

## AGE OF ARTIFICIAL INTELLIGENCE IN PAKISTANI MEDIA LANDSCAPE: CHALLENGES AND OPPORTUNITIES

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### ABSTRACT

Artificial intelligence (AI) has recently become increasingly widespread in mass media and news agency newsrooms. The Pakistani media landscape is changing with the emergence of AI. The adverse effects on journalism, specifically on standards of quality and ethical ideals, are a subject of concern in the age of AI. The study presents the utilisation of Artificial Intelligence in journalism, including content used for print or electronic media. The study is qualitative and uses a phenomenological approach for data analysis. The participants included journalists, media professionals, academics, media industry specialists, and technology providers at the forefront of AI research. Semi-structured interviews were taken for the study N=15 participants based on the criterion sample. The study used thematic analysis by Braun & Clark's (2006) method of data analysis. The findings suggest that using AI has become integral to media sciences. The study results show that AI will simplify journalists' jobs by reducing wasted time and making news production procedures more efficient. This, in turn, will increase productivity in the mass media industry. Nevertheless, sufficient resources and training are required for AI usage. There has to be more opportunity for new viewpoints in the media, and training on using these technologies should be a top priority because of the seeming lack of competence. The emergence of ethical considerations highlights the need for continuous control and supervision of AI operations.

**Keywords:** Media, Artificial Intelligence, Communication, News, Social Media

### INTRODUCTION

Pakistan's news media landscape in South Asia is characterised by its multilingual nature, with six prominent media firms actively working. These groups include "Express Group, the Dawn Group, HUM TV, Dunya TV Group, ARY Group, and Jang Group Group". According to a study by Rehmat (2019), local media figures indicate that:

By the conclusion 2018, a cumulative count of 88 television channels, encompassing both news and entertainment categories, as well as 209 radio stations, had obtained licences. In the initial months of 2019, PEMRA granted licences to an additional 48 channels, encompassing 14 news channels, thereby augmenting the total count to 136. The total population of individuals affiliated with the media

industry is approximately 250,000. The growth of the media industry can be attributed to several factors, including positive economic conditions, higher per capita income, and an upsurge in the consumer economy. This expansion was driven by increasing surpluses in private earnings and the expansion of the advertising sector (Rehmat, 2019).

Besides the growing media industry and the emergence of AI, it has emerged as a unique field to help journalists with their tasks, and it has become easier to develop such content and stories that can be sources of information and entertainment for the audience. Like human beings in nature, AI and personalised response and communication have revolutionised the media industry. Personalised

replies to suggestions in text-based communication, often known as "smart replies", are one of the most prevalent applications of artificial intelligence developed to this point. By 2017, algorithmic responses accounted for twelve percent of all messages sent through Gmail, equivalent to approximately six and a half billion emails created by AI on our behalf each day (Pavlik, 2023). The objective of intelligent response systems is to enhance the effectiveness of text generation by utilising extensive text collections to generate forecasts (Imran & Lashari, 2023) regarding potential textual content. These predictions are then used to create one or more recommended responses that individuals can choose from when replying to a message. A significant amount of technical research on various methods for generating algorithmic responses has facilitated the rapid integration of this type of artificial intelligence in interpersonal communication (Mollman, 2022).

There is an increasing amount of research in the computer and social sciences field that aims to investigate the impact of AI systems on human behaviour (Abbasi et al., 2019; Liu, 2022). Preliminary research indicates that algorithmic responses can influence individuals' writing styles. Users also perceive that the mere existence of smart replies affects their communication patterns, partly due to the linguistic bias of smart replies, which often express an abundance of positive emotions compared to typical conversations (Broussard, 2019). Nevertheless, the impact of algorithms on our social connections and views of others remains uncertain. This potential ability of AI has emerged as one of the most helpful sources in all disciplines, particularly journalism and content writing (Imran & Lashari, 2023).

Several businesses, including Arria, Automated Insights, Applied Semantics, and Narrative Science, have developed and commercialised natural language generation (NLG) technology in the last ten years. This technology allows for automatic text production via digital structured data (Örnebring et al., 2016). The utilisation of automated journalism in newsrooms has experienced a consistent rise due to a confluence of factors. These factors encompass the imperative for news organisations to establish sustainable business models and the significant economic pressure to enhance productivity in

producing journalistic content. However, it is important to note that this trend has been accompanied by scholars' concerns (Anderson, Bell, & Shirky, 2012).

The analysis of the relationship between journalism and artificial intelligence (AI) has often focused on the employment of weak or narrow AI in a limiting manner. This phenomenon arises from the conceptualisation of news generation as a mechanistic process when a machine only carries out predetermined activities as per its programming (Hansen et al., 2017). Artificial intelligence (AI) has not only been introduced in the written press or automated textual news but has also been integrated into every aspect of the news production process. Despite its inconspicuous nature, there is a growing trend towards utilising advanced artificial intelligence systems for this purpose (Ignatidou, 2019). This entails the machine's configuration to replicate the cognitive processes employed by individuals in information analysis and its capability to respond and generate potential solutions. Based on the research conducted by Túnuez, Toural, and Frazúo in 2020.

Artificial Intelligence (AI) is a promising framework of innovation that can revolutionise our interaction with technology (Imran & Lashari, 2023). AI is increasingly infiltrating the news production process and the overall structure and operation of the media, especially in journalism and social media (Lashari et al., 2023a). This study analyses the influence of AI on the Pakistani national media ecosystem and elucidates the changes that are now being experienced shortly (Jamil, 2021). The research methodology employed is qualitative, utilising in-depth interviews. The study focuses on an intended sample of academic representatives, relevant associations, and prominent corporations in the technology and communication industry. The research aims to explore and describe the subject matter.

### **The Objectives of the Study**

The primary purpose of this research is to investigate how artificial intelligence is being used in newsrooms, with a particular emphasis on the effects these tools have on the production of news, quality standards, working routines, the perspectives of mass media professionals, and ethical principles. To

accomplish this goal, we have established distinct objectives:

1. To investigate the various groups of individuals involved in implementing artificial intelligence in journalism and to collect their perspectives.
2. To assess the changing landscape of media in the age of Artificial Intelligence.

**Research Question:**

1. How Artificial Intelligence application has been used in media in Pakistan
2. What are the challenges faced by media persons in the changing landscape of Media with the help of AI

**LITERATURE REVIEW**

**Artificial Intelligence's Role in the Media Industry**

On a global scale, merging AI with the media sector is causing a revolution, and Pakistan is leading the way in this technological shift. In this study article, we will examine how artificial intelligence (AI) has changed the media environment in Pakistan. Artificial intelligence is changing how material is created, curated, and distributed in the media sector, which is going through a period of unparalleled upheaval (Imran & Lashari, 2023). This study looks at how newsrooms incorporate AI algorithms to improve the dissemination of information and speed up data-driven journalism (Rehmat, 2019). In addition, the study delves into the impact of AI on audience engagement and personalised content distribution through content recommendation systems. Responsible deployment of AI should be emphasised by addressing ethical considerations and challenges related to AI adoption in the Pakistani media business. Our knowledge of the continuing technological transformation and its effects on the distribution of information in Pakistan is enhanced by this study, which sheds light on the mutually beneficial interaction between artificial intelligence and the media industry in Pakistan.

Although artificial intelligence and other similar technologies will undoubtedly have a profound effect on the media industry, it is quite probable that the automated generation of material, whether news or entertainment, will remain a relatively tiny part of this narrative for the foreseeable future, in contrast to

sectors such as manufacturing and commercial (Bucher, 2017).

The primary source of value in the media is derived from creating intricate material that emphasises elements such as evaluation, analysis, innovation, and effective communication (Diakopoulos, 2019). This stands in opposition to the transportation sector, wherein many occupations essentially involve repetitive duties well addressed by existing technologies. Humans maintain their dominance over algorithms in the media sector and are expected to maintain this dominance for an extended period (Imran & Lashari, 2023).

On the other hand, artificial intelligence has had and will continue to substantially influence the demand side of the media sector (Lashari et al., 2023a). The statement mentioned above pertains to aligning consumers with content rather than the actual development of this material (Grafe, 2016). The future advancement of artificial intelligence can induce significant transformations in this process, including both positive and negative consequences (Lashari & Umrani, 2023).

**The Role of Media in Influencing the Mass**

Due to the fundamental economics of the media industry, demand-side matching plays a particularly significant function. Stories from the news, posts on social media (Lashari et al., 2023b), songs, and movies are all examples of the prototypical "experience goods" that can only be evaluated in terms of their quality and how well they align with the preferences of a customer after they have been consumed (Graefe et al., 2018). There are low marginal costs, and demand varies widely across consumers and time. Marginal costs are low. As a result of all of these elements working together, the market generates vast quantities of content that varies greatly in terms of its quality and attractiveness (Gunkel, 2012). To provide social value, this content needs to be sorted and filtered.

This mass is transformed into a set of intelligible, amusing, and informative commodities through effective matching, which can be accomplished through historical mechanisms such as human editing and well-known media brands, or through contemporary algorithms. The degree to which governments, advertisers, or other third parties attempting to influence people can control the media is a significant issue that plays a significant role in

influencing people's confidence in the press (Hansen et al., 2017). The arrival of social media has fundamentally shattered the traditional centralised broadcasting model that has dominated the media for centuries. Social media offers an alternative, decentralised, algorithm-driven matching process (Guterres, Kituyi, 2017). This domain necessitates our focused attention to tackle the ongoing crises faced by the media and democracy effectively.

The degree to which governments, advertisers, or other third parties attempting to influence people can control the media is a significant issue that plays a significant role in influencing the level of confidence people have in the media (Smith & Eckroth, 2017). It has been completely disrupted by the introduction of social media, which offers a decentralised, algorithm-driven matching process as an alternative to the centralised broadcasting model that has dominated the media for centuries. This is where we need to concentrate our efforts if we will address the crisis that the media and democracy are currently experiencing (Whittaker, 2019).

#### **Artificial Intelligence Effects on Journalism**

Journalism has witnessed substantial advancements in artificial intelligence (AI), leading to its increasing prominence in society (Newman, 2020). According to TúnñezLópez, Toural-Bran, and Cacheiro-Requeijo (2018), artificial intelligence (AI) enables the conversion of activities and routines into algorithms, resulting in outputs that closely mirror those produced by human performers. Therefore, integrating artificial intelligence (AI) in mass media and news organisations offers numerous benefits. Concurrently, it engenders modifications on three separate fronts: the participation of journalists in the generation of textual content, their substitution in particular responsibilities, and interaction with the readership (Gomez-Diago, 2022). Regarding the automated generation of content, one of the most promising fields is currently being explored (Schmelzer, 2019). Certain fields that are dependent on organised information, such as the outcomes of sports, financial earnings, and weather forecasts, are already capable of using this technology at present: Algorithms can convert data into narrative and instructional texts, which can result in the development of a large number of stories with little to no interaction from humans other than the code

that was initially written (Carlson, 2015; Graefe, 2016).

Papadimitriou (2016), Graefe (2016), and DeVito (2017) argue that the imperative drives the utilisation of these tools to enhance news production and foster audience engagement. Tejedor and Vila (2021) assert that artificial intelligence tools augment the capabilities of journalists, facilitating specific tasks in the news production process and elevating their jobs to an unprecedented level of perfection. Artificial intelligence can enable various activities such as identifying informative trends (Steiner, 2014), collecting information (Diakopoulos 2019), creating news-recommendation systems (Helberger, 2019, Túnñez-López, Fieiras-Ceide & Vaz-ºlvarez, 2021), and verifying disinformation (Flores Vivar, 2019). This study examines the progression of investigative journalism (Papadimitriou, 2016; Newman, 2018; Newman, 2020), as well as the advancements in text translation technology (Manfredi-Sánchez & Ufarte-Ruiz, 2020) and the automatic translation of texts (Newman, 2020). Artificial intelligence can enhance the efficiency of journalists by alleviating them from repetitive or conventional tasks (Diakopoulos, 2019). These instances (Loosen, 2018) further demonstrate the impact of the 'datafication' process on society.

#### **The Interplay of AI Advantages and Human Imperatives in a Media Revolution**

The use of AI in journalism has many advantages, such as making content development more efficient and engaging audiences more individually. Nevertheless, a sophisticated approach to this revolutionary phenomenon is required to consider and resolve the competing demands of the business world, primarily concerned with profit and the inherent human World, including social, ethical, and perceptual aspects. Although artificial intelligence improves data analysis and speeds up news production, it raises concerns about algorithm bias and the possible loss of human-centred values. This research highlights the importance of finding a middle ground between the financial interests influencing the media sector and upholding fundamental journalistic values. This study seeks to provide significant insights that can guide ethical AI deployment methods by analysing the junction of the commercial and human components inside AI-driven

journalism. Its goal is to ensure that technology and journalistic integrity can coexist harmoniously.

On the contrary, this technology has sparked numerous queries and debates over the calibre of the outputs produced by artificial intelligence (AI). Moreover, it is plausible that these tools may have the capacity to erode the ethical standards and core values deeply embedded within the field of journalism (Newman, 2018). Therefore, it is crucial to address the issue of artificial intelligence (AI) in journalism by finding a middle ground between the commercial aspect, which focuses on profitability, and the human perspective, which considers social and perceptual factors (Linden, 2017). This article aims to contribute to the ongoing scholarly conversation regarding the utilisation of artificial intelligence in newsrooms of mass media organisations. This will be achieved by acknowledging diverse perspectives, attitudes towards the technology, and viewpoints about its implementation.

#### **METHOD AND PROCEDURE**

The study is qualitative in nature and based on phenomenological design. The study used semi-structured interviews from N=15 respondents based on the criterion sample. To accomplish the objectives of this research project, thirty invitations were sent out, and 15 individuals responded to the email. Fifteen in-depth interviews were conducted for this study. The study sample comprises individuals who possess expertise and academic backgrounds, as well as professionals in the field of mass media and technology hailing from Karachi, Sindh, Pakistan. The objective of the selection is to encompass a broad spectrum of individuals engaged in the implementation of AI in journalism. In the cohort consisting of professionals in the field of mass media, the selection of interviewees was conducted with careful consideration of various application domains. These domains include data verification, content curation, identification of toxic comments, content generation, personalisation, web analytics, news identification, documentation, and tools designed to support journalists.

#### **RESULTS OF THE STUDY**

The journalists are using ChatGPT as an important tool to convert and regenerate the text that they have written with texts that have been artificially produced from data,

*R1: The information in question originates from public databases that contain the reports of reporters working in many departments, such as education, politics, health, economics, and other social issues. As a matter of course, it is of great assistance to supply instructions and obtain drafts, which can be utilised as a preliminary draft.*

Text that is generated automatically has the advantage of having a better capacity for personalisation, which enables it to provide users with content that is in line with their most recent interests, which may include education, politics, health, economics, and other social issues. This information was shared by the users who responded to the interview.

*R2: As part of an inquiry, artificial intelligence algorithms can assist in analysing large amounts of data for a particular journalistic article.*

The respondents have expressed that the process of evaluating vast volumes of data for a specific journalistic story can be made easier with the assistance of algorithms powered by artificial intelligence, which can be used as part of an investigation.

*R3: The first thing we did in the newsroom was to use a notification system known as Datamin. It uses artificial intelligence to identify content on social networks that may be of interest, such as incidents involving accidents, attacks, or claims made by individuals.*

Respondents have shared the experience of using AI in the field by expressing that artificial intelligence can be employed to recognise content on social networks that may be of interest, such as instances involving accidents, attacks, or claims made by individuals.

*R4: Claim Buster is the name of the program that is available. It can dissect the text, searching for examples of the kinds of words and phrases that are typically used to make claims and that may be put to the test. In addition, it leaves out statements that are not relevant.*

It is very interesting to believe that AI helps in news editing, content creation, and dissection in many

ways. The text may be dissected by AI, which searches for examples of the kinds of words and phrases that are usually used to make assertions and that can be tested. This capacity allows AI to analyse the text. In addition, it omits remarks that are not pertinent to the discussion.

#### **Positive Aspects of AI in Journalism**

*R8: It assists us in identifying facts that can be verified more expediently. To put it another way, I would say that AI tools are tools that accelerate. Aaa.....Not a single instance comes to me in which the tools render any of the steps of the procedure unnecessary (silence..). Besides this, AI can modify the content, and there may be unauthentic content and fabricated news just to create interest in the audience for rating purposes.*

*R12: Artificial intelligence techniques assist us in identifying verifiable facts more expediently. aaaa..... I believe that artificial intelligence tools are acceleration tools (someone knocked on the door).... I cannot conceive of any scenario in which the tools render any procedure stage superfluous.*

The implementation of artificial intelligence may be beneficial to both journalists and media organisations. These tools have the potential to liberate journalists from tasks or activities that are repetitive and require little to no qualification. On the other hand, media organisations can benefit from the work being done more efficiently, utilising fewer resources, enabling them to be more competitive.

*R13: If artificial intelligence can automate activities, journalists will have more time to devote to developing more fascinating tasks, such as conducting investigations, conducting interviews with individuals, and developing comprehensive reports (silence). They are, however, devoting their time to transcribing data and writing news pieces one at a time rather than producing more effective outputs. aaaa..... Besides this, ethical concerns about creating such content will remain, which may lead to huge criticism from the public and critics.*

*R14: When viewed through the perspective of the media firm, AI-driven customisation based on user interests has the potential to guarantee that the information delivered to the user is pertinent and interesting, hence optimising the user experience. Because of this, mass media that use AI can acquire a very competitive position in today's rapidly fragmenting media landscape.*

#### **Lack of Resources for the Pakistani Media Industry**

*R 7: Without a doubt. Concerning artificial intelligence, there is an obvious dearth of professional development opportunities for journalists in Pakistan, in my opinion. Numerous journalists lack the knowledge and abilities required to utilise AI tools effectively. Developing customised training programmes to address the media industry's unique requirements would yield substantial advantages.*

*R9: I concur entirely. Significantly impeding progress is the restricted availability of resources. The availability of sophisticated AI platforms and technologies is limited, posing a challenge for journalists to pursue sufficient resources to incorporate AI into their reporting. Tools and platforms that are more accessible are required.*

*R10: the current training programmes frequently lack specificity and fail to address the distinct demands of the journalism profession. In the media realm, journalists require specialised instruction that encompasses ethical deliberations, bias reduction, and the implementation of AI in its particularised domains.*

*R15: There appears to be a systemic problem at hand. The lack of a structured framework for AI education is palpable in journalism. There is an urgent need for all-encompassing training modules encompassing the fundamentals of AI and its pragmatic application within newsrooms. Promoting a technologically proficient and adequately outfitted journalistic community is of utmost importance.*

From these viewpoints mentioned above, it is clear that Pakistani journalists require improved access to AI resources and training programmes that are both targeted and easily accessible to be adequately prepared to navigate the ever-changing media and technology landscape.

The interview transcription indicates the diverse effects of artificial intelligence (AI) on the media and journalism industry, demonstrating a complex interaction between progress and obstacles. AI has notably improved news production procedures, enhancing efficiency, content creation and dissection. This has resulted in heightened productivity and a more tailored approach to engaging with the audience. Nevertheless, the research also highlights the ethical implications

associated with integrating artificial intelligence (AI), specifically concerning algorithmic biases that might potentially undermine the impartiality of journalism. The examination of media organisations incorporating artificial intelligence (AI) demonstrates a wide range of strategies, underscoring the industry's flexibility and varying degrees of implementation. Furthermore, the results highlight the crucial necessity for a well-rounded approach, as the endeavour to achieve financial success in the business domain must be offset by a dedication to protecting values that prioritise the well-being of individuals. This section elucidates the intricate terrain of artificial intelligence (AI) in the media sector, offering essential perspectives for professionals, policymakers, and researchers alike.

## **DISCUSSION**

The primary aim of this paper is to examine the effects of artificial intelligence (AI) in newsrooms, as perceived by journalists, experts, and academics involved in AI research. Artificial intelligence (AI) presents novel commercial prospects for media enterprises while enhancing journalists' job satisfaction. However, AI technologies can potentially intensify journalists' aversion and apprehension, necessitating a shift in mindset within media organisations. Simultaneously, this development may also give rise to some ethical concerns. AI solutions enhance productivity and efficiency, enabling media organisations to effectively compete with social media and overcome the global financial crisis in this sector.

Moreover, artificial intelligence (AI) improves the working conditions of journalists by alleviating them from mundane and monotonous jobs, enabling them to allocate more time towards qualitative reporting, investigative activities, and the acquisition of witnesses and information. Consequently, they are capable of directing their attention towards the production of high-quality news generated by humans. Therefore, it is proposed that artificial intelligence (AI) has the potential to facilitate a reversion to the fundamental nature of journalism, thereby departing from the prevailing post-Fordist paradigm wherein journalists are primarily regarded as facts transcribers. AI can potentially enhance the value of journalists' work and the entire profession.

The study results reveal that Artificial intelligence (AI) techniques provide the potential to produce extensive media content encompassing a wide range of previously unexplored subjects, hence enabling the dissemination of information to a wider readership. Users can independently construct their personalised news agenda and determine the specific material they wish to receive.

However, with the increasing autonomy of tools, there are growing worries regarding the quality and diversity of content. The personalisation of content has the potential to foster a lack of diversity and reinforce users' existing opinions by producing filter bubbles and echo chambers. Moreover, it is worth noting that algorithms, being analytical instruments, can undermine the editorial authority of the media, instigating bias throughout several stages of production, including input, throughput, and output. While it is widely acknowledged that AI tools can be utilised for malevolent purposes, such as the production of extremely persuasive false content like deep fakes, it is worth noting that these very AI techniques have the potential to reverse this trend when employed by media organisations for fact-checking purposes. Nevertheless, it is plausible that an algorithm may potentially detect a news article as disinformation and generate the filter bubbles discussed before. Consequently, prioritising supervision is vital; nevertheless, the feasibility of supervision may be compromised due to the vast quantity of outputs created by artificial intelligence. Concerning transparency and accountability, the issue of defining responsibilities presents a significant challenge due to the involvement of professionals ranging from programmers and information technologists to journalists and editors in the design, implementation, and utilisation of this technology.

From this perspective, it would be ideal to establish codes of ethics and statements of fundamental values that consider all stages of production and all individuals involved in designing and utilising these technologies. All agents, including designers and journalists, should be obligated by codes of ethics to ensure that ethical ideals are ingrained in the design process and adhered to as the default standard by professionals utilising these technologies. Furthermore, it is imperative to incorporate a delimitation of obligations agreement that all parties

unanimously agree to. This agreement establishes clear and specific quality, compliance, transparency, and accountability responsibilities. This will guarantee that every stage of the process, from design to application, is carried out according to ethical principles.

Ultimately, the constraints on research arising from the interpretative approach are acknowledged in this context. Consequently, additional investigation into the effects of this technology will be necessary.

## CONCLUSION

The study has been conducted to analyse the role of Artificial Intelligence and the changing landscape of the media. The study is based on a qualitative nature. The advent of artificial intelligence (AI) is revolutionising contemporary journalism. The phenomenon of automated news authoring and transmission, devoid of human guidance and oversight, has become a fact, frequently unbeknownst to the reader. It is anticipated that there will be a close integration between human and automated journalism in the future. Pakistani journalists should recognise the beneficial impact of technology and concentrate on how it will alter their current responsibilities and necessary abilities. Rather than perceiving AI advancements as a threat, individuals should enhance their training in areas that algorithms are incapable of, such as conducting a thorough analysis, conducting interviews with influential individuals, and engaging in investigative journalism. Automation is likely to supplant journalists who mostly focus on mundane subjects, but it also creates new employment opportunities in news-generating algorithms.

Pakistan's media must engage in AI-related research and policy development, foster cross-government cooperation, facilitate intergovernmental knowledge-sharing, and engage in honest, open, and regular conversations with civil society and the private sector, particularly technology developers, to achieve technological advancement.

Regrettably, the lack of adequate professional representation and prevailing cultural attitudes towards women journalists collectively hinder their perspectives on any AI-driven changes in Pakistani journalistic practices. Automated journalism has demonstrated efficacy in producing routine news items by utilising algorithms that facilitate the

generation of extensive, multilingual, and structured news on time while minimising errors. However, this study emphasises certain obstacles that hinder the implementation of AI-enabled devices and automation in the Pakistani news medium. The primary issues are insufficient economic resources and limited availability of precise data. A digital divide in Pakistan poses an additional constraint on the technological advancement of news media. It is crucial to address the digital divide to attract more readers of digitally generated news material.

## REFERENCES:

- Abbasi, A. M., Lashari, A. A., Kumar, H., Khan, S., & Rathore, K. (2019). Impact of Facebook on the trends of university students. *Journal of Social Sciences and Media Studies*, 3(2), 29-37.
- Anderson, C. W., Bell, E., & Shirky, C. (2015). Post-industrial journalism: Adapting to the present. *Geopolitics, History and International Relations*, 7(2), 32.
- Broussard, M., Diakopoulos, N., Guzman, A. L., Abebe, R., Dupagne, M., & Chuan, C. H. (2019). Artificial intelligence and journalism. *Journalism & mass communication quarterly*, 96(3), 673-695.
- Bucher, T. (2017). 'Machines don't have instincts': Articulating the computational in journalism. *New Media & Society*, 19(6), 918-933.
- Carlson, M. (2018). The robotic reporter: Automated journalism and the redefinition of labor, compositional forms, and journalistic authority. In *Journalism in an Era of Big Data* (pp. 108-123). Routledge.
- Caswell, D., & Dörr, K. (2018). Automated Journalism 2.0: Event-driven narratives: From simple descriptions to real stories. *Journalism practice*, 12(4), 477-496.
- DeVito, M. A. (2017). From editors to algorithms: A values-based approach to understanding story selection in the Facebook news feed. *Digital journalism*, 5(6), 753-773.
- Diakopoulos, N. (2019). *Automating the news: How algorithms are rewriting the media*. Harvard University Press.
- Flores Vivar, J. M. (2019). Artificial intelligence and journalism: diluting the impact of disinformation and fake news through bots. *Doxa Comunicación*, (29).
- Franklin, B., & Eldridge II, S. (Eds.). (2016). *The Routledge companion to digital journalism studies*. Taylor & Francis.



- Gómez-Diago, G. (2022). Perspectives to address artificial intelligence in journalism teaching. A review of research and teaching experiences. *Revista Latina de Comunicación Social*, (80), 29-45.
- Graefe, A. (2016). Guide to automated journalism.
- Graefe, A., Haim, M., Haarmann, B., & Brosius, H. B. (2018). Readers' perception of computer-generated news: Credibility, expertise, and readability. *Journalism*, 19(5), 595-610.
- Gunkel, D. J. (2012). Communication and artificial intelligence: Opportunities and challenges for the 21st century. *communication+ 1*, 1(1), 1-25.
- Guterres, A., & Kituyi, M. (2017). Information Economy Report 2017: Digitalization, Trade and Development. *United Nations Publication, Switzerland*.
- Guzman, A. L. (2018). What is human-machine communication, anyway. *Human-machine communication: Rethinking communication, technology, and ourselves*, 1-28.
- Hansen, M., Roca-Sales, M., Keegan, J. & King G. (2017). Artificial Intelligence: Practice and Implications for Journalism. Brown Institute for media innovation and the tow center for digital journalism. Columbia Journalism School. <https://www.doi.org/10.7916/d8x92prd>
- Hansen, M., Roca-Sales, M., Keegan, J. M., & King, G. (2017). Artificial intelligence: Practice and implications for journalism.
- Ignatidou, S. (2019). AI-driven Personalization in Digital Media. London: Chatham House.
- Imran, A. A., & Lashari, A. A. (2023). Exploring the World of Artificial Intelligence: The Perception of the University Students about ChatGPT for Academic Purpose. *Global Social Sciences Review*, VIII.
- Jamil, S. (2021). Artificial intelligence and journalistic practice: The crossroads of obstacles and opportunities for the Pakistani journalists. *Journalism Practice*, 15(10), 1400-1422.
- Lashari, A. A., Abbasi, F. N., Kurd, S. A., Mirjat, M. A., Mehmood, T., & Ahmad, S. (2023a). The impact of mobile assisted language learning (MALL) on ESL students' learning. *Onomázein*, (60 (2023): June), 137-148.
- Lashari, A. A., Rizvi, Y., Abbasi, F. N., Kurd, S. A., Solangi, M. A., & Golo, M. A. (2023b). Analysing the impacts of social media use on learning English language. *Al-Qanṭara*, 9(4), 133-146.
- Lashari, A. A., Abbasi, F. N., Kurd, S. A., Mirjat, M. A., Mehmood, T., & Ahmad, S. (2023c). The impact of mobile assisted language learning (MALL) on ESL students' learning. *Onomázein*, (60 (2023): June), 137-148.
- Lashari, A. A., & Umrani, S. (2023). Reimagining self-directed learning language in the age of artificial intelligence: A systematic review. *Grassroots (17260396)*, 57(1).
- Liu, G. (2022). The World's smartest artificial intelligence just made its first magazine cover. *Cosmopolitan*.
- Linden, C. G. (2017). Decades of Automation in the Newsroom: Why are there still so many jobs in journalism?. *Digital journalism*, 5(2), 123-140.
- Loosen, W. (2018). The notion of the "blurring boundaries": Journalism as a (de-) differentiated phenomenon. In *Theories of Journalism in a Digital Age* (pp. 82-98). Routledge.
- Mollman, S. (2022). ChatGPT gained 1 million users in under a week. Here's why the AI chatbot is primed to disrupt search as we know it. *yahoo! finance*, 9.
- Newman, N. (2018). *Journalism, media and technology trends and predictions 2018*. Reuters Institute for the Study of Journalism.
- Newman, N. (2020). Periodismo, medios y tecnología: tendencias y predicciones para 2020.
- Örnebring, H., Domingo, D., Witschge, T., Anderson, C., & Hermida, A. (2016). The Sage handbook on digital journalism.
- Papadimitriou, A. (2016). The future of communication: Artificial intelligence and social networks.
- Pavlik, J. V. (2023). Collaborating with ChatGPT: Considering the implications of generative artificial intelligence for journalism and media education. *Journalism & Mass Communication Educator*, 78(1), 84-93.
- Rehmat, A. (2019). Why is Pakistan's media in crisis? Dawn.
- Sánchez, J. L. M., & Ruiz, M. J. OR. (2020). Artificial intelligence and journalism. *Cidob d'afers internals magazine*, (124), 49-72.
- Schmelzer, R. (2019). AI Making Waves in News and Journalism. URL: <https://www.forbes.com/sites/cognitiveworld/2019/08/23/ai-makingwaves-in-news-and-journalism>.
- Smith, R. G., & Eckroth, J. (2017). Building AI applications: Yesterday, today, and tomorrow. *Ai Magazine*, 38(1), 6-22.
- Steiner, T. (2014). Telling breaking news stories from Wikipedia with social multimedia: a case study of the 2014 winter Olympics. *arXiv preprint arXiv:1403.4289*.
- Tejedor, S., & Vila, P. (2021). Exo journalism: a conceptual approach to a hybrid formula between journalism and artificial intelligence. *Journalism and media*, 2(4), 830-840.

- Túñez-López, J. M., Tural-Bran, C., & Cacheiro-Requeijo, S. (2018). Use of bots and algorithms to automate news writing: perception and attitudes of journalists in Spain. *Information professional*, 27(4), 750-758.
- Túñez-López, J. M., Fieiras-Ceide, C., & Vaz-Álvarez, M. (2021). Impact of Artificial Intelligence on Journalism: transformations in the company, products, contents and professional profile. *Communication & society*, 34(1), 177-193.
- Whittaker, J. P. (2019). *Tech Giants, Artificial Intelligence and the Future of Journalism*. Taylor & Francis.

