

KNOWLEDGE, UTILIZATION OF ARTIFICIAL INTELLIGENCE (AI) TOOLS BY FEMALE JOURNALISTS IN LAGOS STATE, NIGERIA

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Abstract

In an era of rapid technological advancement, the media landscape is undergoing a digital revolution fuelled by the growing adoption of Artificial Intelligence (AI) tools. These advancements have the potential to significantly alter how journalists conduct research, create content, and interact with audiences. Applying the diffusion of Innovation theory developed by Everett Rogers, this study examines the awareness and utilization of Artificial Intelligence (AI) tools among female broadcast journalists in Lagos State, Nigeria. Through a mixed-methods approach, combining surveys and interviews, we explored the levels of awareness, usage, and perceived benefits of AI tools among 217 female journalists in the region. Our findings indicate a moderate level of awareness and usage of AI tools, such as ChatGPT, among the participants. The study also identified significant barriers to adoption, including limited technical expertise and lack of access to training. Our study highlights the need for targeted training and capacity-building initiatives to empower female journalists in Lagos State to effectively harness the potential of AI tools in their professional practice. The findings have implications for promoting gender inclusivity in the development and use of AI in the media industry.

Keywords: Artificial Intelligence tools, female journalist, Knowledge, Utilization

Introduction

The media landscape is undergoing a digital revolution fuelled by the growing adoption of Artificial Intelligence (AI) tools (Hao, 2023). These tools offer a vast range of functionalities, from automated news writing powered by GPT-3 to sentiment analysis software like SentiSight and data visualization platforms like Tableau for impactful storytelling (Tableau, 2023). These advancements have the potential to significantly alter how journalists conduct research, create content, and interact with audiences. Nevertheless, this transformation also raises concerns about inclusivity in journalism and potential gender disparities in AI adoption. However, Journalism plays a critical role in shaping public opinion and fostering democratic societies (World Economic Forum, 2022). Therefore, ensuring equal access to and utilization of AI tools for journalists becomes paramount. Unfortunately, a significant gender gap exists in the tech sector, with only 28% of the global STEM workforce which comprised of women

(World Economic Forum, 2022). This disparity might be particularly pronounced in developing countries like Nigeria, where gender inequalities in technology access and education persist. Studies by Adedoyin and Alabi (2021) highlight that 75% of Nigerian girls are digitally excluded compared to boys. Furthermore, cultural norms and stereotypes surrounding women in technology can further exacerbate this gap (Mbugua & Ssemwogerere, 2017).

Despite the growing adoption of Artificial Intelligence (AI) tools within the Nigerian media landscape, a concerning gender gap persists in both the knowledge and utilization of these tools, particularly among female journalists working in Lagos (International Center for Journalists, 2020). The gender gap in AI use originates from a complex interplay of factors, primarily the persistent digital divide that limits female access to technology, hindering their ability to develop the necessary skills (Adedoyin & Alabi, 2021).

Therefore, this study examines the current level of knowledge among female journalists in Lagos State regarding artificial intelligence (AI) tools in journalism and investigating the extent to which female journalists in Lagos State are utilizing AI tools in their daily journalistic practices.

Research Objectives

1. Assess the current level of knowledge among female journalists in Lagos State regarding artificial intelligence (AI) tools in journalism.
2. Investigate the extent at which female journalists in Lagos State are utilizing AI tools in their daily journalistic practices.
3. Examine the challenges faced by female journalists in Lagos State in adopting and effectively utilizing AI tools in their work.

Literature Review

Journalistic Practice

The practice of journalistic training involves the dynamic and adaptable process of journalism includes the collection, processing, and distribution of information to a wide range of audiences through a variety of media platforms. This complex term entails recognizing noteworthy occurrences and tales, carefully verifying facts, and developing engrossing stories suitable for various media (Hassan, 2014). However, journalistic practice transcends the mere reporting of news; it serves as a vital mechanism for informing, educating, and empowering diverse audiences (Shukla, 2000). This role becomes particularly critical in the technologically evolving media landscape of Nigeria, where technology plays an increasingly crucial role in shaping information access and consumption. The arrival of Artificial Intelligence (AI) has further enhanced the dynamism of the media landscape, presenting both opportunities and challenges for journalists worldwide. AI tools offer a vast variety of potential benefits, such as; automated data analysis and fact-checking that is the Streamlining verification

processes and uncovering hidden patterns in large datasets (Brundage et al., 2020). Understanding the current state of knowledge and utilization of AI tools among female journalists in Lagos is crucial because this requires investigating the various levels of awareness and understanding of diverse AI tools applicable to their work, accessibility to training and resources necessary for effectively utilizing AI tools, existing barriers and challenges faced by female journalists in adopting AI, including potential biases, infrastructure limitations, and cultural norms and current utilization patterns of AI tools, identifying existing practices and potential areas for improvement.

Artificial Intelligence

The application of artificial intelligence (AI) in journalism has dramatically transformed news production, impacting both workflow and industry dynamics. This technological revolution, seeded decades ago with John McCarthy's coining of the term "AI" in 1956 (McCarthy, 1956), has spread to diverse industries, and its recent venture into media has significantly altered journalistic practices, particularly in news production. As Sarbjit Nahal, Managing Director of Bank of America, Merrill Lynch, anticipates, AI is poised to be the primary driver of technological advancements in the coming decade (Crespo, 2018). This growth will inevitably lead to automation in content-driven industries like journalism, due to their similar value chains involving content creation, processing, and distribution. AI's ability to master the mechanics of one creative process readily facilitates its application to others, paving the way for its widespread adoption in journalism and related fields. Crespo (2018) further observes the rise of instant news production as a natural progression of the late 1980s automation trend. This trend has laid the groundwork for data-driven journalism, heavily reliant on machines to analyze data, identify patterns, and generate reports across various media platforms. Consequently, data journalism has become a burgeoning field, empowering journalists through AI tools. These tools, leveraging machine learning algorithms, provide deep insights into breaking news, making data analysis more accessible and efficient.

However, as noted in the previous review, careful consideration of the ethical implications and potential impact on the human element of news production is crucial. The landscape of journalism is rapidly evolving with the integration of AI, transforming news production, content personalization, and journalist efficiency. Leading media outlets are innovating the use of AI-powered tools examples of these includes the Washington Post; Their robot reporters published a staggering 850 articles in just one year (Nick Wolny 2024). In 2018, China's state-run agency unveiled the world's first AI news anchor, showcasing the potential for automated news delivery (Xinhua News Agency, 2023) and their News Tracer system has successfully broken over 50 major news stories, demonstrating the effectiveness of AI in efficient newsgathering (Reuters, 2023). While major news agencies showcase the cutting edge of AI implementation, the benefits extend to smaller organizations as well as NTB news

agency (Norway); Automation has enabled them to offer a significantly broader news service, covering previously neglected events. Caswell (2021) highlights the diverse advantages of AI, including increased news coverage scope, personalized content delivery, and improved reporting speed and accuracy.

2.3 Artificial Intelligence (AI) and Journalism

The field of journalism is undergoing a profound transformation driven by the ubiquitous presence of technology, with artificial intelligence (AI) playing a pivotal role. Advanced technological tools have woven themselves into the fabric of journalistic practice, spearheading significant changes (Veglis, 2017). AI, in particular, has emerged as a game-changer, fostering radical transformations within the field (Gilbert, 2021). Some (Bring, 2016) perceive technology as an objective force reshaping professional journalistic practices, demanding the acquisition of new skill sets. Consequently, technology has become an indispensable element of contemporary media production. This technological influence permeates various facets of news production. As Alshamaila (2013) observes, AI increasingly assists in tasks ranging from reporting, content creation, and distribution to audience interaction. Recent developments include crowdsourcing, brainstorming, and fact-checking tools designed to facilitate data-driven information gathering and efficient data organization. Automation has become a crucial tool for modern newsrooms to remain competitive in the industry.

The growing impact of AI extends beyond theoretical discussions. Readers can now encounter articles entirely written by AI-powered tools, as Hassan (2014) notes. The Washington Post, for instance, developed "Heliograph," an AI system that supported its editorial team during the 2016 Rio Olympics. This system subsequently generated over 850 articles, primarily focusing on political and sports news. Furthermore, a Reuters report by Newman (2018) revealed that nearly three-quarters of surveyed media outlets utilize AI in their production processes. These outlets are actively developing projects to leverage AI for content improvement, marketing efficiency, and information validation, aiming to accelerate data classification and enhance their economic viability. Interestingly, public perception of AI-generated news appears positive. In a 2017 study, Hassan (2014) found that audiences tended to trust journalistic materials written by software more than those written by human journalists. This finding highlights the potential of AI to contribute to journalistic credibility and audience engagement.

While the full scope of AI's impact on journalism remains underplayed, its pervasive influence is undeniable. Technological advancements continue to reshape the journalistic landscape, demanding both adaptation and critical reflection from practitioners and audiences alike. As AI infuses news production, the future of journalism will likely be characterized by a dynamic interplay between human expertise and technological innovation. This interplay presents both opportunities and challenges that require careful consideration to ensure ethical and responsible use of AI

in journalism, ultimately serving the public's right to accurate and trustworthy information.

Theoretical framework

To attain the research objectives stated in the previous section, this study adopts the diffusion of Innovation theory as developed by Everett Rogers which sheds light on the social and psychological processes governing the spread of new ideas and technologies within social systems. A key strength of DOI is its ability to map out the different stages of adoption those individuals and groups go through when encountering an innovation (Rogers, 2003). It allows us to explore how female journalists with varying levels of experience and technological comfort approach AI tools. This research can compare the knowledge and utilization patterns of seasoned journalists (early adopters) who might readily utilize AI for efficiency gains, with novice journalists (late majority) who might be cautiously exploring its potential.

DOI encourages us to investigate deeper than just adoption rates by examining the motivations and challenges driving journalists' decisions (Objective 3). Are female journalists seeking to enhance reach, amplify storytelling capabilities, or gain data-driven insights through AI? Conversely, what concerns or barriers might they face, such as perceived complexity, lack of training or financial constraints? Analysing these factors through the lens of DOI provides a comprehensive understanding of the individual and social aspects influencing knowledge and utilization of AI tools. DOI highlights the importance of diffusion agents (individuals who champion innovation) and social networks that accelerate the spread of new technologies (Rogers, 2003). This framework encourages to consider how newsroom culture, access to resources, and peer networks play a role in shaping journalists' experiences with AI tools. By employing DOI theory, this research can gain a deeper understanding of the knowledge and utilization of AI tools among female journalists in Lagos. Examining adoption stages reveals how journalists with different levels of experience approach AI tools, analysing motivations and challenges highlights the reasons behind adoption or resistance to AI. Exploring the role of diffusion networks identifies how newsroom culture and social interactions influence AI adoption. Ultimately, this framework contributes to fostering a more inclusive and empowering environment for female journalists as they navigate the evolving landscape of AI-driven journalism.

Methodology

This research adopted a quantitative research design. Quantitative research methods enabling the exploration of generalizable patterns and trends in female journalists' knowledge and utilization of AI tools. With the focus on female journalists in Lagos State working in news gathering, news editing, or news/information anchoring roles on radio and television stations, the National Association of Women Journalists (NAWOJ) in Lagos Chapter served as the sampling frame of roughly 500 members across the

categories as of May 28, 2022. A sample size of two hundred and seventeen (217) respondents was drawn using the Taro Yamane formula for determining sample size. The primary instrument for data collection in this study was a self-administered questionnaire designed to gather relevant information from the respondents. Furthermore, data was presented in tables while analysis was done with the use of Statistical Package for Social Sciences (SPSS) version 20.

Discussion/Findings

Table 1: Demographic Data

Respondents Demography	%
Age	
18-24	95
25-34	2.5
35-44	1.3
45-54	0.6
55 and Above	0.6
Educational Qualification	
High School Diploma Equivalent	50
Associate degree	8.2
Bachelors degree	39.2
Masters degree	2.5
MEDIA PLATFORM	
Television (TV)	91.2
Radio	5.7
Print	3.1
TOTAL	100
	N=159

Demographic distribution across participants in this study is presented in table 1. It shows that a highly significant percentage of the respondents exposed to the study's survey were between ages 18-24 (95%), while a combined total of 5% exposed to the survey were 25 years or older. This could either mean that at the point of operation of the survey, there were more younger individuals available to participate in the survey or that younger individuals were more willing to participate in the survey. This could also further mean that more people of the younger generation are engaged in the practice of journalism. In terms of highest educational level, half (50%) of the respondents possess a high school diploma, while 39.2% possessed a bachelor's degree. This is linked to the ages of respondents as individuals between ages 18-24 are more likely to have recently completed high school or a bachelor's degree. Ultimately,

about 91% of the respondents primarily utilize television as their media platform as against other traditional means such as print and radio. Given that a majority of the respondents of this study are young, this result aligns with Mumtaz (2019) finding that television is the most commonly used traditional medium amongst youths.

Knowledge of AI Tools in Journalism

Table 2

Respondents' knowledge of AI Tools in Journalism

Level of knowledge	
General understanding of AI in Journalism	7.5
AI tools facilitating Journalism	8.8
Specific applications of AI in Journalism	6.3
No understanding and awareness of AI in Journalism	3.8
AI Tools' role in improving Journalism	2.5
Negative or neutral perception	1.9
AI Apps used in Journalism	
Chatbots	47.2
Machine Translation	13.2
Content Creation Tools	29.6
Data Analysis Tools	3.8
Fact-Checking Tools	4.4
Other(s)	1.9
Source of Knowledge	
News Articles and Online Publications	21.4
Industry Conferences and Workshops	13.2
Social media	44.7
Colleagues and Peers	12.6
Online Courses or Tutorials	7.5
Other(s)	0.6
TOTAL	100
	n=159

Results in Table 2 indicate that majority of the respondents constituting 93.7% responded to be conversant with the term Artificial Intelligence (AI) against the minority (6.3%) who have not. This finding suggests a high level of awareness of Artificial Intelligence among the study's respondents and can be attributed to young people having a higher level of knowledge on AI than older people (Vandenberg & Mott, 2023). Furthermore, the table shows a varied level of understanding as well as

perspectives of AI from the respondents. As seen in the table, only a minor portion of the respondents (7.5%) have a general understanding of the concept in journalism and a minority of 3.8% have no understanding of AI in the context of journalism. The varied responses as seen in the table suggest that there is a diverse degree of familiarity and attitude towards AI in Journalism. On the other hand, a majority of respondents did not attend to the question in the section of the table.

The table further illustrated the different levels of familiarity with different AI applications used in journalism by the respondents. Chatbots are the most familiar AI application with a percentage close to half (47.2%) and Content creation tools coming close with approximately 30%. On the other hand, other AI tools like fact-checking and data analysis AIs are less recognized by the respondents. Lastly, the study divided the sources of AI tools and applications into interpersonal means, non-personal means, and new media. The non-personal categories comprised of news articles and online publications, industry conferences, and online courses/tutorials. On the other hand, colleagues and peers constituted the interpersonal sources while social media constituted the new media means. Result from table 2 therefore indicated that social media was the most used source (44.7%) for learning about AI tools and applications used for Journalism. Cumulatively, the non-personal source i.e. news articles, industry conferences made less than half (42.1%) of the population sample while the interpersonal source was mildly represented at 12.6%.

Utilization of AI Tools in Journalism

Table 3 Utilization of AI Tools in Journalism

Utilization of AI Tools in Journalism	%
Use of AI in writing or reporting	
Yes	39.6
No	60.4
Most frequently Used AI Tools	
Chatbots	37.1
Machine Translation	27
Content Creation Tools	23.9
Data Analysis Tools	9.4
Fact-Checking Tools	2.5
Frequency of usage	
Never	15.1
Rarely	19.5
Sometimes	25.2
Often	28.3
Always	10.1

Effectiveness of AI Tools

Not effective at all	19.5
Somewhat Effective	26.9
Neutral	22
Moderately effective	17.6
Very Effective	11.9

Reasons for using AI Tools

Saves time and resources	40.3
Improves accuracy and efficiency	31.4
Provides new insights and data analysis	16.4
Enhances creativity and content generation	9.4
Helps overcome language barriers	2.5
TOTAL	100
	n=159

While Table 2 sought to present the knowledge of AI tools in journalism, Table 3 presents the utilization of AI tools in the same context. The top the indicate that a notable portion of respondents (39.6%) utilize AI in their journalistic work while the majority 60.4% do not. This suggests that while the use of AI tools is notable in journalism, there still remains a segment of journalists who have not integrated the use of AI tools and applications in their professional duties. This could be for reasons such as concerns about their expertise and autonomy, lack of knowledge of the use of AI, and so on. Therefore, the use of AI in journalism is growing but there is still room for broader acceptance and utilization by some journalists. In addition, data from the table shows that amongst the journalists who utilize AI in their journalistic duties, chatbots are the most utilized with 37.1% of the respondents indicating their use. On the other hand, machine translations are also common as they stand at 27% followed by content creation tools which stand at 23.9%.

Further data in the table show that about 79.2% of respondents did not provide answer to the open-ended question on how they use AI in their daily journalistic activities. However, among the respondents who provided answers, writing and content creation was cited by 5% while 4.4% responded that they utilized AI for understanding and learning. In addition, other reasons included research, assignments and schoolwork and finally, for inspiration. This data suggests that the use of AI in daily journalistic life is varied. To further determine how often AI is utilized by the respondents, result show that a combined 38.4% of respondents utilize AI tools and applications often (28.3) or always (10.1). Similarly, a combined percentage of 34.6% of respondents utilize AI tools and applications either rarely (15.1) or never (19.5) On the other hand, 25.2% stand neutral as they use AI tools and Applications sometimes. This

data suggests that while a significant portion of respondents frequently utilize AI, another notable segment still rarely or never utilize them.

Later segment of the table shows varied opinions on the effectiveness of AI tools and applications in achieving respondents' journalistic goals. The researcher divided the effectiveness into three; positive opinion, comprising of very effective, moderately effective, and somewhat effective; neutral opinion; and negative opinion comprising of being not effective at all. The positive opinions were a combined total of 56.4%. Conversely, 19.5% have negative opinions as they rated them as not effective at all while 22% remain neutral. This data indicates that while a dominant portion of respondents see benefit in using AI tools for journalism, although minor, a notable percentage either question their effectiveness or have no strong opinion on its impact in the context of journalism. Ultimately, the last segment of the table sought to uncover the reasons for AI utilization by journalists in the work. 40.3% of the respondents answered that AI is utilized by them to save their time and their resources. Improving accuracy and efficiency in the context of journalism is the second common reason for AI utilization by the respondents. The ability of AI to provide new insights and data analysis is also appreciated by 16.4% of respondents.

The study next investigated the extent to which female journalists in Lagos currently utilize AI tools in their daily work. The findings indicated a notable presence of AI use, with 39.6% of respondents reporting that they integrate these tools into their journalistic practices. This suggests a growing trend of AI adoption within the field. However, it's important to acknowledge that a larger percentage (60.4%) of respondents did not utilize AI tools. This highlights the fact that in Nigeria AI use in journalism is not popular, and there may be a segment of journalists who haven't yet explored its potential benefits.

The researchers further probed into the specific AI tools commonly used by the respondents. Findings reveal that Chatbots is the most popular tool with nearly half (37.1%) of AI users citing its application in their work. This could be attributed to the versatility of chatbots in automating tasks like conducting interviews or collecting data. Machine translation followed closely, with 27% of AI users finding it valuable for overcoming language barriers and expanding their reach. Content creation tools, utilized by 23.9% of AI users, were another popular choice, likely due to their ability to streamline content generation and enhance workflow efficiency. Examining the motivations for using AI tools provided valuable insights. The primary driver for 40.3% of respondents was the ability to save time and resources. This aligns with the findings of (Parasie, 2023) who suggest that AI-powered tasks like data analysis and content generation free journalists to focus on higher-level storytelling and investigative work.

Conclusion/Recommendation

This study sheds light on the gender gap in AI adoption among female journalists in Lagos and their quest for knowledge to effectively learn the act and awareness of AI

tools. The findings underscore the critical need for targeted interventions to bridge this gap. Media organizations, policymakers, and tech sector stakeholders have a pivotal role to play in providing tailored training programs and promoting inclusivity between AI developers and female journalists. By addressing these issues, we can empower female journalists to harness the potential of AI tools, contributing to a more equitable and informed media landscape. Based on the findings of this research, which shed light on knowledge of AI tools by female journalists in Lagos, here are some key recommendations to bridge this gap and empower these journalists:

Targeted Training and Capacity Building:

- **Media Organizations:** Develop and implement training programs specifically designed for female journalists. These programs should address the fundamentals of AI in journalism, explore the functionalities of various AI tools relevant to their work (e.g., data visualization, fact-checking, content creation), and provide hands-on experience through workshops and practical exercises.
- **Industry Collaborations:** Partner with universities, tech companies, and NGOs to offer specialized training programs on AI for female journalists. These collaborations can leverage existing expertise and resources to create comprehensive and accessible training opportunities.

Bridging the Digital Divide:

- **Policy Advocacy:** Advocate for policies that promote affordable internet access and bridge the digital divide in Lagos. This can involve lobbying for infrastructure development and initiatives that reduce the cost of data plans, particularly for female journalists.
- **Grant Programs:** Establish grant programs or scholarship opportunities to assist female journalists in acquiring necessary hardware and software, such as laptops and subscriptions to AI-powered platforms.

References

- Adedoyin, O. A., & Alabi, A. A. (2021). Gender, digital exclusion, and access to information and communication technologies in Nigeria. *Information Technology & People*, 34(4), 1238-1254. doi:10.1108/ITP-09-2020-0422
- Aishamaila, A. M. (2013). The impact of ICT on journalism practice in Nigeria: A case study of The Guardian newspapers. *International Journal of Scientific & Engineering Research*, 4(7), 302-308.
- Bring, T. (2016). *Journalism, technology and society: A critical introduction*. Oxford University Press.
- Crespo, I. (2018). Transparency and trust in algorithmic journalism. *Digital Journalism*, 6(2), 185-200. doi:10.1080/21670870.2017.1330944
- Gilbert, C. (2021). *Journalism in the age of artificial intelligence*. Polity Press.
- Hassan, J. (2014). How algorithms are changing the news: A conversation with danahboyd. *Journalism Practice*, 8(5), 593-600. doi:10.1080/17512786.2014.917210
- International Center for Journalists (ICFJ). (2020). State of AI in journalism 2020. Retrieved from <https://www.lse.ac.uk/media-and-communications/polis/JournalismAI/The-report>
- Jones, R., & Aishamaila, A. M. (2013). The impact of ICT on journalism practice in Nigeria: A case study of The Guardian newspapers. *International Journal of Scientific & Engineering Research*, 4(7), 302-308.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607-610.
- Mbugua, D. W., & Ssemwogerere, E. (2017). Why so few? Understanding the gender gap in ICT in East Africa. *Gender & Development*, 25(1), 121-139. doi:10.1080/09688086.2016.1230222
- Mumtaz, S. A. (2019). Media usage and political participation among young adults in Pakistan. *Journal of Media and Communication Studies*, 11(2), 182-198.
- Newman, N. (2018). Report on the future of journalism: How artificial intelligence is changing the news. Reuters Institute for the Study of Journalism. doi:10.6855/researcher/202.0001
- Nick Wolny 2024 Heliograf: How The Washington Post's AI Writer Wrote 850 Articles in Year One Retrieved from <https://nickwolny.com/>
- Parasie, S. (2023). How AI is transforming journalism? *Journalism Quarterly*, 96(2), 456-478.
- Reuters Digital News Report. (2024).
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.
- Shukla, A, K (2000). Mass Communication and journalism. New Delhi. Anmol publications pvt. Ltd
- Tableau. (2023). Tableau software. Retrieved from <https://www.tableau.com/>

- Vandenberg, B., & Mott, B. (2023). Age differences in knowledge and use of artificial intelligence. *International Journal of Human-Computer Studies*, 172, 102882.
- Veglis, A. (2017). The impact of digital media on journalism. *Journalism Practice*, 11(2), 187-200. doi:10.1080/17512786.2016.1203432
- Wang, Y., & Siau, K. (2018). Ethical considerations in artificial intelligence development, adoption, and use. *Computer*, 51(9), 73-78. doi:10.1109/MC.2018.3091340
- World Economic Forum. (2022). Journalism's role in shaping the future [Report]. Retrieved from <https://www.weforum.org/press/>
- Xinhua News Agency Report (2023)
- Yamane, T. (1967). *Statistics: An introductory analysis*. Harper & Row.