Media and Communication
2025 • Volume 13 • Article 9495
https://doi.org/10.17645/mac.9495

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Open Access Journal

Harmonizing Traditional Journalistic Values With Emerging AI Technologies: A Systematic Review of Journalists' Perception

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Submitted: 28 October 2024 **Accepted:** 6 January 2024 **Published:** 24 April 2025

Issue: This article is part of the issue "AI, Media, and People: The Changing Landscape of User Experiences and Behaviors" edited by Jeong-Nam Kim (University of Oklahoma) and Jaemin Jung (Korea Advanced Institute of Science and Technology), fully open access at https://doi.org/10.17645/mac.i475

Abstract

This study investigates how news organizations perceive the integration of artificial intelligence (AI) technologies in news production, focusing on the synthesis of traditional journalistic values with AI advancements. By conducting a meta-analysis of 59 scholarly articles published between 2020 and 2024 in the field of journalism, the research examines the perceptions of journalists, editors, and decision-makers regarding AI. The primary research question explores the general findings of previous studies on journalists' perceptions of AI in their workflows and the frameworks used to reconcile AI with journalistic values. The findings indicate that AI is regarded as a transformative tool, enhancing efficiency, effectiveness, and fostering a new organizational culture. However, it raises concerns about costs and job security. Attitudes toward AI are polarized, with optimism about efficiency gains and skepticism due to potential impacts on employment and ethical standards. Three theoretical models—field theory, human–machine communication, and the technology acceptance model—are employed to understand these dynamics, with field theory addressing power shifts and human–machine communication and the technology acceptance model examining human–AI interaction. To effectively integrate AI with journalistic values, the study proposes three strategies: AI technologists should embed journalistic ethics into their processes, journalists should acquire basic AI technical skills, and collaborative platforms should be established to bridge gaps between journalists and technicians. These strategies aim to create a balanced framework where AI-driven news production can uphold essential journalistic standards while embracing technological innovation.

Keywords

artificial intelligence; journalism; journalistic values; newsrooms; organizational culture

1. Introduction

The rapid advancement of artificial intelligence (AI) has significantly influenced various industries, including journalism, by altering organizational strategies and dynamics (de-Lima-Santos & Ceron, 2021; Gelgel, 2020). In journalism, AI encompasses algorithmic processes that automate the creation and distribution of text, images, and videos with minimal human involvement (Carlson, 2015; Moran & Shaikh, 2022). Following the success of tools like the *LA Times*' QuakerBot, which generates earthquake stories in minutes, newsrooms globally are adopting AI-driven automation for tasks such as tagging, story delivery, summarization, and text-to-speech conversion (Motta et al., 2020; Newman, 2021, 2022; Salaverría & de-Lima-Santos, 2020). Due to the advent of AI, agenda-setting, content gathering, production, and news distribution processes have evolved dramatically.(de-Lima-Santos & Ceron, 2021; Örnebring, 2010).

Such technological shifts pose fundamental challenges to the roles and values of journalists. Van Dalen (2012) asserts that "the idea that journalistic tasks can be completely automated clashes with our general understanding of the nature of journalism" (p. 649; see also Moran & Shaikh, 2022; Örnebring, 2010). Automated technologies capable of replacing specific tasks threaten the professional and social identities of human journalists. In the context of newsrooms, AI can be defined as automated systems designed to replicate human cognition (Lindén & Tuulonen, 2019) or as "cognitive technologies" aimed at emulating human intelligence (Chan-Olmsted, 2019, p. 194).

Research on the impact and practical applications of automated algorithms in journalism has gained momentum since the late 2010s (e.g., Lindén, 2017a; Siitonen et al., 2023; Thurman et al., 2017). The 2010s marked the initial phase of AI integration into journalism, primarily emphasizing the technical and procedural aspects of automation. Since then, two major factors have significantly affected the adoption of AI in journalism: the Covid-19 pandemic and the emergence of generative AI. The reduced mobility of people during the Covid-19 period undoubtedly influenced journalism, leading to a greater reliance on AI for news content production. Additionally, the swift development of generative AI tools like ChatGPT and Midjourney, particularly in post-Covid-19, calls for fresh perspectives from journalism organizations and scholars. The commercialization of AI tools such as transcription, translation, and text generation through models like OpenAI's GPT offers innovative ways to integrate technology into journalism (Jones et al., 2022). The new social and technological changes occurring in the 2020s create an environment that necessitates special attention to the adoption of AI in journalism.

Previous research on AI in journalism often compares AI-generated articles to those created by human journalists or examines how AI-related news is framed, typically focusing on AI as a topic within media coverage. This reflects a predominance of technology-oriented studies that highlight AI as a product in journalism. While this approach has generated significant insights, it tends to overlook the human agents—the journalists—who implement AI. The perspectives of newsroom practitioners on AI increasingly shape the evolving values and roles within journalism.

Scholars emphasize the need for empirical data from journalists to comprehend AI's impact on newsroom practices (Carlson, 2015; Kim & Kim, 2018; Lindén, 2017b; Missaoui et al., 2019; Siitonen et al., 2023). Yet, empirical research on journalists' perceptions of AI remains limited (Moran & Shaikh, 2022). This study addresses this gap by systematically reviewing existing research on how journalists have perceived and

adapted to AI since 2020. It synthesizes findings on the practical perceptions, concerns, and challenges journalists encounter in adopting AI, as well as the organizational dynamics that influence skill development, workforce changes, and identity in AI-integrated newsrooms. By consolidating these insights, this study aims to provide a comprehensive understanding that supports journalism's adaptation to AI while upholding its traditional ethics and values.

2. Issues of AI in Journalism From an Organizational Perspective

An organizational perspective in journalism and AI research is essential because AI involves more than just a technology designed for user convenience and ease of use. The values and professional identity of journalism organizations and journalists have long been associated with truthfulness, transparency, and trustworthiness (Komatsu et al., 2020; Kreft et al., 2023; Paik, 2023; Tariq et al., 2024; van Drunen & Fechner, 2022). Therefore, adopting AI as a technology in newsrooms must align with journalists' professional values and their organizational norms.

While integrating AI into newsrooms could benefit journalists, it may also raise fundamental questions regarding the essential role and identity of journalism (Calvo-Rubio & Rojas-Torrijos, 2024; Guanah et al., 2020; Noor & Zafar, 2023; Okocha & Ola-Akuma, 2022). Work-related identity is influenced by the social groups to which people feel they belong and the enactment of specific behaviors typical of those groups, further enhanced by a sense of "social recognition" from society (Ashforth & Schinoff, 2016; Nelson & Irwin, 2014). Therefore, the accepted values of the journalistic profession, journalistic ethics, and journalists' sense of professionalism are issues that must be examined in conjunction with adopting AI in newsrooms.

Given the ethical issues inherent in AI technology, the extent to which automated news stories can faithfully reflect objectivity, autonomy, and the public interest is still being determined. These journalistic values are fundamental in an era where digital technologies significantly impact journalism's ability to fulfill its traditional role. The threat to these values may lead to a crisis in modern society, as Habermas warned, in which the overdevelopment and dominance of instrumental rationality stifle the communicative rationality of the lifeworld (Habermas, 1984).

In this context, this study explores the complexities of integrating AI into journalism by examining the tension between journalistic values and the mechanical nature of AI. The primary goal is to identify frameworks and standards that reconcile the adoption of AI technologies with the values journalism should uphold. To this end, this study primarily relies on an extensive and systematic review of existing research on the topic, given the significant accumulation of excellent studies, particularly in the 2020s. Based on this review, it also aims to help construct an alternative framework facilitating the harmony between AI's technical supremacy and journalistic values. Thus, it seeks to conduct a meta-analysis of current studies to identify overarching findings and suggest some strategies for developing an alternative framework.

The following are the research questions of this study:

> RQ1: What are the general findings of previous studies on journalists' perceptions of AI adoption in their work processes, and why do they favor or oppose its adoption?

RQ2: What frameworks are employed in the previous studies to explain the adoption of AI in journalism, and what strategies could be proposed to construct an alternative framework necessary for integrating AI with journalistic values?

3. Data and Analysis

For a systematic review of current studies, this research collected academic articles on AI in journalism published from 2020 to 2024, utilizing Google Scholar, Web of Science, and Scopus to ensure comprehensive coverage (Calvo-Rubio & Ufarte-Ruiz, 2021; Martín-Martín et al., 2018). To address Google Scholar's less systematic approach (Siitonen et al., 2023), only the top 100 results were included. Searches were performed using keywords like "AI," "artificial intelligence," "automated," "computational," "robot," "algorithm," "technology," and "data," along with "journalism," "journalist," "news," "media," "newsroom," and "news organization" to ensure thematic relevance across diverse topics.

The review period begins in 2020, marking the Covid-19 pandemic as a transformative moment for automated news production. Declared by the WHO in March 2020, the pandemic generated structured data on infection rates that many media outlets utilized as predictable story frames, which accelerated news automation (Danzon-Chambaud, 2021; de-Lima-Santos & Ceron, 2021; Haim, 2022; Kreft et al., 2023; Okocha & Ola-Akuma, 2022; Montaña-Niño & Burgess, 2024). Daily updates on infections and vaccinations further reinforced this shift, providing journalists with abundant data to manage and interpret for public understanding (Burgess et al., 2022; Pentzold et al., 2021).

The initial search yielded numerous studies unrelated to media and journalism. To refine the sample, this study employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology (Moher et al., 2010). Following the procedures of this method, articles less relevant to the issues of this study were excluded. First, those related to AI and algorithms in business, law, and information systems were screened out by checking their abstracts and keywords. Second, studies that concentrated on news consumers' perspectives were eliminated. Third, meta-analyses and systematic reviews were filtered out. To ensure consistency, conference proceedings and reports were also excluded, focusing solely on peer-reviewed journal articles of empirical studies.

Finally, this study collected 59 empirical studies that offer insights from journalists, experts, and managers directly involved in news production. The selected studies addressed at least one of the following questions:

1. How are AI technologies utilized in newsrooms?
2. What attitudes and evaluations do newsroom members hold regarding AI adoption?
3. How are journalistic values and meanings realized in the context of AI adoption?

Focusing exclusively on empirical research serves dual purposes. First, it grounds those studies as inherently data-driven, ensuring their findings reflect observable phenomena rather than speculative theorization. This is particularly crucial in the context of journalism and AI, where technological adoption and its implications are often context-dependent and shaped by real-world practices. Second, it incorporates insights from news practitioners that are essential to capture the challenges, opportunities, and ethical considerations faced by those at the forefront of AI's integration into journalism. Thus, concentrating on empirical evidence from

previous studies will not only enhance the reliability and relevance of the findings but also contribute to bridging the gap between academic research and industry practices. It highlights the necessity of anchoring scholarly discourse in the lived experiences and operational realities of journalists navigating a rapidly evolving technological landscape.

Figure 1 illustrates the selection process of 59 papers using the PRISMA methodology.

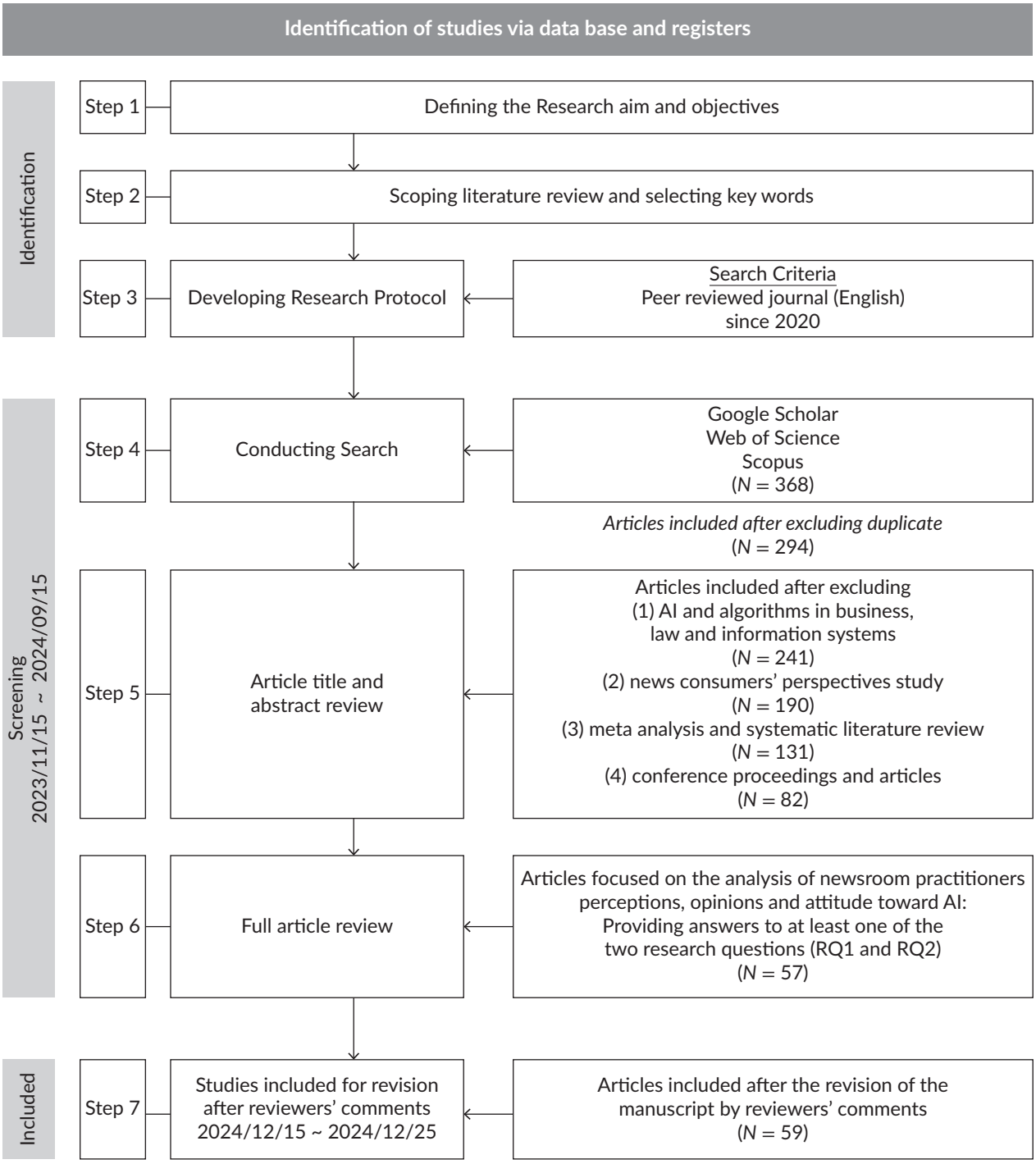

Figure 1. PRISMA flow chart. Source: Moher et al. (2010).

Below is the basic information about the selected papers, including their target countries, publication venues, and years of publication.

In terms of the countries analyzed in the selected papers, the geographical area was broad, encompassing 41 nations. This widespread geographical distribution provides a solid foundation for identifying general patterns in the reviewed studies, demonstrating a global reach that transcends differences in technological infrastructure. While the studies were primarily concentrated in technologically advanced nations such as the US ($N = 6$), Germany ($N = 3$), the UK ($N = 3$), Norway ($N = 3$), and other Western European countries, some also focused on less technologically advanced nations like Pakistan ($N = 5$), Nigeria ($N = 4$), Jordan ($N = 2$), and the UAE ($N = 2$). This division between the two groups can be advantageous for comparisons to identify disparities stemming from the heterogeneous technological infrastructures. Notably, some studies employed a comparative approach, particularly those from Europe and the US, analyzing a range of nations with special emphasis on countries such as China, the UK, Germany, and the US. These multi-country studies ($N = 8$) typically highlighted general features of news organizations rather than focusing on specific constraints related to regional or national contexts.

The reviewed papers were published in various journals: *Digital Journalism* ($N = 15$), *Journalism Practice* ($N = 11$), *Journalism Studies* ($N = 4$), *Journalism* ($N = 3$), *Journalism and Media* ($N = 3$), *Media and Communication* ($N = 2$), *New Media and Society* ($N = 2$), *Communication and Society* ($N = 2$), and *Studies in Media and Communications* ($N = 2$). Most of these journals focus on journalism, communication, and media studies. However, some articles, particularly those discussing newsrooms in less developed countries, appeared in interdisciplinary journals that cover broader fields such as the humanities, social sciences, and geography.

Regarding the timeline, publications were distributed over several years: 2020 ($N = 6$), 2021 ($N = 3$), 2022 ($N = 17$), 2023 ($N = 16$), and early 2024 ($N = 19$), reflecting data collection conducted mid-year. This trend reflects a growing interest in AI's impact on journalism, as evidenced by the substantial increase in publications from 2022 onward.

One of the concerns of this study was to investigate the impact of generative AI on journalism since its introduction in 2022. Notably, more than half of the 36 reviewed papers were published since 2023, which was anticipated due to the rapid growth of interest in generative AI technologies within journalism. However, among the 59 papers analyzed, only two since 2023 specifically addressed journalists' perspectives on ChatGPT, providing valuable early insights into its influence on newsroom dynamics. This trend indicates that a comprehensive investigation into the impact of generative AI on journalism remains beyond the scope of this study and is reserved for future research.

4. Results

Previous studies on the adoption of AI in journalism have typically been conducted at three different levels. Some investigations focused on a micro-level analysis, examining the individual responses of media practitioners to AI technology: their personal dispositions, temperaments, professionalism, technical proficiency, etc. (e.g., Ayyad et al., 2023; de Haan et al., 2022; Jones et al., 2022). These studies explore how journalists perceive the benefits and drawbacks of adopting AI, the influence of their technical expertise, and the ethical and normative challenges they encounter in the integration process.

Other studies focused on the meso-level analysis of mass media organizations, examining how news content was produced using AI technology (e.g., Allam & Hollifield, 2021; Bastian et al., 2021; Møller & Thylstrup, 2024). These studies primarily investigated ownership structure, organizational culture, technical training programs, and the distribution of collective financial resources in journalism organizations—factors that affected the integration of AI in journalism.

The third group of studies conducted a macro-level analysis, investigating the broader social context in which AI technology is developed and the national-level infrastructure for AI and journalism (e.g., Ahmad et al., 2023; Calvo-Rubio & Rojas-Torrijos, 2024; Gondwe, 2024; Munoriyarwa et al., 2021; Yu & Huang, 2021). They sought to identify favorable social conditions for integrating AI into the media landscape, including challenges related to inadequate internet access and limited data availability, the establishment of cultural norms, and national regulations for AI usage.

Despite varying levels of analysis from diverse perspectives, the reviewed studies suggested general findings on the relationship between AI and journalism, highlighting their universal significance. Some findings pertain to fundamental issues, such as the advantages and disadvantages of AI adoption, whereas others address more specific concerns. A recurring theme is the interplay between journalists' professional identity and the ethical considerations involved in AI integration. Reflecting on the evolving role of AI algorithms, these studies expressed concerns about the potential erosion of journalists' professional ideology and values due to AI adoption. The findings from existing studies are summarized below.

4.1. Findings for RQ1

The first research question addressed in this study is how journalists perceive the adoption of AI in journalism and why they maintain specific attitudes toward it. This question is crucial as it enables us to comprehend the factors that influence journalists' positive or negative perspectives on AI adoption, helping us identify what facilitates and hinders this adoption in the newsroom. Previous studies reveal that the discourse on AI in newsrooms is predominantly divided into optimism and pessimism. According to Cave et al. (2018), popular portrayals of AI in the English-speaking West often oscillate between excessive optimism about the technology's potential achievements and melodramatic pessimism. Additionally, it is also noteworthy that journalists exhibit an ambivalent attitude in various facets of journalism regarding the introduction of AI technology in news production.

4.1.1. Positive Perspectives

Many of the studies reviewed in this work revealed that journalists' positive attitudes toward the application of AI technology center around three main issues: enhancing the efficiency and effectiveness of news production and creating a new organizational culture.

4.1.1.1. Efficiency of AI: Save Time and Resources

Most journalists pointed out that the introduction of AI in news organizations is still in its initial stages. However, it is evident that they displayed a very positive attitude toward AI adoption, believing it would enhance their work's efficiency and productivity. AI systems that automatically generate news articles based

on data sets and templates save time and resources for news organizations. Journalists pointed to time savings and increased efficiency as major advantages of AI (Canavilhas, 2022; Cools & Diakopoulos, 2024; Noain-Sánchez, 2022; Tejedor & Vila, 2021).

Automated technologies are particularly advantageous for generating large volumes of articles on specific topics (Ahmad et al., 2023; Haim & Graefe, 2017). Tools that automate transcription, image and video tagging, and story creation in news production can reduce temporal and physical variable costs (Ahmad et al., 2023; Keefe et al., 2021). The benefits of autonomously produced content through algorithms became more apparent in time-sensitive newsroom environments (Ahmad et al., 2023; Wölker & Powell, 2021). Schapals and Porlezza (2020) propose that automated journalism provides valuable support to journalists in managing routine tasks, thus allowing them to focus on more intricate responsibilities that still require the unique expertise of human professionals.

The advantages of AI concerning efficiency are most evident in the context of generative AI. Some studies have specifically examined the impact of generative AI on journalism, viewing it as a means of showcasing state-of-the-art advancements in AI (Cools & Koliska, 2024; Jia et al., 2023; Spyridou & Danezis, 2024).

4.1.1.2. Effectiveness of AI: Automating Computation and Visualization

Journalists have indicated that adopting AI could enhance the effectiveness of their work by improving the quality of their products. AI plays a central role in automating computation-intensive processes, enabling journalists to access and extract critical information that was previously difficult to obtain (Beckett, 2019; de-Lima-Santos, 2022; Fridman et al., 2023). Data journalism utilizes AI technologies to analyze and visualize vast amounts of information. Visualization is vital for presenting complex information in a simple and comprehensible format (Fridman et al., 2023; Rodríguez et al., 2015). By leveraging these tools, journalists can pursue in-depth topics more effectively, contributing to the public discourse through investigative journalism. The adoption of generative AI, in particular, will dramatically improve the quality of news content. For instance, research shows that OpenAI's GPT software series, powered by deep learning, produces text of quality remarkably close to human writing (Floridi & Chiriatti, 2020; Moran & Shaikh, 2022).

4.1.1.3. New Organizational Culture: Fostering Collaborations Among Journalists

The organizational structure and culture of newsrooms significantly influence journalists' perceptions and adoption of AI systems. Organizational culture in media organizations is a critical determinant in executing journalistic innovation (Steensen, 2018; Zaragoza Fuster & García Avilés, 2022). Journalists working for large media groups that prioritize public service and are not under significant financial pressure tend to exhibit relatively positive and proactive attitudes toward AI adoption (Ahmad et al., 2023; Jones et al., 2022; Munoriyarwa et al., 2021; Zaragoza Fuster & García Avilés, 2022).

This aligns with previous research suggesting that technology adoption is influenced by political, social, economic, and cultural environments (Burr, 2015; Pinch & Bijker, 1984; Yu & Huang, 2021). For instance, the BBC in the UK and RTVE in Spain have established specific innovation departments, like media labs, to equip journalists with the knowledge and tools necessary for developing innovations in content production and distribution (Nunes & Mills, 2021). These initiatives cultivate a "collaborative space for innovators from

within and beyond companies to engage with one another or function as a loose network of communities of practice within a specific geographic cluster, brought together to solve a problem, experiment, or play" (Mills & Wagemans, 2021, p. 1469; see also Møller & Thylstrup, 2024; Svensson, 2021; Zaragoza Fuster & García Avilés, 2022).

4.1.2. Negative Perspectives

Journalists who worried about the adoption of AI mainly cited the enormous cost of implementing AI and its impact on the labor market (particularly regarding employment opportunities) in journalism.

4.1.2.1. Burden of Cost: Lack of Financial and Technological Resources

Despite the significant advantages of AI technology, financial resources and environmental assets are prerequisites for reaping the benefits of AI in newsroom organizations. The challenges in securing or supporting resources (funds and personnel for technology adoption, development, and maintenance) are barriers from the initial stages of establishing AI infrastructure (Guanah et al., 2020; Paik, 2023; Yu & Huang, 2021). The essential algorithmic tasks for journalistic organizations include storytelling, layout, headline optimization, and selecting story-related materials such as images and photos (Bold-Erdene, 2020; Munoriyarwa et al., 2021). Nevertheless, implementing the requisite technologies entails substantial costs (de-Lima-Santos, 2022; Litskevich, 2022; Noor & Zafar, 2023; Okocha & Ola-Akuma, 2022; Paik, 2023). While recognizing that AI can enhance the productivity and efficiency of work processes, media companies may find that the enormous cost of new technology diminishes their motivation for investment.

This contradiction—that AI can lower costs in news production and operations but does not attract organizational financial support—may be linked to a lack of knowledge about AI's potential (Canavilhas, 2022; de Haan et al., 2022; Jamil, 2021; Noain-Sánchez, 2022). Journalists frequently shared such concerns in less technologically developed countries like Nigeria, Pakistan, and South Africa, as well as among smaller or regional media organizations even in more developed nations. This stands in contrast with the active algorithmization of news production processes by well-funded media entities in Europe and the US, including *The Guardian*, *The New York Times*, and *Washington Post* (Cools & Koliska, 2024; Jamil, 2021; Jia et al., 2023; Milosavljević & Vobič, 2021; Munoriyarwa et al., 2021; Svensson, 2021; Zaragoza Fuster & García Avilés, 2022). Insufficient funding, a lack of technical expertise, and a rigid institutional environment pose significant obstacles to AI adoption within journalistic organizations (Boczkowski, 2005; de-Lima-Santos & Mesquita, 2021; Krumsvik et al., 2019; Lindblom et al., 2022; Paulussen, 2016).

4.1.2.2. Impact on Employment: Concerns About Job Security

Another skepticism and anxiety of journalists regarding AI have impeded the adoption and diffusion of the technology. Concerns about job security and social status manifest as vague fears about AI technology. While innovative technology and automation can threaten job security across various sectors, the field of journalism faces a unique challenge due to the prevailing journalistic logic in newsrooms. Journalism ideology is often interpreted as "how journalists give meaning to their news work" (Deuze, 2005, p. 444; see also Helberger et al., 2022) and frequently serves as a normative framework in media studies (Danzon-Chambaud & Cornia, 2021; Lindén, 2017b; Usher, 2017). However, the processes behind AI's data

and algorithm formation are technically complex and challenging to understand. This constitutes a perplexing situation for journalists who generally lack awareness of this new technology—one that could ultimately jeopardize their job security. Furthermore, enhancing news production productivity by applying advanced AI technology will significantly reduce job opportunities for journalists, resulting in large-scale layoffs. This structural shift in the labor market will compel journalists to develop negative attitudes toward the adoption of AI in their workplaces.

4.1.3. Ambivalent Attitudes: Integration of AI Technology With Journalistic Values

While some aspects of the advantages and disadvantages of adopting AI in journalism are somewhat expected, others remain uncertain, primarily due to the ambiguous attitudes of media practitioners. Especially important in this sense is that there is little consensus among news organizations about integrating AI technology with journalistic values. Although journalists generally advocate for the inclusion of journalistic values in AI-driven news content, they are divided on whether the current AI technology adequately respects these values. They also identified various challenges that hinder the incorporation of journalistic ethics and values into AI-assisted news stories.

AI can open new avenues for journalistic research and reporting, but such technologies are far from neutral (Ahmad et al., 2023; Bastian et al., 2021; Gondwe, 2023; Jamil, 2023; Moran & Shaikh, 2022; Munoriyarwa et al., 2021). Journalists displayed a relatively ambiguous attitude, expressing both hope and skepticism regarding the introduction of journalistic values. No one presented fixed opinions reflecting pure optimism or pessimism. Instead, they conditionally assessed whether AI would enhance or undermine journalistic values based on specific conditions (de Haan et al., 2022; Jones et al., 2022; Noain-Sánchez, 2022; Sholola et al., 2024; Soto-Sanfiel et al., 2022; Spyridou & Danezis, 2024). The debate on how AI will advance or hinder the normative vision that journalism upholds has spurred extensive scholarly discussions (Carlson, 2015; Gutierrez Lopez et al., 2023; Kothari & Cruikshank, 2021; Lewis et al., 2019; Stray, 2019).

The efforts of news organizations to integrate AI technology with journalistic values have become more pronounced, particularly during the Covid-19 pandemic, when the risk of misinformation increased (Kreft et al., 2023; Montaña-Niño & Burgess, 2024; Sharadga et al., 2022; Túñez-López et al., 2021). However, many algorithm-based tools are fundamentally not designed and developed with journalistic values and norms in mind (de Haan et al., 2022; Diakopoulos, 2019). Journalists suggest that more contextual information is necessary to enhance the quality of AI-generated news content. From a journalistic perspective, providing context that explains the reasons and methods behind news events, enabling readers and viewers to connect the dots, has become increasingly important (Ahmad et al., 2023; Zaid et al., 2022).

This issue of journalistic values and accountability of journalists continues to evolve and intensify with the prevalence of generative AI (Cools & Diakopoulos, 2024; Cools & Koliska, 2024; Paik, 2023). Some studies advocate for developing accountability models to update journalistic ethical standards in the generative AI era, while others delve into the practical risks and opportunities associated with generative AI technologies, stressing the importance of continuous monitoring and evaluation to ensure the ethical and responsible deployment of such tools. This indicates that despite advancements in generative AI, the technology has yet to be regulated and monitored by those at the core of the newsroom operations.

4.2. Findings for RQ2

The second research question pertains to the frameworks that journalism organizations apply to understand the adoption of AI technology and what strategies can be adopted for the development of alternative frameworks facilitating the collaboration of AI with journalistic values. This study found that three theoretical models are primarily applied to explain the relationship between AI technology and journalism: field theory, human–machine communication (HMC), and technology acceptance model (TAM). Field theory is particularly relevant for analyzing power dynamics within journalism, while HMC and TAM elucidate the interaction between humans and AI technology.

4.2.1. Field Theory: Broadening the Boundaries and Power Dynamics of Journalism

With the introduction of AI technology in journalism, the traditional boundaries of the journalism field have become blurred. Various kinds of AI professionals are widely collaborating with journalists in news content production. Developers, programmers, and designers are now regarded as representatives of the journalism profession in newsrooms (Lischka et al., 2022; Møller & Thylstrup, 2024; Olsen, 2023; Schjøtt Hansen & Hartley, 2021). The significance of new entrants to journalistic work in the form of data scientists is growing (Chew & Tandoc, 2022; Lischka et al., 2022; Møller & Thylstrup, 2024). These technology professionals consistently introduce new information technologies into organizations, embodying the avant-garde journalism community (Hepp & Loosen, 2019). Consequently, the perspective that IT experts and developers should be considered key actors in news organizations (Anderson, 2013; Diakopoulos, 2020; Moran & Shaikh, 2022) is gaining traction.

Diverse practitioners within the journalist group play a crucial role in maintaining news operations (Jamil, 2021; Lewis & Westlund, 2015), while traditional journalists are still regarded as the core agents that uphold journalism (Jamil, 2021; Ryfe, 2019). Thus, editorial technologists work "at the intersection of traditional journalist positions and technologically intensive positions that were once generally separate" (Kosterich, 2020, p. 2). The advancement of AI-based digital technologies has prompted the phenomenon of "the blending of journalist-technologists" (Hermida & Young, 2017, p. 171) and created an "intersectional techno-journalistic space" (Ananny & Crawford, 2015, p. 192). Data managers, analysts, algorithm developers, and other newsroom members fill this intersectional space and are now incorporated into the realm of "journalists."

The expanded boundaries of journalism and the influx of new members naturally incur a new power dynamic, often leading to conflicts between traditional journalists and newcomers. The introduction of new members, frequently referred to as insurgents who challenge the status quo, inevitably threatens the power of incumbents striving to maintain the field as it currently exists. It is widely recognized that Pierre Bourdieu's field theory provides the best framework for analyzing the struggles between new and established journalists to accumulate, exchange, and monopolize various power resources. This explains why many studies have relied on this theory to elucidate journalism's complex power dynamics and hierarchies among journalists (Bourdieu & Wacquant, 1992; Lindblom et al., 2022; Lischka et al., 2022; Møller & Thylstrup, 2024; Perreault & Ferrucci, 2020). Although field theory was not originally intended to explore technology-driven organizational changes, research inspired by Bourdieu has rapidly increased, analyzing how digital technology is altering the journalism field (Craft et al., 2016; Hovden, 2008; Lindblom et al., 2022; Schultz, 2007; Vos et al., 2012).

4.2.2. The HMC Model

The human–computer interaction framework, as articulated by communication scholars, defines "humans as communicators" and "machines as intermediaries or facilitators" (Jamil, 2021, p. 1402; see also Barnlund, 2008; Weiswasser, 1997). Jamil (2021) further elaborated, "[The] human-machine communication framework, which is an emerging area of communication research…posits technologies and machines as communicators" (Jamil, 2021, p. 1403). According to Guzman (2018, p. 1), the HMC concept is concretized into three areas: human–computer interaction, human–robot interaction, and human–agent interaction. Within the context of human–computer interaction, it is possible to design systems that verify news sources (including instances where news content is revised and republished over time), measure media bias, and more (Cruz et al., 2020; Diakopoulos, 2020; Evans et al., 2020; Gutierrez Lopez et al., 2023; Jamil, 2021; Jones et al., 2022; Komatsu et al., 2020). Understanding the algorithms that represent AI development, as well as the interactions between machines and human journalists, can enhance the journalistic values of trust, objectivity, and transparency.

4.2.3. TAM

TAM is one of the most influential and widely used theories for analyzing the factors that determine the adoption of new technologies by individuals or groups (Davis, 1989; Venkatesh et al., 2003). The core components of this model are "perceived ease of use" and "perceived usefulness." "Perceived ease of use" refers to the degree to which a person believes that using a particular technology would be free of effort. "Perceived usefulness" denotes the degree to which a person believes that using a specific technology would enhance their job performance. When individuals perceive a technology as both easy to use and useful, they are more likely to develop a positive attitude toward its adoption.

TAM has provided a theoretical foundation for connecting technology and journalism across various cultural contexts (Ayyad et al., 2023; Goni & Tabassum, 2020; Shah et al., 2024; Soto-Sanfiel et al., 2022; Zhou, 2008). With the evolution of new technologies, TAM has been expanded to include various additional variables, resulting in more nuanced models. TAM2 (Venkatesh & Davis, 2000) introduced additional determinants of technology adoption, such as job relevance and social influence factors, bridging the gap between technology adoption and journalism research (Ayyad et al., 2023). TAM later evolved into TAM3 (Venkatesh & Bala, 2008), which detailed variables like computer self-efficacy and experience, and UTAUT (Unified Theory of Acceptance and Use of Technology), which incorporated factors like price value and habit (Venkatesh et al., 2003), and UTAUT2 (Venkatesh et al., 2012). While TAM's broad applicability is advantageous, it has been criticized for providing only general information about users' opinions on systems (Ayyad et al., 2023; Mathieson, 1991). This critique is particularly pertinent when navigating the complex equation of merging technology with journalistic ethics.

5. Considerations for the Establishment of an Alternative Framework

Drawing from an extensive literature review and the general findings from existing studies, this study now intends to suggest some helpful ideas for constructing an alternative framework that aligns AI technology with journalistic values. The fundamental issue here is how human journalists' editorial judgment and ethical values can be incorporated into AI-generated content (Bell et al., 2017; Jamil, 2021; Ward, 2018). In an era

marked by the rise of automated journalism, exemplified by AI, traditional journalists have become increasingly compelled to staunchly defend their work—or what many have referred to as their "craft" (Schapals & Porlezza, 2020, p. 23; see also Hanitzsch & Vos, 2017). Journalists are concerned about whether essential ethics and values can be technically implemented.

Following Ward's (2018) definition of journalistic values as principles and norms guiding public journalism, they can be classified into organization-centered and audience-centered (Bastian et al., 2021). Organization-centered values include objectivity, diversity, transparency, accountability, and other related values that constitute "good" journalism. In contrast, audience-centered values encompass privacy, data protection, user agency, autonomy, and other values that focus on the relationship between the media and the audience. One study indicated that journalists generally prioritize "core" values, such as transparency, diversity, editorial autonomy, personal relevance, and usability, over less essential ones like objectivity, neutrality, and enjoyment of usage (Bastian et al., 2021 p. 855).

Journalists have still not reached a consensus on how to implement their professional values in AI-based news production. Additionally, academic research on this issue is relatively scant compared with an enormous accumulation of studies focused on technical matters and journalists' attitudes toward them. In this context, it is imperative to explore the possibility of an alternative framework to enhance both the efficiency and effectiveness of news production without losing the professional ethic and values of journalism. It is beyond the reach of this study to develop a fully established theoretical framework. Instead, it proposes three essential strategies or approaches for implementing this alternative framework: the AI technologists' side, the journalists' side, and the collaboration between the two.

5.1. Infusing Journalistic Values Into AI Technologists and Data Scientists

The first strategy for implementing journalistic values is to demand that technologists and data scientists learn and incorporate them into their technical work. It is generally believed that these technicians are only interested in collecting and providing data from a purely technical perspective. However, the decisions of which data to collect and how to refine and process them are never free from biases, which critically threaten the objectivity and transparency of news content (Haim, 2022; Jamil, 2021; Lindblom et al., 2022; Noor & Zafar, 2023). Data specialists confess that "datasets are never neutral sources, and almost all of them are biased in some way" since "AI technology is prone to inherit human biases" (Noain-Sánchez, 2022, p. 113).

In this situation, the newsroom relies on the journalist's active involvement in news production to check the fulfillment of journalistic values in the news content. Journalists (not technology) are still accountable for applying these values to their stories. Eventually, it is up to journalists to decide how to incorporate technology into their narratives. Some journalists confess that they trust their own "gut and skills" in determining what stories should be published, without enshrining editorial judgments such as impartiality in the tool itself (Gutierrez Lopez et al., 2023, p. 494).

The monopoly of editorial judgments by journalists may sometimes incur conflict between two groups of specialists participating in news production: journalists and technicians. The contrast between the "hard" practices of data science and the "soft" considerations of journalists generates "science frictions." This friction, however, involves productive tension that reshapes the awareness of data scientists and AI

engineers, prompting them to consider ethics more seriously than some of their previous places of employment (Møller & Thylstrup, 2024, p. 9). They began to acknowledge their social responsibility regarding technology implementation; as one noted, "It is our responsibility to go forth and to make sure that we are presenting the clearest picture possible and that we are presenting it fairly" (Lischka et al., 2022, p. 11).

Renewed awareness of technicians' responsibilities creates an excellent social environment to infuse journalistic values into these technology practitioners. By developing some strategies for blending technological capabilities with editorial requirements, it is now possible to convert them to ethical data scientists and AI programmers. The future of AI journalism hinges on merging algorithms with editorial and ethical parameters (Jamil, 2023; Møller & Thylstrup, 2024; Noain-Sánchez, 2022; Perreault & Ferrucci, 2020; Rydenfelt, 2021; Spyridou & Danezis, 2024). Just like the journalists' gut feeling has safeguarded journalistic values so far, the algorithmic gut feeling, based on the normative orientation of data technologists, will enforce ethical values in AI-driven news stories in the future.

Simultaneously, technologists need to clarify how they process data from a technical perspective, especially how AI assists in making specific recommendations for the journalists (Cools & Diakopoulos, 2024; Cools & Koliska, 2024; Olsen, 2023; van Drunen & Fechner, 2022). This explanation will enhance the transparency of the technical work process, which is a prerequisite to realizing the value of trust and encouraging users to embrace technical innovations. Achieving transparency "can strengthen the legitimacy of the chance to use such a system" (Bastian et al., 2021, p. 849).

5.2. Enhancing Journalists' Adaptability to AI Technology

The second strategy for integrating journalistic values into AI technology is to educate journalists on the technical details of AI. The accumulation of enormous amounts of data used for news production overwhelms journalists who struggle to understand how to process this information. The monopoly of databases by large engineering corporations and the secret management of AI algorithms exacerbate journalists' helplessness in producing AI-based news content. The situation is further complicated, as even their developers of AI systems may find it difficult to clarify how they function: This is known as the black-box problem (Castelvecchi, 2016). The technical complexities of incorporating algorithmic logic into news production lead journalists to adopt a notably passive attitude toward its adoption (Ayyad et al., 2023; Canavilhas, 2022; de Haan et al., 2022; Noain-Sánchez, 2022). This limited understanding of AI specifics within the industry poses a significant threat to journalists' overall performance (Kreft et al., 2023).

Addressing this challenge begins with raising awareness, empowering journalists to actively pursue knowledge and better understand the workings of AI (Basak et al., 2024; de Haan et al., 2022; Heravi & Lorenz, 2020; Olsen, 2023; Trang et al., 2024). Journalists acknowledge that their role in the journalism field requires ongoing advancement in technology, writing, and ethical standards. It is evident that journalism, in the rapidly evolving AI-driven media landscape, now requires a mindset grounded in technological innovation (Ahmad et al., 2023; Lindblom et al., 2022; Montaña-Niño & Burgess, 2024; Olsen, 2023). They should be bold enough to embrace a digital mindset and undergo training on technical tools to control and supervise AI processes (Noain-Sánchez, 2022).

Some studies express optimism by predicting that organizations and individuals can become digitally savvy if they are equipped with only about 30% fluency in technical topics, which offers the minimum digital literacy needed to be digital (Leonardi & Neeley, 2022). Realistically speaking, however, it is never easy for journalists to obtain digital literacy skills without undergoing rigorous training and extensive learning processes. This raises an urgent call for journalistic curricula to meet these requirements to help establish norms and quality standards for data collection, processing, analysis, and visualization for journalism (Ahmad et al., 2023; Cools & Diakopoulos, 2024; Fieiras-Ceide et al., 2022; Haim, 2022). In this sense, the educational model for journalism must be updated to accommodate AI.

Although there is no consensus on how to teach journalists to acquire the technical abilities needed to perform specific tasks in AI engineering, journalists generally agree on the necessity of learning those skills. One journalist testified to this necessity by stating, "We cannot leave this technology managed only by techs. Education and training are essential, and we may focus on the editorial role of algorithms and how decisions made by algorithms can have serious social implications" (Noain-Sánchez, 2022, p. 115). Some even went further to insist that "it is essential that journalists learn how to programme in order to understand what is behind algorithms and the criteria they follow" (Noain-Sánchez, 2022, p. 115).

With enhanced digital literacy capabilities, journalists can audit the products of AI technical experts to determine whether they observe journalistic ethics and values. They can also supervise the work process of AI specialists to check whether ethical codes are implemented and ethical principles are embedded by design. One perfect example is those journalists who have switched careers from journalistic posts to technical ones, acting as conduits between the needs of journalists and the technical teams (Gutierrez Lopez et al., 2023). This career shift not only provided them with the capabilities necessary for algorithm audits but also helped other journalists understand the complexities of AI technology. One of them defined her role as translating what the tool does in an easy-to-understand and meaningful way, so that it is evident to journalists why this helps them. This aptly testifies to the effectiveness of technical training for journalists who will merge their professional values with AI-driven works in news production.

5.3. Facilitating Collaborations Between Journalists and AI Technicians

The final approach is to develop a new collaborative framework for journalists and AI technologists to work together while maintaining their traditional field boundaries. This is a somewhat realistic solution, given the diverse impasses both journalists and technicians encounter when attempting to cross disciplinary boundaries by learning each other's expertise. In fact, journalists and technicians strongly agree that collaboration is necessary with their partners. In this regard, the formation of multidisciplinary teams comprising diverse fields of expertise and the organizational dynamism that encourages both internal and external collaboration emerge as crucial elements within the culture of modern newsrooms (Bailer et al., 2022; de-Lima-Santos, 2022; Grimme & Zabel, 2024).

Collaboration can take various forms, from casual meetings to establishing cooperative organizations. A casual meeting can evolve into a more serious one as the need for collaboration is widely shared among participants. This progression could serve as a first step toward data transparency and a culture of open journalism (Cook, 2021; Dierickx et al., 2023), where increasingly intelligent entities, knowledge sharing, and collaborative thinking may become integral components of a newsroom (Grimme & Zabel, 2024). One

typical collaboration model suggested by Gutierrez Lopez et al. (2023) will help us understand the workflow of collaboration; in this model, participants "undertook several in-house rounds of ideation across their interdisciplinary team to look out for themes in the groups of codes" (Gutierrez Lopez et al., 2023, p. 491). When this occurs, collaboration will advance to a new level, transcending the traditional disciplinary boundaries of each participant.

The collaboration participants generally agree that human involvement is essential. They believe that "automated recommendation technologies are never in place 'instead of' but always in combination with humans who decide what is important news and what is not" (Bastian et al., 2021, p. 846). This signifies the prioritization of human involvement over technical processes in news production; editorial decision-making, with particular attention to journalistic values, should take place before designing algorithms sensitive to these values.

The formalization of journalists' involvement in AI-based news production can create new professional roles, such as intermediaries with technical and editorial expertise who facilitate collaboration between editorial and technical departments. It can also establish new procedures that outline the roles of editors and journalists in algorithmic design (Cools & Koliska, 2024; Jia et al., 2023; Lindblom et al., 2022; van Drunen & Fechner, 2022). *Washington Post* developed a highly effective method to achieve this goal by employing liaisons connecting the two groups of specialists. The *Post* hired two liaisons who served as intermediaries between the newsroom staff and the more technically oriented engineering team. These liaisons possessed knowledge and skills in both journalism and technology, enabling them to translate the newsroom's goals and values into actionable technical requirements for the engineering teams, and vice versa (Cools & Koliska, 2024, p. 675).

One significant obstacle that both journalists and technicians should overcome to facilitate collaboration is the cultural difference between these two groups of professionals. They each developed their expertise in entirely different cultural and organizational contexts, which hinders their mutual understanding. Additionally, technicians and journalists may face conflicts over essential decision-making in the news production process, as the former infiltrates a new territory and challenges the power and authority of journalists who have traditionally dominated the field. Editorial technologists struggle to gain appropriate recognition and sufficient symbolic capital (Lischka et al., 2022). Therefore, it is essential to foster an amicable relationship between the two groups and acknowledge the equal status of all participants in the collaboration, regardless of their career backgrounds. By achieving this collaborative spirit, they can build a solid foundation of mutual understanding and recognition, leading to shared ownership of the products they create.

6. Conclusion

Journalists who participated in the interviews or surveys in the 59 reviewed papers worked in 41 countries, including both advanced and less technologically developed ones. Despite differences in their perceptions of AI based on newsroom organizations and regional contexts, they generally predicted that AI adoption in newsrooms was inevitable. The findings of the reviewed papers indicate that they commonly pointed out the benefits of AI adoption in terms of enhancing the efficiency and effectiveness of their work processes and promoting a collaborative organizational culture. On the other hand, they expressed concerns about the financial burdens and job insecurity that AI adoption could incur. They also recognize that the potential of

generative AI technologies is so vast that they need to learn its internal working to improve the quality of their work.

Empirical studies connecting AI and journalism most frequently reference Bourdieu's field theory, HMC, and TAM. After a thorough review of previous research, this study proposed three strategies for developing an alternative framework that integrates AI into journalism. The key components of this alternative framework include how to assist journalists in adapting to new AI technologies, how to encourage technicians to uphold journalistic values, and how to foster a collaborative relationship between the two professions. These factors pertain to the issue of power dynamics within journalism, which is experiencing a radical transformation due to the rise of AI and its integration into the field, a change that will be further accelerated by the groundbreaking advancements in generative AI.

This study primarily focused on the findings of the general pattern in existing research. These findings and suggestions could establish a good foundation for comparative studies and case studies in the future. The recommendations of this study may serve as a yardstick for evaluating how closely each specific case aligns with or diverges from the general trend. Additionally, it makes significant contributions by identifying universal challenges that journalism faces in the era of AI, such as algorithmic bias, ethical dilemmas, and the global exchange of innovative practices. It also provides a framework for understanding how AI reshapes journalistic values like accuracy, trust, objectivity, and accountability. By doing so, it not only advances scholarly discourse but also equips newsrooms and policymakers with practical strategies for ethical and effective AI integration, ultimately strengthening journalism across various contexts.

This study explores ways to harmonize the adoption of AI with journalistic values and concludes by proposing the concept of a "journalistic algorithm." The term "journalistic" reflects traditional professional values like reliability, fairness, and truth-seeking. Combined with "algorithm," often associated with the enigmatic nature of AI technology, it underscores the need for transparency and ethical integrity in AI systems. Given this context, this study argues that AI algorithms used in journalism must adhere to these ethical and normative principles, making the integration of journalistic values into AI a central objective in the evolving relationship between technology and journalism.

Furthermore, newsrooms can advance beyond simply adopting or using the technology presented to them by actively developing it and engaging in discussions to make algorithms more "explainable." Thus, technologists—a new type of journalist—must open the black box and publicize the algorithms they utilize to produce news content, enhancing the transparency of AI technology in journalism. Conversely, professional journalists who strive to uphold the traditional ethos of their field must learn about AI algorithms to verify that journalistic values are maintained and respected in AI-generated news products. In doing so, they can highlight the unique professional reasoning of human journalists by participating in the "creation of meaning" process.

7. Limitations

Some limitations should be acknowledged when interpreting the results of this study. First, while it attempts to identify general patterns from previous research by emphasizing the universal aspects of AI adoption, it overlooks regional and national variations, only occasionally referencing the differences between technologically advanced countries and those less developed. This limitation is somewhat unavoidable, as

the two objectives—identifying general features and examining regional diversities—cannot be accomplished in a single article. It would be very helpful for future studies to focus on this aspect of regional and national variations.

Second, since this study only included English-language papers relevant to the research questions, the range of reviewed documents may be somewhat limited. This selection bias is driven by practical considerations such as accessibility, global knowledge dissemination, and the role of English as the lingua franca of academia. However, this focus undoubtedly restricts the scope of this research by excluding studies in other languages, particularly those that provide localized or culturally nuanced perspectives on journalism, media, and AI.

Third, literature reviews inherently have certain limitations, which empirical studies should complement. Combining search strings that are optimized for the research topic in order to find highly relevant papers is difficult. In addition, databases are continuously updated, so the final sample may vary slightly depending on the timing, even with the same strings. The concepts and models proposed and highlighted in this study should be substantiated through future empirical research. To evaluate the applicability of these models in journalistic environments, it is highly recommended that both qualitative and quantitative methods be applied simultaneously.

Conflict of Interests

The authors declare no conflict of interests. In this article, editorial decisions were undertaken by Jeong-Nam Kim (University of Oklahoma).

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