taking. These digital devices range from smartphones to autonomous drones equipped with cameras and other sensors to capture and record audio, video, and other material essential to a news story. Vital in this regard are social networking media which reporters can mine for sources and story ideas as well as scrape for data that can reveal important trends and developments.

The transactional records of government and other organizations are increasingly in digital form and massive in scope. These factors mandate that journalists need advanced capacity use computer-based (e.g., AI-fuelled) analytical techniques to interrogate the data contained in these records. In many cases the scope of data is in the millions, billions, or even trillions of records, and traditional methods of analysis would prove not only inefficient but entirely impractical. Only through computer-based analysis, increasingly supported by AI, is it possible to critically examine these big data in a manner that is amenable to the news cycle and deadlines. Diakopoulos (2020) has described this process as computational news discovery.

Producing News Content

Processing the facts collected and verified from an array of diverse sources is how journalists turn their reporting into news content. Traditionally, this process was conducted using a set of skills and competencies amenable to the analogue age. Journalists would sort the facts often using a question-based formula called the five Ws: Who? What? When? Where? and Why? and sometimes How? Answers to these questions constituted the essence of news and news values. Determining how to organize and present these answers derives from editorial or news judgment, which is the critical intellectual means by

which a journalist decides on news worthiness and framed within an ethical context. From this, a journalist, reporter, or editor assembles the facts and sources into a story. For hard news, this typically begins with a lede, or a sentence or paragraph that summarizes the most salient elements of the story as news, followed by a nut-graph, which puts those facts and sources into broader context to help give meaning, followed by the body of the story. This form holds essentially for text, audio, and video news content (newspaper, radio, TV). Moreover, the 5Ws form and news construction still largely hold for the digital age, though the process by which it is implemented shifts significantly through the requisite utilization of a range of digital tools and technologies. The nature of non-hard news, or feature-type journalism content, departs somewhat from the 5Ws formula, though the essential principles of editorial judgment remain, placing a heightened emphasis on the human interest, novelty, or less time-bound dimensions of a story.

In the digital age, how the facts and the sources from which they derive are processed shifts dramatically and requires a new set of digital competencies. Most important are three sets of intellectual and technical skills that intersect with editorial judgment. First, journalists need competencies in basic digital tools for word, image, audio and video, and data processing. These include word processing software, image and video editing applications, and spreadsheets for data processing. But in recent years many of these tools have transitioned to online or via the Cloud, and journalists need to have facility in using these tools in this environment, which supports working in the field and remotely, while being in close communication with editors, sources, and others. The process is increasingly supported by generative AI tools. Second, journalists need to have a basic capacity to utilize emerging storytelling tools that are designed for the digital, networked platforms that are increasingly dominant today. These tools include not only audio and video but more immersive, interactive, and multi-sensory formats such as augmented reality (AR), mixed reality (MR), virtual reality (VR), and other forms of eXtended Reality (XR). Dan Pacheco, Peter A. Horvitz Chair of Journalism Innovation at the Newhouse School at Syracuse University, has pioneered the use of virtual reality (VR) in journalism. He co-produced the Edward R. Murrow award-winning *Harvest of Change* VR project at *The Des Moines Register*. Designed for the Oculus Rift in 2014, the project was the first large-scale use of virtual reality by a commercial news operation. Pacheco's research (2024) suggests immersive news visualizations such as Nonny de la Peña's *Hunger in Los Angeles* can fundamentally transform journalism in the digital age and more deeply engage the public (forthcoming). Such content is increasingly being designed for and presented online for the Web 3.0, or the immersive web, using WebXR technology.

As the public has transitioned increasingly to embrace digital news access, they increasingly seek content optimized for that environment. Finally, journalists must bring increasingly sophisticated skills and competencies for collaborative online news production work. Although journalists certainly still work alone, operating in teams is increasingly common and necessary for high-end

journalism, especially that of an investigative form, which arguably is the most vital form of journalism. Moreover, teams with a diverse set of skills and training often comprise journalism that is produced for XR formats, including WebXR. Since early pioneering VR news productions, immersive journalism has continued to grow and is now commonly seen in leading news media as WebXR in the *New York Times*, the *Washington Post*, *USA Today*, and elsewhere, including ProPublica, an independent news site dedicated to investigative reporting. WebXR is a format that enables the design and publication of immersive content for access on the World Wide Web and does not require the user to don an AR or VR headset.

A review of the news content produced and published by leading news media on any given day reveals extensive team-based work, especially when involving advanced storytelling techniques such as that involved in WebXR content. For instance, on September 20, 2023, a review of *The New York Times* reveals multiple WebXR stories, including a story headlined *Being 13*. It is a WebXR report about how digital media, especially social media, impact the lives of teenagers, particularly those at age 13. Although a single reporter is credited with being the journalist who wrote the story (Bennett, 2023), the team involved in the production of this content totaled at least 16 persons with a wide range of skills, from design and production to editing photo editing, photos, audio editing, and guest Disc Jockey (DJs). Journalists in the digital age often have diverse background and training, and come from fields of expertise such as design, audio production, or computer science. A mainstream journalist might be the lead reporter on a story, but they need to be adept at working with such a diverse team which may be physically located in a remote array of locations and time zones.

Managing News Media Organizations

Newsroom managers face a growing array of challenges and problems in the digital age. As funding resources for news media have generally declined over recent decades, forcing some news media to close operations or at least scale back, remaining newsrooms have often been under pressure to continue to operate at a high level but with fewer resources. This has meant newsroom managers, including editors and producers, have had to become increasingly adept with new tools and technologies, especially digital and networked, to facilitate operating in a streamlined fiscal fashion while maintaining high-quality journalism, defined as not only accurate but also diverse, inclusive, and effectively utilizing digital and networked storytelling. Combined with the impact of the recent COVID-19 pandemic and other regional, national, and international crises, adaptation has been a defining quality of successful news media management during the Fourth Industrial Revolution.

The requisite competencies of news media management include not only the capacities required in traditional news media operations. These include a well-honed sense of news or editorial judgment of what is news-worthy

complemented by ethical considerations, human resource expertise, and a grasp of the evolving state of journalism in the digital age. New competencies linked to the digital environment include knowing when and how to integrate emerging digital news gathering, production, and distribution applications. These applications can be expensive and fast changing. Moreover, how they interface with the public's adoption of news media forms is another consideration. Management must make economically sound decisions that utilize digital applications such as WebXR at the right time when the public appetite for adoption of new technologies aligns well to maximize reach. Further, news media management must have a fundamental grasp and capacity to advance a funding model that best supports the news enterprise. News media often are caught in a position where traditional advertising support has dwindled, and support from the public is embryonic. Questions include such as whether a membership or subscription model will prove viable or most effective, or whether a non-profit organizational structure would work most efficiently and effectively.

Research shows that the adoption and acceptance of digital technology and the associated changes in professional practices in contemporary newsrooms are often met with resistance, making for additional challenges to newsroom managers seeking digital adaptation in their organizations. In a study of a Reuters newswire bureau, Bunce (2019) found that resistance to change could be mitigated by the use of select strategies management employed to incentivize journalists to accept new reporting practices and priorities. These successful strategies include disseminating audience metrics and hiring and promoting journalists with the requisite skill-sets to positions of greater influence in a newsroom.

Engaging the Public

Journalism depends on the public for its purpose and existence. The public provides not only the audience, but it also is increasingly the foundation of the funding that makes journalism possible. Government funding notwithstanding (as it is a key part of the funding of journalism in some parts of the world or in some non-commercial media forms such as public television and radio in the U.S.), the public is also the audience advertisers seek to reach. But in the digital age, the transformation of the news media funding model away from advertising has meant news media must increasingly rely on public financial contributions to pay for its operation, whether commercial, non-profit, or public (e.g., National Public Radio in the U.S.). This shift is increasingly taking the form of digital subscriptions and news media memberships. In some cases, foundations are providing increasing levels of support for news media.

Given the dependence of digital news media on the public for much of its funding, public trust in news media is therefore essential. Trust among the public has always been important for news media, but it has been in steep decline for decades, at least in the U.S. according to Pew Research Center data

and other sources (Liedke and Gottfried, 2022). Data show that those under 30 trust information obtained from social media nearly as much as that obtained from national news media.

The digital age has introduced new or evolving mechanisms to increase public trust and engagement. Among those is not only the increasing reliance on membership models but also engagement of the public as partners in the news gathering process. Armed with digital devices such as smartphones, the public is increasingly joining the news process as citizen reporters, collecting facts on their local communities, capturing video of news events (e.g., citizen-police encounters) and assisting in distributed data analysis. Combined, this heightened public engagement in the digital news ecosystem can catalyze journalism in local communities, many of which have deteriorated into news deserts in the twenty-first century. Research by Abernathy (2022) shows that a growing number of communities in the U.S. are becoming news deserts (lacking professionally produced local journalism), fuelled by a type of climate change based not on the physical environment but on the transformation of the media landscape from analogue to digital and networked and the resulting vanishing of funding for local news production and distribution in many communities. Moreover, this shift has fostered the elimination of many professional news positions, the layoff of an estimated 30,000 journalists (26% of the entire news workforce) since 2008 (Walker, 2021). Consequently, there are simply few reporters available to gather the news in many places where important news might occur, such as the state house or the venue where elected state officials gather to craft, discuss or debate, and pass legislation. If news media can nurture citizen reporters and train them in basic news gathering methods that rely on their basic digital devices, news media could continue to gather the facts but through a public-professional journalism partnership. This could be essential to the future of healthy governance in democracies across the globe.

Given these four sets of journalism competencies, we now present a four-part framework in the application of digital technologies that will continue to impact the journalism industry. These technologies will push or enable the news industry to further develop in quality and potentially new directions, but also pose threats to the viability of the news industry and its operation and ability to deliver quality news content defined in terms of accuracy, independence, impartiality (or lack of bias), diversity and inclusion, and the pursuit of truth.

The Internet and Other Networking Technologies

Since at least the publication of the *Acta Diurna* in ancient Rome, notices of current events have been published using the technology of the day. In the case of the *Acta Diurna*, considered the beginning of newspapers in antiquity, these notices were sometimes carved on stone or metal and presented on public message boards at the Roman Forum as early as 59 BC (Wright, 2016). In the twenty-first century, the principal publishing technology of the day is the Internet and other networking technologies such as Bluetooth. Not only are

news media web sites and mobile apps valuable in this capacity, but utilization of various social media platforms also plays a key role in reaching a public that increasingly relies on social media for much of their news engagement.

But these technologies are not static and continue to evolve, increasing in speed, interactivity, and capacity among other developments. Available bandwidth continues to develop as does the reach of broadband connectivity for economically marginalized or rural communities. Advances in the public telecommunications network, including 5G and 6G as well as satellite networks that can deliver broader wireless Internet service, are making near-WiFi capacity available more widely and affordably, further increasing accessibility. Bridging the digital divide is an essential element if journalism is to perform its principal function as the Fourth Estate, or informal branch of government which holds the other three accountable. Widespread public access to quality digital journalism is necessary for digital journalism to serve as a public good and service. Without universal access to quality news content, mis and disinformation will fill the void for those especially who are disenfranchised from access to journalistic excellence. Democracy can function in a healthy manner only when the entire public has efficient and affordable access to quality journalism. It is vital that journalism operating in the digital environment continues to evolve in its utilization of emergent networking technologies and developments in the Internet. Among these is the Metaverse. Described by some as the next generation of the Internet, or broadband Internet, the Metaverse represents a connected set of virtual worlds where commerce and culture may increasingly grow in the Fourth Industrial Revolution. News media need a presence in the Metaverse as it emerges as a potentially important part of the digital public sphere (Taranto, 2022).

The Internet and other networking technologies play a vital role in news gathering as well. As cross-border journalism grows, reporters across the globe are utilizing the Internet and other networking and networked technologies to gather facts and access data generally and employ it for analysis in investigations across a broad array of subjects, from international conflict to financial records of corruption in global settings.

Artificial Intelligence

Artificial intelligence (AI) means machines that can think (i.e., perform cognitive functions usually associated with intelligence, such as write or make decisions) in a human-like fashion or at least appear to do so. In the computer age, AI has been in development since at least the 1950s when British computer scientist and mathematician Alan Mathison Turing proposed the Turing Machine (Bernhardt, 2017). Decades of advances have brought AI into the mainstream of society, and in the twenty-first century it is transforming journalism in fundamental ways. The roots of AI trace to at least the days of the ancient Greeks, whose mythological god of invention, Hephaestus, is credited

with creating the first robot, the bronze giant Talos some 2500 years ago (Mayor, 2018).

There are at least four main applications of AI that are impacting journalism. First is Natural Language Processing (NLP), which refers to computers that can make sense of human language, or digital devices that can read, write, listen, or speak to communicate with people. Smart media, such as the Amazon Echo with Alexa or Google Home or the Apple HomePod or smartphone and its voice assistant Siri, do this. NLP is also available in the form of real-time captioning services. These help journalism become far more accessible. Journalists use NLP and related technologies to create text from voice, to generate notes from interviews and meetings, and to create transcripts of interviews and meetings. Early applications of NLP to journalism included automated systems for summarizing the news, such as the Columbia Newsblaster in the 1990s (McKeown et al., 1999a, 1999b). A variety of news organizations from the Associated Press (AP) to the *Los Angeles Times* have used various NLP applications such as that of Narrative Science and Automated Insights to create news content.

Second is machine learning (ML), which refers to technology that enables computers to learn. This is often through training examples or by modelling human action or decisions. Artificial neural networks and deep learning are prime examples. In combination with NLP, machine learning has played a fundamental role in the development of current generative AI systems. OpenAI's ChatGPT is a publicly available example of a generative AI system that utilizes what is called a Large Language Model (LLM) to enable humans to interact via text, voice and now images or video and generate new content, whether in the form of text, images, audio, video, computer code, and the like. For journalism, generative AI has the potential to produce news content. A variety of news organizations have utilized generative AI to create content, though the process has not been a seamless one, as it has become increasingly clear that generative AI is far from perfect. In fact, generative AI systems are plagued with problems such as making up facts (called hallucinating), demonstrating bias, and producing misinformation. CNET is a news operation that utilized ChatGPT-3 to create news content, but soon learned that stories produced and even published were filled with errors, and the trial was terminated (Leffer, 2023).

The Associated Press (AP) has instructed its staff to avoid using ChatGPT to generate publishable news content and to treat all GenAI content as unvetted source material that needs full fact-checking. Amanda Barrett (2023), AP vice president for standards and inclusion, has stated that the AP does not view AI "as a replacement of journalists in any way." AP journalists may experiment with ChatGPT, however, which suggests AI can be useful as a tool for developing innovative strategies and approaches in news. To that end, the AP has a licensing agreement with OpenAI, the creator of ChatGPT, which the AP expects to use to examine potential use cases for generative AI in AP news products and services including its text archive.

Newer generations and competing generative AI systems such as Google's AI news platform Gemini may solve some of these problems. *The New York Times*, *Washington Post*, and News Corp. (including its *Wall Street Journal*) are among the news organizations evaluating the Gemini AI platform (Hines, 2023). But unless Gemini or other generative AI platforms solve problems such as hallucinating, the role of generative AI in news content production will be severely limited. The potential to create news graphics via generative AI exists and was demonstrated in 2021 when the magazine *Cosmopolitan* created its June 2021 cover illustration via DALL-E (Liu, 2022).

Machine vision (MV) is the third major AI application relevant to journalism. It refers to computers, or any digital devices, that use optical sensors (e.g., cameras and light) and advanced processing to understand the nature and position of objects in the physical or virtual world. MV has proven valuable in facial recognition, although the potential for bias still limits the utility of MV in journalism. However, for autonomous drone operation, MV has proven valuable news gathering (Pavlik, 2020). Such drones can feature automatic object avoidance (to avoid collisions) and can capture images of objects and automatically identify and geo-tag those objects. This has considerable usefulness in creating immersive news content and spatial video of news scenes, events, and venues. Related to computer vision are computer hearing and speech synthesis, which enable computers to engage with the spoken human word in a highly efficient fashion. Though not yet perfectly reliable or accurate, these audio systems are dramatically improved over the twentieth-century precursors.

Robotics is the fourth major AI application pertinent to journalism. Robotics means computerized automation. Robotic applications can see, hear, and interact with their environment. With their physical form and advanced design, robots are increasingly able to operate in the real-world in a wide spectrum of capacities, including in journalism and media. A drone, such as that described above, is essentially a form of aerial robotics. As early as 2002, a robot reporter was proposed by Chris Csikszentmihalyi, then director of the Computing Culture group at MIT's Media Lab (Emery, 2002). He envisioned a remote-controlled robot could help journalists report news in the world's conflict zones. This robotic reporter was conceived to use machine vision to witness battles at close range and conduct news gathering, and through NLP conduct interviews. And it would operate without putting human journalists at risk of physical harm. The robot reporter was modelled on NASA's Mars Explorer.

To understand the potential long-term impact of AI on journalism, it is useful to consider what computer scientists have described as the three tiers or levels of AI (Allan, 2018). These are Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), and Artificial Super Intelligence (ASI). These three tiers or stages range from the current and least powerful form of AI, to the far off but most powerful form. Today's generative AI already demonstrates its capabilities, but it is only ANI. A look at a fully AI-generated news site such as News By AI (https://news-by-ai.com/) quickly demonstrates how such news content can be scraped automatically off other human-produced

news sites and repackaged by AI to look authentic and credible. As newer AI platforms advance and user in AGI systems that can fully replace not just human journalists and editors but entire news media platforms, there is a substantial risk that the owners of news media may find it a cost-effective alternative to human-produced and edited news. If ASI is ever achieved, it may bring in an age in which AI is smarter and more capable than humans at any task, including journalism. The potential to completely control the entire journalism ecosystem across the nation and the globe via AI becomes a reality, and the consequences, both social and political, could be irretrievable and irreversible.

Mobile Media

Since the 1970s and the beginning of online journalism, computers for use in the production, distribution, and access to online news have become ever more mobile. From desktop to laptop to smartphone to wearable device, journalists and consumers alike increasingly prefer to use mobile devices for their engagement with news. Moore's Law posits that computer chips double in speed and power every 18 months, and as a result, mobile digital devices today are like the supercomputers of a decade ago (Mody, 2016). Projecting into the next decade, mobile digital devices are forecast to continue to increase in capacity. They are likely to feature high levels of AI, advanced natural user interfaces (NUI, or gesture, voice and haptic user engagement, navigation, and control), and media production, distribution, and display abilities. Combined, these mobile devices will enable a more complete form of the virtual newsroom where reporters can stay continuously in the field to gather news and efficiently produce and distribute news content.

Multi-Sensory Media of Communication

For centuries, journalism was limited to text printed on the pages of newspapers. The nineteenth century witnessed a series of innovations and inventions that enabled a transformation of news to more visual format. The Daguerreotype and new printing technologies such as the halftone photographic process made possible the advent of newspapers illustrated with photographs of news events and people in the news, with the first publication of a news periodical featuring a photograph occurring in 1848 (Piper, 2021). The invention of wireless communication enabled the creation of audio-based radio transmissions, which in the early twentieth century saw the development of radio news reporting. At about the same time the advent of motion pictures made possible the production and display of newsreels. The invention of electronic television (TV) ushered in the development of TV news in the mid-century. The creation of the Internet, the World Wide Web, and other networked technologies in the final decades of the twentieth century laid the foundation for multi-sensory news media in the twenty-first century. Combined with the development of augmented reality (AR), virtual reality (VR), and other forms of eXtended Reality

(XR) have made possible even greater advances in multi-sensory, immersive, and interactive news that can even utilize haptic, or tactile, interfaces (Singh, 2020).

These advances present the potential to design a highly immersive, interactive, and multi-sensory news form in which the news user can engage the news as participant or eye-witness to news events. Research suggests that when designed effectively, such immersive first-person news experiences can generate not only better understanding of the news but greater empathy for the subjects and persons whose stories are portrayed (Archer & Finger, 2018).

Conclusions

This chapter has presented a set of four professional journalistic competencies mandated by the digital disruption of journalism. These include evolving methods of gathering or reporting the news, producing news content, managing news media organizations, and engaging the public. These competencies are complemented by four digital applications of relevance to the journalism industry, including AI, the Internet, mobile media, and multi-sensory communications. None of these applications is in its final form and is likely to continue to evolve and develop in significant ways and substantial form. Consequently, there is a great challenge for journalists and news media leaders to continue to monitor these changing domains and critically evaluate when, how, and whether to engage each in their practices.

Moreover, there are profoundly important ethical concerns that accompany this technologically changing news media scape. Not only is there the potential for mis and disinformation in a digital form fuelled by the relentless advance of powerful AI. But also, there is the possibility of deepfakes that are so real as to take on the character of artificial reality and be virtually indistinguishable from physical reality. This may pose an almost existential threat to the believability of news. Trust is threatened with extinction in this evolving digital environment. The global nature of the Internet and other digital technologies also poses an enormous threat to journalism and its role in society. AI-generated news platforms that appear fully authentic can be generated from anywhere in the world and published for audiences everywhere. But determining and assessing whether they are honest, accurate, and truthful will require vigilance on the part of both journalists and the public. Threats to privacy, potential mental and physical health effects, and data and cyber-security are among the concerns that journalists and news media leaders must consider, confront, and account for in a responsible fashion in the Fourth Industrial Revolution.

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