Kajian Jurnalisme
Volume 08 No. 02 January 2025
https://doi.org/10.24198/jkj.v8i2.53801

AI-Driven Media Evolution: Exploring Automated Journalism's Impact on Industry's Future

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Abstract

Today, mass media experiences significant developments with respect to the introduction of automated journalism systems in the age of artificial intelligence (AI). This study looks into how Indonesian media organizations respond to and deploy automated journalism technologies. Specifically, it focuses on how newsroom practices and professional roles change. The study investigated three key aspects of automated journalism-technology integration, ethics, and workforce adaptation based on a systematic literature review and secondary interview data obtained from industry practitioners. It explored the problems encountered in the implementation of automated journalism. This study found that automated journalism has been successfully integrated into news production to improve efficiency and quality. However, its integration within existing organizational facets is challenging, demanding heavy cultural updates, and professional skills development. Also, effective integration of AI into newsrooms depends on ethical frameworks and quality control infrastructures to ensure that the benefits of automated content generation do not come at the expense of journalistic quality. Furthermore, unlike many fears of job loss associated with its usage, automated journalism can also create new hybrid positions where journalists have leveraged technical knowledge to complement fact-checks and storytelling.

Keywords: artificial intelligence; automated journalism; media industry; news production; robotic journalism

Abstrak

Saat ini, media massa mengalami perkembangan yang signifikan sehubungan dengan pengenalan sistem jurnalisme otomatis di era kecerdasan buatan (AI). Dalam studi penelitian ini, kami melihat bagaimana organisasi media di Indonesia merespons dan menggunakan teknologi jurnalisme otomatis, khususnya berfokus pada bagaimana praktik-praktik di ruang redaksi dan peran profesional berubah. Studi yang menyelidiki tiga aspek utama dari jurnalisme otomatis-integrasi teknologi, etika, dan adaptasi tenaga kerja berdasarkan tinjauan literatur sistematis dan data wawancara sekunder yang diperoleh dari praktisi industri-mengeksplorasi masalah-masalah yang dihadapi dalam penerapan jurnalisme otomatis. Studi penelitian ini memiliki sejumlah temuan yang penting. Di satu sisi, meskipun jurnalisme otomatis tampaknya telah berhasil diintegrasikan dalam produksi berita-memperbaiki efisiensi dan kualitas-pengintegrasian jurnalisme otomatis ke dalam aspek-aspek organisasi yang sudah ada cukup menantang, menuntut pembaruan budaya yang besar, dan pengembangan keterampilan profesional. Selain itu, integrasi yang efektif dari AI ke dalam ruang redaksi bergantung pada kerangka kerja etis dan infrastruktur kontrol kualitas untuk memastikan bahwa manfaat dari pembuatan konten secara otomatis tidak mengorbankan kualitas jurnalistik. Selanjutnya, tidak seperti banyak kekhawatiran akan hilangnya pekerjaan yang terkait dengan penggunaan AI secara umum, jurnalisme otomatis juga bisa menciptakan posisi hibrida baru di mana jurnalis sudah menggunakan pengetahuan teknis untuk melengkapi pemeriksaan fakta dan penulisan berita.

***Kata kunci**: kecerdasan buatan; jurnalisme otomatis; industri media; produksi media; jurnalisme robot*

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Submitted: March 2024, **Revised**: June 2024, **Accepted**: January 2025, **Published**: January 2025
ISSN: 2549-0559 (cetak), ISSN: 2549-1946 (online), Website: http://jurnal.unpad.ac.id/kajian-jurnalisme

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https://doi.org/10.24198/jkj.v8i2.53801

INTRODUCTION

Mass media plays a crucial role in modern society as a vehicle for message transmission and public influence through education, enlightenment, and entertainment (Deuze, 2011). In Indonesia, Law No. 40/1999 outlines the press' functions, including information dissemination, education facilitation, entertainment provision, and social control. This legislation emphasizes the significant responsibility of the media to inform the public accurately, contribute to societal education, offer entertainment, and act as a watchdog to ensure transparency and accountability within society and government.

The media's significance extends to providing essential information that supports people's lifestyles, particularly concerning food-related topics (Reese & Shoemaker, 2016). With AI, social media platforms have undergone significant transformations (Kaplan & Haenlein, 2019). The development of automated journalism represents a notable advancement in AI applications within the media industry (Amran & Irwansyah, 2018; Carlson, 2015). By leveraging sophisticated data analysis tools and robotics, AI-powered systems have the potential to revolutionize information presentation and dissemination. It offers increased efficiency and speed compared to traditional human-based approaches (Dörr, 2016; Graefe, 2016). Since the last decade, journalism has entered a transitional period amidst ongoing digital evolution that required established journalistic practices to accommodate and adapt to continuous technological changes (Krisdinanto, 2024).

This phenomenon of journalistic transformation through AI can be seen concretely in various leading media. The Associated Press, for example, has produced more than 3.000 financial reports per quarter using AI systems since 2014, with a significantly improved accuracy rate compared to manual reporting. In Indonesia, a similar implementation can be observed at Beritagar.id, which has adopted an AI system to automatically generate more than 10.000 weather news and earthquake reports throughout 2022, showing a 300% increase in news production efficiency compared to conventional methods.

These changes also pose significant challenges to journalistic practice. Data from the Reuters Institute Digital News Report 2023 shows that 67% of global news organizations have implemented or plan to implement AI systems in their news production, yet 72% of journalists express concerns about its impact on journalistic quality and professional ethics. In Indonesia, a 2023 Press Council survey revealed that 45% of national online media have adopted some form of automation in their news production process although implementation is still limited to certain types of news such as weather, finance, and sports reports.

Robotic journalism has been both a boon and a burden for the media landscape. The second primary consideration is the Ethics of automated news production. Automated algorithmic content production raises concerns about information accuracy, integrity, and credibility (Diakopoulos, 2015). Addressing this requires establishing policies like measures that determine the trustworthiness of information from automated systems and mechanisms to promote transparency with accountability for algorithms used (Diakopoulos, 2019).

Human oversight is required to ensure quality control and preserve ethical standards in the automated journalism process (Franklin & Eldridge, 2016). The code of journalistic ethics is the compass and shield for journalists in their profession. However, all reporters have different levels of knowledge and understanding regarding the code of ethics. However, on the other hand, not all journalists implement this code of ethics despite knowing about it (Winora et al., 2021).

Human supervision is necessary to mitigate any unintended biases and inaccuracies that algorithms may introduce. By overseeing this process, we ensure that the content produced

meets high standards of journalism, crucial to protecting the integrity and credibility of media. Similarly, in both manual and automated journalism, preventing fake news from getting published through high-quality fact-checking techniques and compliance with strict guidelines for producing reporting or providing information is crucial (Carlson, 2018; Graves, 2018). Fact-checking works as a safety stop for further disseminating false news, protecting accuracy and veracity (Amazeen, 2020). This is especially important in the age of AI and automated content generation (Brandtzaeg et al., 2018), as cross-referencing information with several sources and fact-checking doubtlessly corroborates that journalists are contributing to the credibility of their reports.

Scholarly exploration of AI has focused on automated journalism and media change. Automated journalism has also impacted how newsrooms function, with words written by Olsen (2025) that AI implementation pushes a positive evolution in workflows but transfers more power and respect to people with technology skills. Some journalists have felt sidelined during this transition, and there has been a demand from media organizations to drive digital efficiency. Ali and Hassoun (2019) lamented the problems that automating journalism has created for journalists - loss of jobs and the need to learn other digital skills to work with the AI system.

Utoyo and Putranto (2022) researched the effect of robot journalism on the news and concluded that robots cannot replace human journalists because, in terms of making technical, ethical judgments, they need to do as trained journalists. For Ariestyani (2021), this raises questions about its possible implications for news credibility and the hazards associated with bypassing traditional journalistic verification processes in favor of an automated system.

In the present literature, most researchers argue that automated journalism in newsrooms is a two-faced coin. They note this technology potentially helps push up productivity and efficiency and also troubles obstacles concerning content quality (Ariestyani, 2021), ethics matters, or otherwise harmful effects on the practice of human journalists (Utoyo & Putranto, 2022). Linden (2017) argues that, despite the rapid transformation of media landscapes, journalists still play crucial roles in how information is filtered and interpreted by human intelligence.

The article discusses the role and influence of robot journalism in the evolution of the social media era powered by AI. This literature review, case study, and expert exploration aims to assess the advantages and disadvantages of automated reporting in media. In addition to these theories and their implications for human-robot interactions in journalism, this study also examines how these developments should be tracked to determine possible changes in the media industry service workforce. It focuses on how these changes could result in the possibility of consuming news differently. It aims to offer insights from longitudinal observation and analysis to help increase the use of robotics in media applications while complying with the traditional values of journalism, under the project crowdfunding goals.

RESEARCH METHOD

The study used a qualitative descriptive design with an extensive literature review and interviews of main data sources. This method is consistent with a current trend in mixed media sciences studies that provides a broader view of complex phenomena (Creswell & Creswell, 2018). A survey of existing literature is conducted to provide a state-of-the-art picture of mass media and research into robotics and AI technology as it relates to robotic journalism. This requires a different direction as it leads to an improved theory and complex understanding of our object of study.

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https://doi.org/10.24198/jkj.v8i2.53801

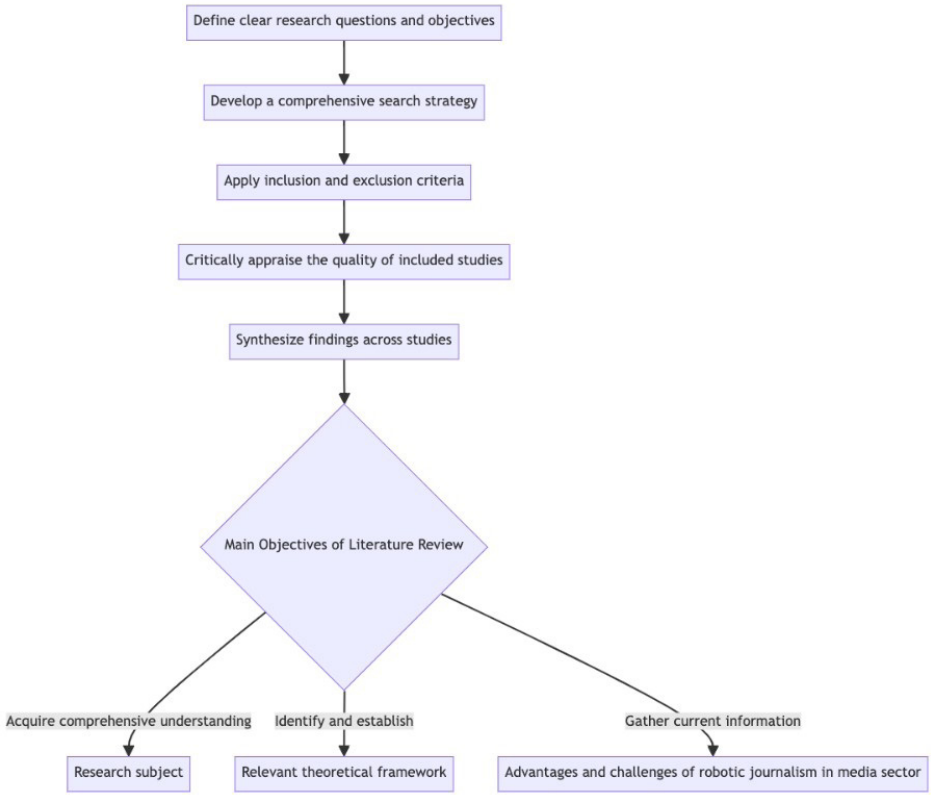

Figure 1. Systematic Literature Review
Source: Booth et al., (2016) and own Analysis

One of the bases of the mentioned objectives, the data was collected in two phases. Stage one was a systematic literature review (See Figure 1), building upon the framework of Booth et al. (2016). We comprehensively searched the top academic databases, such as Web of Science, Scopus, and Google Scholar. The qualifying keywords used in the search strategy included "automated journalism", "robot journalism", "AI journalism" and "algorithmic news production". Literature review inclusion criteria were peer-reviewed journal articles examining automated journalism (implementation or impact) published in English or Indonesian with empirical evidence or substantial theoretical frameworks.

In the second stage, secondary data analysis was performed on interviews reported in previous studies. The data from the interviews were part of several studies that included local media practitioners' and journalists' opinions on automated journalism practices. Using this secondary data allowed us to combine practical knowledge from practitioners with identified theoretical outcomes from a literature review.

A thematic analysis method allows for the identification, analysis, and reporting patterns within the data. The analysis consisted of the following steps: First, we coded data generated by key findings (both from the literature and the secondary interview data) and clustered them into descriptive themes. Next, we synthesized the descriptive themes into broader analytical themes and integrated the literature findings with the secondary interview data findings. In performing the systematic literature review, we followed the methodology by Okoli (2015) to confirm the correctness and completeness of the analysis across the analysis process.

To enhance the credibility of the analysis, we utilized data triangulation techniques following the recommendations of Flick (2018). These were compared with secondary interview data from different neighborhoods for triangulation of the findings from the literature.

This process identified and detailed the areas of convergence and divergence in findings, whilst multifaceted exploration helped to untangle the complex nature of implementing automated journalism.

It considers three distinct yet interrelated dimensions: the ethics of how AI is used within journalism practice, the shift in media labor market dynamics, and the radical re-writing of news production practices. This method involved an in-depth exploration of specific aspects of automated journalism. The approach of member checking and peer debriefing is advised by Birt et al. (2016) to fortify the trustworthiness of the data collected and analyzed.

The approach used in this study is therefore methodologically rigorous as the triangulation of qualitative research is mandatory for credibility and depth (Flick, 2018). The researchers employed an inductive approach combining a systematic literature review with secondary data analysis to construct a nuanced understanding of robotic journalism. As a result, this method improves the credibility of the results of their research and enriches a wide lens on media transformation amid AI age.

RESULTS AND DISCUSSION

A thorough examination of the implementation of automated journalism in the media industry reveals three predominant interrelated themes: (1) transformation of news production practices, (2) ethical and professional challenges, and (3) organizational and workforce adaptations. These findings emerged from a systematic literature synthesis and secondary data analysis from interviews with media practitioners.

Transformation of News Production Practices

The transition is among the most transformative developments in journalism, following the integration of AI-powered robotics into newsroom workflows. Journalism, once exclusively concerned with information-gathering, has evolved to encompass scientific and practical innovation. Machine-driven systems have assumed many of the routine tasks previously performed by journalists (Lewis et al., 2019). The concept of automated or robot journalism is a news story that can be produced with minimal human effort using algorithms and artificial intelligence. This has led to a series of terms, including ‘algorithmic news’ and ‘automated content’, pointing towards the increasing role of computational systems in media production (Carlson, 2015; Dörr, 2016).

However, over the last few years, new research has focused on how AI may be used in elite journalism. Graefe (2016) investigated introducing Natural Language Generation (NLG) systems for journalism in news-writing tasks, while Leppänen et al. (2017) explored Hoax Detection Methods Using Machine Learning and the possibilities of machine learning algorithms in the news verification process. In Indonesia, Beritagar.id, as a pioneer of automated journalism in Indonesia, shows how this transformation is happening in a local context. Using AI technologies, this outlet has improved the efficiency and accuracy of news produced, highlighting a trace of how rapidly traditional journalism practices within the country are being transformed. Based on data from their annual report, AI has increased news productivity by 300% for certain news categories such as weather and earthquake reports (Amran & Irwansyah, 2018). It not only increases the speed of news production but also enables content personalization based on individual reader preferences.

Since then, automated journalism has grown to include more than sports reporting. More recently, many online media outlets in Indonesia have started using AI to generate a wide range of content, from weather forecasts to earthquake reports (Tapsell, 2018). This mirrors

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international trends in the sector, where automated systems are increasingly used for data-driven reporting that occurs at high speed (Stray, 2019).

However, the growth of automated journalism highlights what is possible - good and perhaps bad - for reporters regarding AI content. Studies by Wu et al. (2019) and Thurman et al. (2017) explored how readers perceived automated news and found that people require humans to write more complex and emotionally nuanced stories despite AI's power to match the credibility of human journalists on a particular story-type metric for some categories like sports or financial summaries. The more significant challenge as we proceed is finding the middle ground when there are such automated systems and preserving human critical thinking, creativity, and ethical judgment - all of which human journalists bring to journalism (Broussard et al., 2019).

The integration of robotic journalism in the media industry has ushered in a new era of efficiency and productivity in news production. Automated systems can process vast amounts of data and generate news content at speeds far surpassing human capabilities, significantly streamlining the news production process (Dörr, 2016). This increased productivity allows media companies to churn out more content in a shorter amount of time, satisfying the need to disseminate information even quicker in today's digital age (Carlson, 2015).

Robotic journalism, for example, can operate on three steps and purposes - collecting, analyzing, and synthesizing multiple news sources. This advance makes it possible to produce news more quickly and comprehensively (Graefe, 2016). Such systems process information computationally and produce news articles at a very fast pace permitting human journalists to use their time for in-depth, investigative, and interpretative journalism (Lewis et al., 2019).

The instantaneous pace of robotic journalism has fundamentally altered the nature of how quickly news can be delivered. With the rise of social media platforms, in this rapid dispersion information sharing era, having news capability to be created and delivered almost immediately is very important for any website or broadcast site/company if they would like them to keep up (Hermida et al., 2012). Automation, which can constantly scan numerous news outlets to catch major events as they happen and synthesize the stories automatically for newsgathering, is one solution that can help keep some parts of the 24/7 puzzle ticking over (Thurman et al., 2017).

The increase in the involvement of users in spreading, retweeting, or liking news content on social media platforms has additionally promoted automated journalism (Kümpel et al., 2015). As Westlund (2013) argues, as a result of the symbiosis between automated content creation and user-driven distribution an entirely new way to think about news consumption has emerged where distinctions with who is producer and consumer have become significantly less intuitive. In recent years, artificial intelligence tools have been increasingly used by media, moreover journalism. These days, many professionals are relying heavily on AI-powered platforms like ChatGPT and the Chrome Extension of Google named Bard to help in several areas with News writing & research (Broussard et al., 2019). This points to the growing infusion of AI-based technologies in journalism, incorporating human knowledge with mechanical ease.

The biggest advantage of this new tradition in journalism is the superior capability for the collection and analysis of data. Automated systems can handle a large amount of data with similar precision over and over in ways that humans cannot (Stray, 2019). This kind of signal can be a powerful tool in the era of data-driven journalism, where mastery over complex datasets is indispensable (Coddington, 2015). Though robotics has succeeded in speed and data processing, human oversight is necessary. Journalists offer context, ethics, and nuanced interpretations that automated systems are incapable of doing (Wu et al., 2019). Marconi (2020)

suggests that the future of journalism is a hybrid in which benefits derived from both human journalists and their AI system counterparts are harnessed to produce news content with high quality, speediness, and accuracy.

Automated journalism has helped improve the accuracy and efficiency with which news can be collected, sifted through for insights, and uniquely visualized as a form of storytelling. Automated systems with the ability to quickly draw and analyze data from several sources often more accurately than humans (Stray, 2019). This way the analyzing of data patterns and trends is done by what Diakopoulos (2019) calls weak AI systems which otherwise could not be detected due to human inattentiveness. However, AI-based tools like ChatGPT and Google's Bard may not always strictly follow the age-old journalistic 5W+1H (Who, What, When Where Why How) standards though they might provide factual content. This limitation draws attention to the fact that even under perfect conditions, without bias and limited only by one strict rule for example, "only use novel images", news stories are rooted in human judgment and hence considered a necessity (Broussard et al., 2019). To overcome these challenges and realize the full potential of automated systems, many news organizations adopt hybrid methodologies combining computational and manual content analysis techniques. This method enables the analysis of vast amounts of data, without forfeiting human journalistic expertise and ethical sensitiveness (Boumans & Trilling, 2016). Using combined automated and human efforts, news outlets can get more accurate and up-to-the-mark information to their audience.

Robotic journalism is used by media organizations to produce fact-based news stories enabled by precise data analysis features. The increase in precision minimizes errors and gives more reliability to the information that readers are reading (Wu et al., 2019). But, as Thurman et al. (2017) demonstrated, a fine balance between automation in human judgment must be found when implementing this technology for maximum efficiency - especially if the stories covered are complex.

The diversification of news formats and presentations is one of the most important benefits of robotic journalism. Automated systems can produce a wide range of content types, and not only text-based articles that are traditionally focused on in media coverage (Graefe, 2016), e.g. video news or infographics as well as podcasts This is consistent with consumer behavior, as screen time-related habits continue to evolve in favor of more visually rich media formats across all demos (Kalogeropoulos, 2018).

Diverse content format - news orgs can produce more and in the different formats audiences prefer to consume. Media organizations can use different platforms and types for circulating news to increase the engagement of their audience, adapting to new requirements posed by users in an increasingly digital environment (Westlund & Quinn, 2018). That provides a better news reading experience to consumers as well as aid media organizations hold their grip against the stiff digital competition.

But as we use this new technology, it is always necessary to remember the essential principles of journalism: accuracy and fairness in how something is written or reported along with depth. They also identified that a key challenge in utilizing the efficiency and analytical capabilities of robotic journalism is to ensure that they maintain critical thinking, contextual awareness, or ethically driven decision-making which human journalists bring to their practice (Lewis et al., 2019). This tension must be accommodated to achieve automated journalism in a way that can complement rather than derogate the practices of news production (Clerwall, 2014; Graefe et al., 2018). By combining human oversight with technology, the media industry can continue to modernize and serve an audience that only becomes less static while also preserving core values (Milosavljević & Vobič, 2019). If AI is used and the ethical guidelines

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for journalism are still protected, it can advance as a purveyor of truth (Caswell & Dörr, 2018) to become even more precise and fairer journalism.

Ethical and Professional Challenges

The adoption of robotic journalism in newsrooms is a trend that poses opportunities and challenges for the media sector. One of the most pressing issues is how to ensure that AI-generated writings are controlled in practice (Dörr & Hollnbuchner, 2017). Even if automated technology can produce news fast, that does not entail the sufficient level of qualitative wisdom and judgment in this field as journalism requires. This limitation has required the development of strong systems for monitoring and evaluating AI news designed to guarantee high journalistic quality (Carlson, 2018).

AI poses significant questions about accountability and ethics in journalism (Diakopoulos & Koliska, 2017). With automated systems increasingly taking part in news creation, where to draw the line between human journalists and AI systems is becoming an important issue. These efforts should include establishing procedures for inaccuracies or ethical violations in AI-generated content as well that ensure consistent application of appropriate journalistic norms (Montal & Reich, 2017).

Indonesian media's experience in adopting automated journalism presents unique ethical challenges. The Indonesian Press Council has noted an increase in cases related to the accuracy and verification of automatically generated news, prompting the development of specific guidelines for the use of AI in journalism. These cases demonstrate the importance of striking a balance between automation efficiency and journalistic integrity.

Organizational and Workforce Adaptations

Robotic journalism is also affecting changes in the media industry labour force landscape. Many assume, for example, that AI systems will automate low-skill and routine news production tasks which could in theory eliminate the need for human labor from certain areas (Linden, 2017), yet they also generate new job roles and skills. Rather, media outlets will have to accommodate this change with adequate journalism-related training (Broussard et al., 2019).

Even, many journalists have said they are confident that AI cannot completely replace their roles based on the inherently human factors vital to parts of journalism: demonstrating initiative in investigative processes or for sparking new story ideas, creating innovative content and imaginative multimedia formats as well as utilizing critical thinking skills while also making ethical judgments - all traits which even more advanced levels of AI will be unable to imitate. The reporter hopefully has some: sagacity, facility with complicated matters of life and politics (however that manifests itself), and a conscience when it comes to certain issues no algorithm is sufficiently equipped to tackle. Therefore, the incomparable aspects of human journalism make AI best for improving production efficiencies and dealing with massive amounts of information.

This development has occurred alongside several unsettling trends in news consumption. Instead, as in the Pew Research Center study that Shearer constantly references when discussing these issues, more people are trending towards digital news formats and preferring live information sources updated throughout the day (Shearer, 2021). This development has encouraged news organizations also those adopting automated journalism to provide updated and distributed content on all platforms (Westlund, 2013).

This influences how people consume news content. Faster delivery of news and more diverse approaches to journalism correspond with the change in audiences which may influence

reading patterns and content engagement (Kalogeropoulos, 2018). While news organizations are adapting to these demands, it is imperative that they weigh automated, real-time benefits with the depth of reporting and accuracy (Lewis et al., 2019).

As this shifted media landscape continues to evolve, we must be aware of how these technological changes affect the news environment as a whole and society at large. The difficulty is how to achieve and take advantage of the efficiency, doings, and possibilities AI offers while retaining the core values of good journalism as well as its democratic status (Marconi, 2020). Maintain responsible, quality news reporting that is both accurate and balanced while serving the important functions of holding power to account and informing a democratic public. We believe that by using this unique approach of carefully integrating technology with key fundamentals, the media industry can adapt to these changes without losing the trust and engagement of its audience.

We are free from any spatiotemporal restrictions because robotic journalism has done wonders by increasing nonstop information distribution in the news industry. According to Diakopoulos (2019), artificial intelligence technology enables systems that automate the production of content and can curate news and analyze news data in real time as it is produced anywhere on earth. The ability to do this greatly increases the accessibility of news and levels out global event access, which aids in an all-sidelong understanding of international capability (Thurman et al., 2017).

The downside to all of this is that we get back into murky waters, mostly because algorithms lack biases and have relatively low-band reasoning capabilities. Being algorithmic and data-centric in generating their news, these systems inadvertently might reinforce already existent prejudices imprinted on the training-set databases or programmatic views (Dörr & Hollnbuchner, 2017). Furthermore, the ability of AI to understand complex scenarios, to make subjective judgments, and appreciate nuances is way less compared to human journalists (Wu et al., 2019). These limitations may result in inaccuracies, incomplete information, and a lack of a comprehensive view of AI-generated news content (Montal & Reich, 2017).

For those developing algorithms with the aim of ensuring both transparency and openness, it is imperative to engage in the identification of biases embedded within their models (Diakopoulos & Koliska, 2017). Ensuring transparency in algorithm processes is pivotal in minimizing the lack of trust and consequent allowance for vigilant audits of underlying prejudices. Giunchiglia et al. (2021) posit that incorporating a diverse array of viewpoints within models can foster enhanced equitable outcomes and fairness in the algorithms, thereby mitigating biases while promoting the generation of superior AI outputs.

The maintenance of journalistic integrity and public trust can be achieved through stringent ethical standards and comprehensive oversight of algorithms (Broussard et al., 2019). Scholars and practitioners in collaboration with policymakers and the public play a key role as potential stakeholders during the development & evaluation of algorithmic decision-making processes which aim to improve, fairness, accountability & transparency while ensuring privacy principles do not get violated (Ananny & Crawford, 2018).

To follow the evolution in the field, it is important to continue investing in educating journalists and media professionals about how they can effectively work with AI (Linden, 2017). Moreover, a hybrid model of AI support can be again useful in cases where stories could at first have been written by humans and then improved by an AI system. Eventually, models created to advise on formulations might prove quite successful (Marconi, 2020). Performing regular audits of both the AI engine and its output can help in recognizing and mitigating potential issues related to bias, accuracy, and ethical concerns (Diakopoulos, 2020). Finally,

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media literacy work about how news is produced can make it easier for consumers to think more critically, and far more positively towards AI-produced content (Graefe, 2016).

These are the strategies that the media industry needs to walk on, so they can use automatic journalism effectively and avoid the bad effects of such technologies. The goal is to establish a faster, more precise, and ethically responsible news ecosystem serving the common good in the digital era. It includes combining the strengths of human insight and AI expertise to maintain news content that is valid and reliable. The media can remain faithful to the basic tools of their trade, journalism by returning to core journalistic practices alongside new uses for technology which allow all sectors of this industry to supply valuable news one can rely on.

If newsrooms are to bring automated journalism into their workflow, they must assure quality on all levels of journalistic input and implementation. There is, therefore, a clear need for strong quality control on AI – statements so that standards of accountability, accuracy, and objectivity are met — respectively the key points outlined in (Dörr & Hollnbuchner, 2017). Human reviewers and journalism experts can help identify potential errors or biases in automated content by implementing rigorous monitoring and evaluation mechanisms (Broussard et al., 2019). For instance, regarding their use in content generation concretely within journalism, the guidelines that accompany such systems would need to be aligned not only for the broader social good around transparency (Diakopoulos & Koliska, 2017) but also systemically upfront at every stage of data collection and management. Montal and Reich (2017) went so far as to specify that guidelines should provide disclosures about when AI is being used in news production; protections for reader privacy behind data collection and processing walls; and a maintenance of editorial integrity. Also, issues like data privacy violations, black-box profiling, unclear accountability, and the restriction on user agency must be considered (Mittelstadt et al., 2016).

Automated journalism can make news production more efficient, but it still requires oversight by humans. Given training plays such an important role in the interplay between these trust factors, it is necessary to increase our understanding of what affects human-AI system-related trust by designing effective learning regimes and cultivating encouraging relationships within any emerging media environment (Guzman & Lewis, 2020). Human skill development is critical for the effective management and oversight of robotic journalism. According to Linden (2017), training programs should cover the fundamentals of AI technology, experience managing algorithms, and a dose or two in questioning online news. These training initiatives can be guided by similar insights from industrial applications of human-robot collaboration in the industrial sector (Cherubini et al., 2016). Responsible development and deployment of journalistic AI systems involve effective collaboration among stakeholders who serve as dialogue partners (Lewis et al., 2019). This approach should be collaborative involving regulators, media outlets, AI experts, journalists, and the public. These types of partnerships can result in the spread and sharing of knowledge (Diakopoulos, 2019).

To gain the most benefit out of automated journalism, it is necessary to form interdisciplinary research initiatives whereby computer scientists work together with journalists, ethicists, and social researchers to study all aspects related to AI in journalism (Carlson, 2018). Accurate audits can be achieved through routine assessments of AI systems to measure performance, detect biases, and regulate conduct according to ethical standards (Diakopoulos, 2020). Media literacy educating the public about AI's role in news production also helps the audience engage with automated content (Graefe, 2016).

Journalistic industry standards are formalized through the development and adoption of common transparency, accountability, and quality principles across media industries (Marconi,

2020). To combine their strengths, researchers have begun investigating hybrid models that can make effective use of both human expertise and AI capabilities (Wu et al., 2019). Implementing these strategies can help the media industry approach a future in which automated journalism improves quality news reporting and its ethical and societal value.

CONCLUSION

This research shows that the expansion of automated journalism is not merely a technological change but the beginning of a deeper change for news organizations, their functioning, and their ability to provide content. Through a systematic analysis of the secondary literature and data, we identified three key practical implications that represent pathways for media organizations to follow in their process of adopting automated journalism. A successful practice of automated journalism will first require new organizational competencies, particularly around data management and algorithmic oversight. With that in mind, media organizations have been establishing in-house teams that merge traditional journalistic skills with AI technologies. Structured training that includes fundamentals of machine learning, data analysis, and AI ethics in newsrooms can facilitate such a trajectory. Second, news organizations should create ethical frameworks regarding auto-generated content before rolling out such systems. Such a framework should encompass established protocols for transparency regarding algorithms, verification, and rectification of errors. News generated automatically must clearly state how AI is used and what involvement humans have made. Third, developing hybrid skills for journalists is crucial for successful automated journalism. Such development initiatives should combine technical training in AI tools with reinforcing traditional journalistic skills, including deep writing, analysis, and values. In this way, journalists can adapt to their new role as the watchdog and editor of AI content.

There are some important areas that future research should focus on. Longitudinal studies that follow the trajectory of journalists in organizations that make use of automation would generate long-term effects on the profession. Second, further research into the relationship between audience knowledge of AI-generated content and news credibility perceptions is necessary to understand the mechanisms driving public trust. Models that synthesize the efforts of human journalists and AI optimization should be researched to establish industry best practices. Lastly, it is necessary to conduct comparative studies on the practice of automated journalism across cultural and linguistic settings, particularly in a developing country such as Indonesia. That would be useful to understand how the local context influences the uptake and adjustment of this technology. Also, for market conditions and economic consequences of the adoption of automated journalism in different media markets, research regarding the financial impact and sustainability of integrated AI business models is required. The future of journalism will be shaped by AI technologies in media organizations, balancing between what makes journalism truly valuable and a case of successful synergy between artificial intelligence and human power to uphold public scrutiny and keep journalistic integrity.

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