



The Pros and Cons of Artificial Intelligence (AI) in Women's Empowerment

Nwachukwu Prince OLOLUBE

Department of Educational Management
Faculty of Education

Ignatius Ajuru University of Education, Nigeria

nwachukwu.ololube@iaue.edu.ng, ololubenp@gmail.com

<https://orcid.org/0000-0002-5415-9602>

Chigozie Alvan HARBOR

Department of Educational Management
Faculty of Education

Ignatius Ajuru University of Education, Nigeria

harborjnr@gmail.com

<https://orcid.org/0009-0002-6066-8910>

Oluchi Christogonus-Anyanwu

Department of Educational Management
Faculty of Education

Ignatius Ajuru University of Education, Nigeria

buoguagala@yahoo.com

Abstract

Artificial Intelligence (AI) has increasingly been recognized as a transformative tool for women's empowerment, AI offers both significant opportunities and notable challenges. On the other hand, AI-driven technologies enhance access to education, healthcare, and economic opportunities for women worldwide. Online learning platforms, telemedicine, and digital marketplaces provide women, especially in underserved regions, where resources are previously out of reach. AI also supports gender advocacy because it analyses large datasets to uncover patterns of discrimination and helping policymakers design more inclusive initiatives. However, the use of AI is not without its setbacks. These biases ranges from AI algorithms, which often reflect historical gender inequalities, reinforce the existing stereotypes and the further marginalization of women. In sectors like recruitment, finance, and criminal justice, biased AI systems perpetuate discrimination rather than alleviate it. Besides, the digital divide marked by unequal access to technology and digital literacy means that the benefits of AI are not equally shared; as such it often excludes women from low-income backgrounds. In addition, concerns around privacy and surveillance inexplicably affect women, particularly in conservative societies. Nonetheless, AI holds remarkable potential to drive women's empowerment, and it also requires deliberate action to address biases, promote inclusivity, and ensure equitable access. This study might suggest that a balanced approach that combines technological innovation with strong ethical frameworks is essential to maximize AI's benefits in addition to mitigating its risks for women globally and particularly in sub-Saharan Africa.

Keywords: Artificial Intelligence, Women's Empowerment, Gender Equality, Digital Divide, Algorithmic Bias, Inclusive Technology, Ethical AI, Access to Technology, Discrimination, Digital Literacy.

Reference to this paper should be made as follows:

Ololube, N. P., Harbor, C. A., & Christogonus-Anyanwu, O. (2025). The pros and cons of artificial intelligence (AI) in women's empowerment. *International Journal of Scientific Research in Education*, 18(3), 433-451.

Copyright © 2025 IJSRE

INTRODUCTION

Artificial Intelligence (AI) has rapidly emerged as a transformative force that holds immense potential to reshape multiple facets of society, from healthcare and education to economics and governance. AI refers to the development of systems and algorithms designed to perform tasks that typically require human intelligence, such as learning, problem-solving, and decision-making (Binns, 2021). As AI technologies continue to evolve, their integration into societal systems presents opportunities for both innovation and disruption. In recent years, a growing discourse has emerged around AI's capacity to empower women, especially in the global South, where gender inequality remains pervasive. On one hand, AI has the potential to unlock new avenues for women's participation in various sectors. On the other hand, if not properly managed and designed with inclusivity in mind, it risks reinforcing existing gender biases and inequalities (UN Women, 2021).

AI's integration into sectors such as education, healthcare, and economic development has shown promising signs of empowerment, particularly for women in marginalized communities. Chin (2022) highlighted that AI-enabled platforms for online learning and telemedicine have increased access to education and healthcare for women in regions with limited physical infrastructure. These platforms allow women to overcome traditional barriers such as geographic isolation, financial constraints, and gender-based mobility restrictions (Ololube et al., 2024). Furthermore, AI-based tools have helped women entrepreneurs by enabling them to access digital markets and financial services that were previously inaccessible, fostering economic independence and security (Kabeer, 2019). AI technologies also hold great promise in gender advocacy, as they can analyze vast amounts of data to detect patterns of gender discrimination, supporting policy initiatives that promote gender equality (UN Women, 2021).

However, the implementation of AI is fraught with challenges, particularly regarding algorithmic biases that perpetuate existing gender inequalities. Buolamwini and Gebru (2018) conducted an investigation into the biases embedded in AI systems and revealed that these systems often reflect the biases present in historical data and societal norms, leading to outcomes that disproportionately disadvantage women. For instance, facial recognition systems have been criticized for their inability to accurately recognize women, particularly women of color. Dastin (2018) also found that recruitment algorithms tend to favor male-dominated profiles, thus perpetuating gender imbalances in various industries. The lack of gender diversity in the development of AI technologies further exacerbates these biases, with women being underrepresented in the teams that design and test these systems (West et al., 2019). UNESCO (2023) emphasized the need to address these biases to ensure AI systems do not inadvertently reinforce societal inequalities.

Another critical issue is the digital divide, which remains a significant barrier to women's access to AI technologies, particularly in low-income and rural areas. In many regions of the world, including Sub-Saharan Africa, access to the internet and modern technologies is still limited, and women are disproportionately affected by this digital exclusion. According to the International Telecommunication Union (ITU, 2020), women in developing countries are 20% less likely to own a smartphone or have access to the internet compared to men. This digital divide restricts women's ability to take full advantage of the benefits of AI, from access to online education to participation in the digital economy. As such, while AI holds the promise of

empowering women, it risks exacerbating existing inequalities if steps are not taken to ensure equitable access and inclusivity in its deployment (UNESCO, 2022).

In addition to the digital divide, concerns around data privacy and surveillance disproportionately affect women, especially in patriarchal societies. Zwitter (2020) conducted a study on how AI technologies in social media and mobile applications can expose women to risks such as data misuse, online harassment, and violence. In such societies, where women's movements are often restricted, AI-based technologies can be used to control and monitor women's activities, raising ethical concerns about surveillance and privacy. UNESCO (2023) also warned that AI's role in surveillance could undermine women's privacy rights, particularly in societies with restrictive gender norms, highlighting the need for ethical guidelines to mitigate these risks.

This paper aimed to explore the complex relationship between AI and women's empowerment by examining both the opportunities and challenges that AI presents. Specifically, it focused on how AI can be used to advance gender equality while addressing the risks associated with its use, such as algorithmic bias, digital exclusion, and privacy concerns. The study drew from a wide range of scholarly literature and policy reports to critically assess the potential of AI to empower women, particularly in regions like Sub-Saharan Africa, where gender disparities are most pronounced. Therefore, analyzing the current landscape and identifying the gaps that need to be addressed will make this paper provide recommendations for stakeholders in the technology and policy sectors to ensure that AI becomes a tool for empowering women in an ethical and inclusive manner. Eventually, this paper argued that when AI designed are deployed with inclusivity, equity, and gender sensitivity, it will then serve as a powerful catalyst for positive change in the lives of women globally (Ololube et al., 2023).

THEORETICAL FRAMEWORK

This study "The Pros and Cons of AI in Women's Empowerment" is underpinned by two key theoretical frameworks that provide valuable insights into understanding the complex relationship between gender, technology, and empowerment. These frameworks offer critical lenses through which to explore the societal impacts of artificial intelligence (AI) on women, particularly within the context of marginalized communities. Using the Feminist Technoscience Theory, the study examined how gender biases are embedded within technological development processes, influencing AI systems and their applications. Additionally, the Intersectionality Framework is employed to assess how overlapping identities such as race, class, and gender affect women's engagement with and outcomes from AI technologies. These theoretical perspectives do not only guide the research but also inform policy recommendations aimed at reducing gender disparities in AI and fostering greater inclusivity.

Feminist Technoscience Theory

Feminist Technoscience Theory, originally articulated by scholars such as Haraway (1991) and expanded in contemporary African contexts by Ogunyemi and Okere (2018), interrogates the embedded gender dynamics and cultural assumptions within scientific and technological systems. Unlike conventional science and technology paradigms that assume objectivity and neutrality, feminist technoscience foregrounds the socio-political construction of knowledge and the often-invisible influence of patriarchal structures in shaping technological development

(Harding, 2008). In examining the pros and cons of artificial intelligence (AI) for women's empowerment, this theory allows researchers to critically assess how algorithmic designs, data sets, and digital policies frequently reflect and reproduce gender biases. For example, AI recruitment tools that prioritize historically male-dominated occupational data often reinforce exclusionary labor practices, thus marginalizing qualified women (Adeleke & Bassey, 2021). Feminist technoscience provides a framework to challenge these epistemological biases by advocating for more inclusive knowledge production, participatory design, and ethical governance of AI technologies.

Recent African feminist scholarship has localized feminist technoscience to address the intersections of digital innovation, postcolonial gender relations, and socio-economic exclusion. Ogunyemi and Okere (2018) argued that in contexts like sub-Saharan Africa, feminist technoscience must account for layered inequalities such as access disparities, infrastructural limitations, and the gendered digital divide. These dynamics are crucial in analyzing how AI is implemented in sectors like healthcare, agriculture, and education, where women's roles are both significant and often underrepresented. In policy spaces, feminist technoscience encourages the inclusion of gender-disaggregated data and community-informed design principles to counteract embedded discrimination (Okon & Ibukun, 2020). Therefore, this theoretical lens supports a transformative approach that sees technology not as neutral tools but as contested spaces for negotiating equity, access, and representation in the AI era.

Intersectionality Framework

The Intersectionality Framework, conceptualized by Crenshaw (1989) and further contextualized in African gender studies by Afolayan and Nwafor (2020) emphasized that social identities such as gender, ethnicity, class, age, and disability interact to create unique modes of oppression and privilege. This framework moves beyond binary categorizations to explore how overlapping identities affect access, power, and participation in various social systems. Within the discourse on artificial intelligence and women's empowerment, intersectionality is instrumental in understanding how certain groups of women such as those in rural areas, those living with disabilities, or from lower socio-economic backgrounds may be disproportionately affected by AI-driven interventions (Nnamani & Bello, 2021). For instance, AI literacy programs that do not consider language barriers or rural connectivity issues risk excluding significant segments of the female population. The intersectionality framework enables a comprehensive critique of how gender inequality in AI is not uniform but layered and contextual.

Contemporary studies in Africa have applied intersectionality to analyze disparities in technology adoption and AI policy impact. Afolayan and Nwafor (2020) noted that technology solutions designed for urban, educated women often neglect the realities of marginalized groups who may lack access to digital infrastructure or face cultural restrictions. Intersectionality also informs the ethical evaluation of AI programs in sectors like finance and health, where differential treatment can exacerbate existing inequalities. For instance, biometric identification systems that fail to recognize women due to data gaps or algorithmic misclassification disproportionately affect those with multiple marginalized identities (Ekanem & Adewale, 2022). By situating gender within a broader matrix of identities, intersectionality offers a nuanced framework for developing more equitable, context-sensitive AI policies and tools. It insists on the deliberate inclusion of diverse voices in design, policy, and evaluation stages to ensure AI

contributes meaningfully to the empowerment of all women is not just a privileged few (Ololube et al., 2024).

The integration of Feminist Technoscience Theory and the Intersectionality Framework in this study offers a comprehensive lens through which to examine the complexities of AI's impact on women's empowerment. These theories are particularly relevant as they address the multifaceted ways in which gender, technology, and power intersect. The Feminist Technoscience Theory enables a critical analysis of how gendered biases influence the design, deployment, and consequences of AI systems, making it indispensable for understanding AI's role in perpetuating or challenging existing gender inequalities. Similarly, the Intersectionality Framework allows for a nuanced exploration of how women, especially those from marginalized backgrounds, experience AI differently based on their intersecting identities. This dual-theoretical approach provides a robust foundation for exploring not only the challenges women face in the AI landscape but also the potential avenues for empowerment, policy reforms, and technological advancements that are more inclusive and equitable. Thus, utilizing these frameworks ensures a well-rounded investigation of AI's impact on women's empowerment, highlighting the need for gender-sensitive and intersectional approaches in AI development and implementation.

CONCEPTUAL CLARIFICATIONS

AI as a Catalyst for Women's Educational Empowerment

Artificial Intelligence (AI) is increasingly being recognized as a powerful tool to bridge educational gaps for women, especially in underserved regions. In such areas, access to traditional educational institutions can be limited due to geographical, economic, or social barriers. AI-driven online learning platforms have emerged as a crucial solution to this problem. These platforms, which offer scalable and flexible learning opportunities, have made it possible for women, regardless of their location, to access a wealth of educational resources. According to the UNESCO (2023) report, AI provides personalized learning experiences that can accommodate the unique learning styles and needs of female students, ensuring that women are not excluded from educational opportunities. Additionally, AI-powered systems can tailor educational content to a learner's pace, allowing women to balance their educational pursuits with other responsibilities such as family and work. This is particularly critical in regions where traditional educational structures may not be accommodating to women's specific needs.

Beyond the realm of online learning, AI has also facilitated the growth of virtual mentorship programs. These programs connect women with experienced mentors, both locally and globally, who can offer guidance and advice on career development and personal growth. By utilizing AI to match mentees with suitable mentors based on shared interests and goals, these mentorship programs empower women and provide them with valuable professional networks. As emphasized by Olorunsola (2021), these programs have proven instrumental in narrowing the gender gap in leadership and academic fields by ensuring that women receive the support they need to navigate their educational and career paths. Furthermore, AI systems can monitor students' progress in real-time, allowing for personalized feedback that helps women improve their academic performance and increase their chances of success.

However, challenges remain in ensuring equitable access to AI-powered educational tools. The digital divide, which affects women disproportionately, continues to hinder many

from benefiting fully from AI-driven educational opportunities. In rural and remote areas, limited access to digital infrastructure and a lack of digital literacy prevent many women from accessing these resources. According to the UN Women (2022) report, women in low-income and developing countries often face a significant technological barrier, which makes it difficult for them to fully participate in the digital learning environment. Additionally, biases in AI algorithms may inadvertently reinforce existing gender inequalities, especially for women from marginalized backgrounds. Thus, addressing these challenges through policy interventions aimed at improving digital literacy and promoting equitable access to technology is vital to ensuring that AI's benefits are distributed fairly.

AI in Enhancing Women's Access to Healthcare

AI technologies hold great promise in improving women's healthcare, especially in addressing health issues that disproportionately affect them, such as reproductive health, maternal care, and personalized medicine. In the context of reproductive health, AI-powered diagnostic tools are revolutionizing the way conditions like breast cancer and cervical cancer are detected. These AI tools, which can analyze medical images and provide diagnostic insights, have been shown to improve early detection rates, significantly enhancing women's health outcomes. As noted by Nnamani and Bello (2021), AI systems can reduce the time and cost associated with traditional diagnostic methods, which is particularly beneficial in areas where healthcare infrastructure is limited. These systems allow for faster, more accurate diagnoses, thereby improving the chances of successful treatment for women who may not have access to specialist care.

In maternal healthcare, AI is being used to monitor the health of pregnant women and predict potential complications. AI-powered tools can track vital signs such as blood pressure and heart rate, alerting healthcare providers to signs of issues like preterm labor or gestational diabetes. These tools can be integrated into mobile applications, allowing women to monitor their health in real-time. According to a study by Adindu (2022), the use of AI in maternal healthcare has been associated with reduced maternal mortality rates by enabling timely interventions, especially in rural areas where healthcare access is often limited. These AI systems can also enhance the efficiency of healthcare delivery by reducing human error and ensuring that women receive the appropriate care throughout their pregnancy.

Despite the clear benefits of AI in healthcare, there are still significant challenges to be addressed. One major concern is the potential for algorithmic bias, which can lead to inaccurate diagnoses and unequal treatment, particularly when AI systems are trained on non-representative data. A study by Nwachukwu (2021) highlighted that AI systems often fail to account for the unique healthcare needs of women, especially those from marginalized communities, which may lead to disparities in health outcomes. Additionally, privacy and security concerns surrounding the use of AI in healthcare are particularly sensitive when it comes to women's health data. Iwuoha (2022) highlighted that there is a need for robust data protection policies and ethical guidelines to ensure that AI in healthcare does not infringe on women's privacy or lead to surveillance, particularly in conservative societies. Therefore, while AI holds great potential to transform women's healthcare, its implementation must be guided by ethical frameworks that ensure it is both effective and equitable.

Economic Opportunities Created by AI for Women

The integration of AI into various sectors has significantly transformed economic opportunities for women, particularly through digital marketplaces and remote work platforms. AI-driven tools have enabled women entrepreneurs to create and expand businesses online, with platforms such as Etsy and Shopify utilizing AI technologies to personalize product recommendations and optimize sales strategies. These tools have empowered women, especially in underserved regions, to break geographical and economic barriers that previously limited their market reach. As highlighted by Olorunsola (2021), AI-powered recommendation systems in digital marketplaces have enhanced the visibility of women-owned businesses, boosting income levels and providing access to global markets. Similarly, remote work platforms like Upwork and Fiverr have leveraged AI technologies to offer flexible work opportunities, which have been crucial for women balancing family and career responsibilities. According to Nwachukwu (2021), AI tools for project management and communication in remote work environments allow women to maintain professional commitments while working from home, thus fostering greater economic independence.

Furthermore, AI has played a significant role in narrowing the gender gap in technology and entrepreneurship. Programs aimed at teaching women AI-related skills, such as coding and data analytics, have grown significantly in recent years. These initiatives have opened doors for women in high-paying industries, such as tech and finance, and increased their participation in traditionally male-dominated sectors. For instance, initiatives by organizations like UN Women (2022) and UNESCO (2023) focused on equipping women with digital skills and creating networks to support women in tech. Such programs have been instrumental in helping women launch AI-powered businesses, which in turn have stimulated local economies and improved individual income levels. These findings emphasize the critical role that AI has played in creating economic opportunities for women, particularly in regions where access to traditional employment may be limited.

While AI has undoubtedly created new economic opportunities, challenges such as digital literacy gaps and unequal access to technology persist. Women in rural and low-income areas often face barriers to accessing AI-driven platforms due to limited technological infrastructure or education. However, initiatives that focus on addressing these barriers, such as subsidized internet access and digital literacy programs, have shown promise in helping women overcome these challenges. As AI continues to evolve, its potential to create economic opportunities for women, especially those from disadvantaged backgrounds will grow by contributing to greater gender equality in the workforce (Adindu, 2022).

Algorithmic Bias and Reinforcement of Gender Stereotypes

While AI offers immense potential for advancing gender equality, it also has the capacity to reinforce existing biases and gender stereotypes. One of the most concerning issues is the way AI algorithms, particularly in recruitment and hiring processes tend to perpetuate gender imbalances. Many AI systems are designed to learn from historical data, which often reflects past biases against women in certain professions. For instance, Olorunsola (2021) noted that AI algorithms used in recruitments can inadvertently favor male candidates by relying on biased training data, which tends to emphasize the hiring patterns of male-dominated industries. This has been a particular concern in fields such as technology, engineering, and finance, where

women have historically been underrepresented. Also, Nwachukwu (2021) pointed out that biases are not only limited to hiring practices but also extend to promotional opportunities, thereby restricting women's career progression in high status jobs.

In addition to recruitment biases, AI-driven financial services have been found to perpetuate gender disparities. Algorithms used to assess creditworthiness or determine loan eligibility can disadvantage women, especially those from low-income backgrounds, as these systems often reflect historical data that demonstrates lower average incomes among women. As Adindu (2022) explained, financial institutions that rely on biased data sets are more likely to reject loans for women entrepreneurs or limit their access to capital, further exacerbating gender inequality in business. This issue is compounded by the fact that women are often underrepresented in the data science and technology sectors, which leads to the creation of algorithms that fail to account for the diverse needs of women. According to UN Women (2022), a lack of gender sensitivity in AI design can have far-reaching consequences, not only for individual women but for entire economies by restricting women's access to essential financial resources.

Moreover, AI technologies used in the criminal justice system have also been criticized for reinforcing gender and racial stereotypes. Risk assessment algorithms used to predict recidivism or assess sentencing often reflect historical biases, disproportionately affecting women, particularly women of color. These biases are embedded in the data used to train AI systems, which typically over-represent male criminal behavior while under-representing female experiences in the criminal justice system. As Olorunsola (2021) noted, the result is a systemic disadvantage for women who encounter these algorithms in legal proceedings. Thus, while AI holds significant promise for promoting gender equality, it is crucial to address these biases to ensure that AI systems are designed to be fair and equitable for all genders.

AI, Surveillance, and Women's Privacy Rights

Artificial Intelligence (AI) is becoming an integral component of surveillance systems across the globe. The systems ranging from facial recognition technologies to behavioral prediction models are often implemented under the pretext of enhancing public safety or improving efficiency. However, while surveillance can serve legitimate security purposes, its expansion has also raised profound ethical and human rights concerns, particularly in relation to women's privacy and autonomy. This concern becomes more urgent when one considers that AI-driven surveillance technologies often inherit and amplify existing social biases, especially those based on gender, race, and class (Governance Now, 2024).

One of the most pressing challenges is the gendered bias embedded in AI-powered surveillance. Research has shown that facial recognition algorithms misidentify women, particularly women with darker skin tones, at disproportionately high rates. Joy Buolamwini's "Gender Shades" project, for instance, demonstrated error rates as high as 47% for dark-skinned women compared to less than 1% for light-skinned men (Buolamwini, 2018). Such inaccuracies can result in wrongful arrests, harassment, and misapplication of the law. Feminist technology scholars argue that these biases are not incidental but rather a reflection of the structural inequities present in the datasets used to train AI systems (MHEducation, 2024).

The risks extend beyond public space monitoring to deeply intimate areas of women's lives, such as reproductive health. In Texas, law enforcement reportedly employed a network of over 83,000 automated license plate reader (ALPR) cameras to track a woman suspected of self-

administering an abortion, extending surveillance across state borders into areas where such procedures remain legal (The Guardian, 2025a). Similarly, in Argentina, a controversial government-Microsoft initiative attempted to predict which teenage girls might become pregnant based on socioeconomic and ethnic data, raising fears of stigmatization and invasive monitoring of marginalized communities (Wired, 2018). Such uses of AI not only violate women's privacy but also risk reinforcing discriminatory stereotypes.

Another dimension of the privacy threat is found in the booming FemTech sector, which offers mobile applications for tracking menstrual cycles, fertility, and other reproductive health indicators. A recent study assessing 45 women's health applications revealed significant privacy vulnerabilities, including excessive permissions, extensive collection of sensitive medical data, integration of multiple third-party trackers, and privacy policies that failed to meet basic data protection standards (Arxiv, 2025). These weaknesses expose users to data exploitation, particularly in political contexts where reproductive rights are under threat.

AI surveillance also facilitates new forms of gender-based violence, such as the creation and distribution of deepfake pornography. Many victims have been forced to go offline to escape harassment, illustrating how AI-enabled abuse can curtail women's freedom of expression and participation in digital spaces. Even outside explicitly harmful contexts, AI systems have been found to disadvantage women through subtle forms of bias. For example, an AI tool known as "Gemma," used by local councils in England to assess social care needs, was found to describe men using more severe health-related terms than identically presented women, potentially reducing the level of care women received (The Guardian, 2025b).

These realities point to significant gaps in existing privacy and data protection laws. While frameworks such as the General Data Protection Regulation (GDPR) emphasize consent, data minimization, and protection, they often fail to address the unique risks posed by AI's gender bias in both training data and outcomes (WomenTech, 2024). In response, experts recommend measures such as mandatory bias audits, transparency in training data, and harmonized global regulations (Woungnet, 2024). The European Union's AI Act, which proposes restrictions on real-time biometric surveillance in public spaces, represents a step toward stronger protections (European Commission, 2024).

Civil society and feminist technology advocates are also taking action. Joy Buolamwini's Algorithmic Justice League has campaigned for ethical AI through initiatives like the Safe Face Pledge, prompting major technology companies to revise or discontinue biased facial recognition systems (Buolamwini, 2018). Such interventions highlight the importance of inclusive AI governance, where women play a central role in designing, regulating, and auditing AI systems to ensure they safeguard privacy and uphold human rights (WomenTech, 2024).

The intersection of AI, surveillance, and women's privacy rights represents a critical frontier in human rights advocacy. The dangers range from misidentification and reproductive surveillance to FemTech exploitation, deepfake abuse, and biased public services. Women, especially those from marginalized communities, are disproportionately vulnerable to these harms. Addressing these risks will require AI-specific legal safeguards, ethical design principles, rigorous external audits, and gender-aware leadership. Without such measures, the expansion of AI in surveillance threatens not only women's privacy but the broader principles of equality and justice.

INEQUITABLE ACCESS AND DIGITAL LITERACY CHALLENGES

The rapid expansion of artificial intelligence (AI) technologies has ushered in transformative possibilities across various sectors, yet its benefits remain unevenly distributed due to a persistent digital divide that disproportionately affects women, especially in developing and underserved regions. Inequitable access to digital tools, combined with insufficient digital literacy, continues to hinder many women from leveraging AI for personal development, education, healthcare, and economic empowerment. Despite ongoing global initiatives promoting digital inclusion, significant challenges persist that are deeply rooted in structural inequalities, socio-economic limitations, cultural dynamics, and infrastructural gaps (Ololube et al., 2024). Understanding the specific barriers contributing to digital literacy disparities is essential for formulating effective strategies that ensure inclusive digital participation. This section explores five core factors, such as, socio-cultural norms, infrastructural limitations, non-responsive educational curricula, economic constraints, and language barriers that perpetuate the gendered digital divide, while proposing actionable solutions tailored to bridging these gaps and fostering equitable engagement with AI technologies:

Socio-Cultural Norms and Gender Biases

Persistent socio-cultural attitudes that prioritize male access to technology and education have long impeded women's digital literacy. In many conservative and patriarchal communities, women are discouraged from interacting with technology due to societal expectations or fears of moral compromise. UN Women (2022) reported that in regions such as sub-Saharan Africa and parts of South Asia, cultural beliefs significantly limit girls' participation in digital learning programs. To address this, community-led sensitization campaigns and inclusive policy dialogues should be launched to challenge restrictive norms. Initiatives that showcase successful female tech role models and embed digital skills within culturally accepted programs for women can help dismantle these barriers and foster greater acceptance of female digital engagement.

Infrastructural Limitations in Rural and Low Income Areas

Lack of infrastructure, including reliable internet, electricity, and digital devices, significantly hinders women's access to AI-driven opportunities, especially in rural settings. According to the International Telecommunication Union (2021), women in low income and remote communities are 17% less likely to use the internet than men. This disparity is exacerbated by inadequate investment in rural connectivity. Governments and private sectors must collaborate to expand broadband infrastructure and introduce solar-powered community tech centers. Equipping schools and community hubs with shared digital resources would also serve as a cost-effective bridge to empower women and girls with essential technological access and literacy.

Non-Responsive Educational Systems and Outdated Curricula

Traditional education systems in many countries lack integration of digital literacy and emerging technologies into school curricula, which leaves many women and girls unprepared to engage with AI tools. As noted by the Global Partnership for Education (2023), less than 40% of public secondary schools in developing countries offer structured ICT training. To close this gap,

educational policies should mandate the inclusion of digital competence modules from early schooling, with a gender sensitive approach that ensures female participation. In addition, teacher capacity development programs should be enhanced to enable educators to teach AI-relevant skills and foster environments that encourage equal engagement from both genders.

Economic Constraints and Affordability Challenges

Economic inequality restricts women's ability to afford digital devices, data subscriptions, or participate in digital training programs. Research by UNESCO (2023) showed that women in informal sectors often prioritize household and survival expenses over acquiring technological tools or skills, thereby widening the digital literacy gap. To counter this, targeted subsidy schemes and scholarship initiatives should be implemented to provide affordable access to devices, internet services, and certified training for low-income women. Public-private partnerships can also launch micro-grant programs for women-led digital startups and mobile-based literacy tools tailored to budget-friendly usage patterns (Ololube, 2025; Cheta-Maclean et al., 2025).

Language and Content Accessibility Barriers

The dominance of AI platforms and educational content in global languages especially English creates another layer of exclusion for women who are not proficient in these languages. This linguistic barrier disproportionately affects women from minority and indigenous communities who often lack digital content in their native dialects. As highlighted in a report by the Alliance for Affordable Internet (2022), only 18% of online content is available in local languages across the Global South. Developing multilingual AI interfaces and promoting content localization are vital steps toward inclusion. Governments and content developers should invest in AI translation tools, culturally adaptive learning resources, and collaborate with linguists to ensure that digital education and tools are linguistically and contextually relevant.

ETHICAL AI AND THE PROMOTION OF GENDER INCLUSIVITY

The development of ethical AI systems is crucial to ensuring that AI technologies are designed in a way that promotes gender inclusivity. The framework for ethical AI requires accountability, transparency, and fairness. One essential factor in achieving these ideals is the involvement of diverse teams in AI development, as research has shown that teams from varied backgrounds create more equitable outcomes (Gorski, 2020). Additionally, the data sets used to train AI systems must reflect diverse populations to avoid reinforcing existing biases and discriminatory practices. When AI algorithms are trained on data that underrepresents women, or certain ethnic and cultural groups, the resulting systems are prone to perpetuating harmful stereotypes (Smith & Ogbogu, 2021). As such, creating inclusive data sets is pivotal in shaping AI that accurately represents and serves the needs of all individuals, particularly women.

Furthermore, ethical AI frameworks emphasize the importance of developing policies and guidelines that mandate the inclusion of gender perspectives at every stage of AI development, from design to implementation. Leading global organizations such as the IEEE (Institute of Electrical and Electronics Engineers) and UNESCO have recommended the creation of guidelines for AI systems that encourage fairness and inclusion, ensuring that women and

other marginalized groups benefit equitably from technological advancements (UNESCO, 2023). The role of inclusive AI development is particularly important in sectors like healthcare and finance, where biased algorithms can exacerbate existing gender inequalities.

For AI systems to truly serve everyone, the ethical frameworks guiding them must prioritize gender inclusivity, acknowledging the lived experiences of women in various contexts. Therefore, there is a growing recognition that AI development must include voices from women and other underrepresented groups in leadership and governance roles. Diverse leadership within the AI industry helps ensure that ethical concerns, particularly those related to gender, are adequately addressed. It has been noted that the presence of women in AI leadership positions correlates with increased attention to issues like gender bias in AI models (Wagner, 2020). Therefore, increasing the representation of women in the governance of AI technologies is essential for promoting ethical practices that lead to equitable outcomes for all.

Representation of Women in AI Development and Governance

The representation of women in AI development and governance roles remains alarmingly low, despite significant progress made toward gender equality in many fields. Women are still underrepresented in the technology sector, particularly in AI, where the gap is even more pronounced. According to recent studies, women make up only about 22% of the global workforce in AI, with even lower representation in leadership roles (Madhok & Yadav, 2021). This disparity can be attributed to several factors, including gender stereotypes, societal expectations, and the lack of accessible opportunities for women in the tech industry. These barriers are not only limiting women's career progression in AI but also influencing the development and governance of AI systems in ways that may not reflect the needs of women.

A significant challenge for women in AI is the lack of mentorship and networking opportunities that are often more readily available to their male counterparts (Williams, 2021). The tech industry, especially in AI, has historically been male-dominated, creating an environment where women face both systemic and social barriers to advancement. Women are less likely to be promoted to senior positions in AI companies or organizations, limiting their influence in decision-making processes that could ensure the creation of gender-sensitive AI systems. Moreover, the exclusion of women from the decision-making process contributes to the reinforcement of gender biases and the lack of gender-inclusive design in AI technologies.

The implications of these disparities are profound. When women are not adequately represented in AI development and governance, the technologies created may fail to address their specific needs and concerns, leading to a lack of trust and engagement among female users. Furthermore, without female perspectives, AI technologies are more likely to perpetuate gender inequalities and bias, as women's experiences and needs are often sidelined. The lack of women in leadership positions also results in missed opportunities for women to advocate for policies and practices that promote inclusivity in AI design. Closing the gender gap in AI development and governance is crucial not only for enhancing the technology itself but also for ensuring that AI can truly serve the needs of all people, regardless of gender.

Efforts to increase women's representation in AI are already underway, with many organizations and initiatives focused on mentoring women, offering scholarships, and supporting gender-diverse teams. Prominent tech companies and academic institutions have committed to increasing diversity within AI and other STEM fields, acknowledging that diverse teams are more likely to produce innovative and equitable solutions (Madhok & Yadav, 2021). However,

for these efforts to have a lasting impact, systemic changes are needed to break down the social, economic, and institutional barriers (Ololube et al., 2013) that limit women's participation in AI and technology development. When there is increase in the representation of women in AI, the field will become more inclusive and responsive to the needs of diverse populations, which will eventually lead to more ethical and effective AI technologies.

Cultural and Geopolitical Contexts in Sub-Saharan Africa

The cultural and geopolitical terrain of Sub-Saharan Africa significantly shapes the adoption and outcomes of artificial intelligence (AI) initiatives, particularly as they pertain to women's empowerment. Within many communities, longstanding patriarchal structures continue to influence social norms and gender expectations, thereby limiting the extent to which women engage with AI technologies. These socio-cultural constraints, compounded by religious and ethnic traditions, affect women's freedom to explore digital tools for education, entrepreneurship, and civic engagement. For instance, in rural areas where male dominance is more pronounced, access to AI-related infrastructure is often prioritized for men, subtly reinforcing existing inequalities. UNESCO (2023) emphasized that while AI presents immense potential for development, the unequal access driven by cultural norms continues to sideline women from benefiting equally. Furthermore, UN Women (2022) noted that the widespread perception of technology as a male domain perpetuates gender stereotypes, thereby impeding women's agency in digital spaces.

Variability in policy responses across the region further deepens gender disparities in AI adoption. Some countries, like Rwanda and Kenya, have made commendable strides by introducing AI policy frameworks that emphasize inclusivity and gender equity. However, in many other Sub-Saharan nations, there remains a lack of coherent strategy to ensure women are not only consumers but also contributors to AI ecosystems. Fragmented governance, coupled with bureaucratic inertia, undermines the establishment of gender-sensitive digital policies. Aina (2020) argued that national digital agendas in the region often overlook the social dimensions of technological integration, especially the nuances of women's experiences. Also, Chigudu (2021) observed that political instability and weak institutional coordination deter long-term investment in inclusive technological education and infrastructure.

Beyond formal policies, grassroots initiatives are instrumental in navigating the cultural and geopolitical challenges that hinder women's access to AI. Civil society organizations and local women-led tech hubs are increasingly creating pathways for women to develop digital competencies. These efforts are tailored to the socio-cultural realities of communities, ensuring they resonate with local values while challenging restrictive gender norms. Programs such as Nigeria's "TechHerNG" and Ghana's "FemInTech" provide digital literacy and AI skills training specifically designed for women who have been marginalized by mainstream educational and economic systems. Ekeanyanwu and Edewor (2019) asserted that such community-based interventions foster not only skills acquisition but also shifts in societal attitudes towards women's roles in technology. UNDP (2021) also emphasized the importance of local engagement in building trust and facilitating the integration of gender-inclusive AI practices.

Nonetheless, substantial hurdles remain in realizing equitable access to AI across Sub-Saharan Africa. Many women, especially in rural and underserved areas, continue to grapple with infrastructural deficiencies such as unreliable electricity, poor internet connectivity, and high costs of digital devices. These structural barriers, when coupled with low levels of digital

literacy, create a formidable obstacle to women's full participation in AI-driven economies. Kalejaiye (2021) found that without targeted interventions, the digital divide is likely to widen, further entrenching gender-based inequities. While acknowledging these challenges, UNESCO (2023) recommended a collaborative multi-stakeholder approach, involving policymakers, private sector actors, and community leaders, to design culturally responsive strategies that prioritize women's inclusion in AI ecosystems.

Intersectionality in AI and Women's Empowerment

Recognizing the multiplicity of women's identities is essential to understanding the complex ways in which AI technologies influence their lived experiences. The concept of intersectionality draws attention to how gender intersects with other social categories such as race, ethnicity, class, and disability to shape individual experiences of inequality. In the context of AI, technologies that are not developed with an awareness of these intersecting factors risk exacerbating exclusion and discrimination. AI-driven systems such as facial recognition, health diagnostics, and predictive analytics have shown patterns of bias against women from marginalized groups. UN Women (2022) explained that the failure to consider overlapping identities in algorithm design results in tools that are not only inaccurate but potentially harmful. Similarly, Williams (2020) highlighted how women from lower socio-economic classes in Nigeria face compounded disadvantages due to systemic bias in data representation.

The development of AI systems is heavily dependent on the quality and inclusiveness of datasets, yet these datasets often lack representation of diverse populations. Data used to train algorithms are frequently skewed toward dominant groups, resulting in outputs that do not reflect the realities of underrepresented users. In predictive policing or hiring algorithms, for instance, women of color or women with disabilities are more likely to be misclassified or unfairly assessed. Aina (2020) observed that financial AI systems in Nigeria tend to exclude informal market women because their economic activities are poorly captured in formal data registries. UNESCO (2023) warned that this form of algorithmic invisibility reproduces historical patterns of marginalization and creates new layers of digital disenfranchisement.

To mitigate these issues, it is imperative to ensure that development teams for AI systems include individuals from varied backgrounds and identities. Diverse design teams are more likely to recognize bias and design more inclusive technologies. UNDP (2021) asserted that promoting diversity in AI-related education and career pipelines is essential for cultivating inclusive innovation ecosystems. Williams (2020) advocated for educational reforms that integrate intersectionality into computer science and AI curricula to sensitize future developers to the implications of their design choices. Such inclusion fosters greater awareness of ethical responsibilities and broadens the capacity of AI to serve a wider spectrum of users fairly and effectively.

Integrating intersectionality into AI policy and governance structures is a critical step toward developing technologies that empower all women, not just those from privileged social groups. This entails embedding intersectional perspectives into AI guidelines, regulatory frameworks, and funding priorities to ensure systemic inclusivity. Williams (2020) stressed that policy interventions must be contextually grounded, addressing specific regional and cultural dimensions of marginalization. UN Women (2022) reinforced that ethical AI must be designed with social justice at its core, ensuring that its applications challenge rather than reinforce

existing inequalities. Only by fully embracing intersectionality can AI be harnessed as a truly empowering tool for women across all identities and communities.

CONCLUSION

In conclusion, this paper has critically examined the multifaceted role of artificial intelligence (AI) in shaping the trajectory of women's empowerment, particularly within the African context. It has illuminated AI's potential to bridge long-standing gender gaps through improved access to education, healthcare, economic participation, and inclusive governance, while simultaneously acknowledging the risks posed by algorithmic bias, surveillance, and digital exclusion. The discussion underscores that AI, though a powerful enabler can reinforce existing inequalities if not governed by ethical standards and inclusive practices. Ethical frameworks that center on gender sensitivity, the inclusion of diverse voices in AI development, and equitable access to digital infrastructure are essential to ensure that AI serves as a tool for liberation rather than marginalization. To harness AI's transformative capacity sustainably, stakeholders must commit to inclusive policy-making, investment in digital literacy for women, and deliberate efforts to dismantle socio-cultural barriers that hinder technological equity.

Suggestions

Drawing upon empirical evidence from global gender-focused AI frameworks, African digital inclusion initiatives, and national education and innovation policies, this study proposes five targeted suggestions to responsibly harness AI for women's empowerment:

- The National Information Technology Development Agency (NITDA) must mandate the inclusion of women in AI regulatory and ethics committees, aligning with Nigeria's National Artificial Intelligence Policy Framework for inclusive governance.
- The Federal Ministry of Communications, Innovation and Digital Economy should integrate gender-responsive budgeting and impact assessments into all AI policy reforms to reflect commitments under the Nigeria Digital Gender Inclusion Strategy.
- The Federal Ministry of Education needs to expand access to women-focused digital skills training by scaling programs like the Girls in ICT Initiative promoted by the International Telecommunication Union (ITU) and adopted in several Nigerian states.
- The United Nations Educational, Scientific and Cultural Organization (UNESCO) and UN Women ought to collaborate with African universities and startups to co-develop gender-inclusive AI research projects using open, accountable, and bias-audited data systems.
- The Economic Community of West African States (ECOWAS) Commission should provide regional funding and coordination for multi-sectoral AI projects that promote women's entrepreneurship and health access, building on the ECOWAS Gender Strategy (2020–2030).

FUTURE RESEARCH DIRECTION

Despite the increasing scholarly attention on artificial intelligence (AI) and gender equity, critical gaps persist in the literature that demands a more argued and sustained research agenda.

Most current studies offer short-term or surface-level insights, often confined to technological capacities without delving into the deeper societal and gendered implications of AI systems. There is a pressing need for interdisciplinary and intersectional research that bridges computer science, gender studies, economics, and policy development, particularly in the context of Sub-Saharan Africa where the sociocultural, economic, and digital landscapes uniquely shape women's experiences with technology. Future research should prioritize longitudinal studies on the long-term impact of AI on women's labour participation, comparative cross-cultural evaluations of gender-sensitive AI policies, investigations into gender differences in trust and adaptation of AI systems, and targeted assessments of AI literacy among rural women. These efforts are especially crucial in Sub-Saharan Africa to ensure inclusive, equitable, and context-responsive technological advancement. In sum, future research must go beyond technological efficacy and embrace a more holistic understanding of how gender, geography, and socioeconomic status interact with AI. Filling these gaps will ensure that AI development and deployment truly contribute to sustainable and equitable empowerment for women globally.

REFERENCES

- Adeleke, O., & Bassey, A. (2021). Gender bias in artificial intelligence systems: A critical review of algorithmic discrimination in the workplace. *Journal of African Technological Advancement*, 5(2), 45-59.
- Adindu, O. (2022). Gendered perspectives on AI and economic empowerment in Sub-Saharan Africa. *Journal of African Technology and Development*, 14(3), 45-62.
- Afolayan, T., & Nwafor, C. (2020). Intersectionality and digital inequality: A feminist critique of technology policy in Sub-Saharan Africa. *African Journal of Gender and Development*, 12(3), 101-119.
- Aina, O. I. (2020). *Women, culture and society in Africa: A review of contemporary challenges*. Ibadan University Press.
- Alliance for Affordable Internet. (2022). *Meaningful connectivity: A new target to raise the bar for internet access*. <https://a4ai.org/meaningful-connectivity>.
- Arxiv. (2025). *Privacy risks in women's health apps: An empirical study*. <https://arxiv.org/abs/2502.02749>
- Ayo, C. K., & Folorunso, O. (2019). Digital transformation in Africa: Harnessing AI for inclusive development. *African Journal of Science, Technology, Innovation and Development*, 11(4), 517-526. <https://doi.org/10.1080/20421338.2018.1550993>.
- Binns, R. (2021). *Artificial intelligence and its impact on society: From challenges to opportunities*. Oxford University Press.
- Buolamwini, J. (2018). *Gender shades: Intersectional accuracy disparities in commercial gender classification*. Algorithmic Justice League.
- Buolamwini, J., & Gebru, T. (2018). *Gender shades: Intersectional accuracy disparities in commercial gender classification*. Proceedings of the 1st Conference on Fairness, Accountability, and Transparency, 77-91. <https://doi.org/10.1145/3287560.3287598>.
- Cheta-Maclean, S., Ananyi, S. O., & Ololube, N. P. (2025). Public-private partnership dynamics and the role of institutional leadership in Nigeria's public universities economic development. In N. Baporikar (Ed.), *Public Private Partnership Dynamics for Economic Development* (pp. 289-322). Information Science Reference (an Imprint of IGI Global). DOI: 10.4018/979-8-3693-9153-2.ch014.

- Chigudu, D. (2021). Gendered dimensions of artificial intelligence in Sub-Saharan Africa: Policy gaps and prospects. *Journal of African Gender Studies*, 7(2), 23–39.
- Chin, R. (2022). The role of AI in empowering women in education and health: Opportunities and challenges. *Journal of Technology and Gender*, 12(3), 45-61. <https://doi.org/10.1016/j.jtg.2022.04.004>.
- Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, 1989(1), 139-167.
- Dastin, J. (2018, October 10). *Amazon scrapped AI recruiting tool that showed bias against women*. <https://www.reuters.com/article/us-amazon-com-jobs-automation-idUSKCN1MK08G>.
- Ekanem, T., & Adewale, S. (2022). Biometric exclusions and digital identity politics: Examining AI misclassification in Nigerian public services. *Journal of Technology and Society in Africa*, 8(1), 66-83.
- Ekeanyanwu, N. T., & Edewor, N. (2019). Exploring gender disparity in emerging AI ecosystems in Nigeria. In A. O. Abiola & T. Okon (Eds.), *Technology, Culture and Communication in Africa* (pp. 178-195). Lagos: University of Lagos Press.
- European Commission. (2024). *Artificial Intelligence Act*. https://en.wikipedia.org/wiki/Artificial_Intelligence_Act.
- Global Partnership for Education. (2023). *Technology and digital learning in education systems*. <https://www.globalpartnership.org/content/technology-and-digital-learning-education-systems>.
- Gorski, P. (2020). Equity and inclusion in tech development: The case for intersectional ethics. *Journal of Technological Equity*, 12(2), 45-60.
- Governance Now. (2024). *AI surveillance comes with inherent bias*. <https://www.governancenow.com/views/columns/ai-surveillance-comes-with-inherent-bias>.
- Haraway, D. (1991). *Simians, cyborgs, and women: The reinvention of nature*. Routledge.
- Harding, S. (2008). *Sciences from below: Feminisms, postcolonialities, and modernities*. Duke University Press.
- International Telecommunication Union. (2021). *Measuring digital development: Facts and figures 2021*. <https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx>.
- Iwuoha, V. C. (2022). Cultural determinants and AI adoption in rural African communities: Implications for women's empowerment. *Journal of African Political Economy & Development*, 7(1), 41-59.
- Kabeer, N. (2019). *Gender equality, women's empowerment, and the role of digital technology*. Cambridge University Press.
- Kalejaiye, P. O. (2021). Gender inclusivity in Nigeria's digital economy: The role of policy and education. *Nigerian Journal of Social and Development Issues*, 11(2), 66-82.
- Madhok, S., & Yadav, B. (2021). *Women in artificial intelligence: Participation, power and policy*. In O. Eze & B. Omotosho (Eds.), *Gender equity in the digital economy: African perspectives* (pp. 183-201). Ibadan University Press.
- MHEducation. (2024). *Tech's tangled web: Intersectionality and surveillance in AI*. <https://www.mheducation.com/highered/blog/2024/06/tech-s-tangled-web-intersectionality-and-surveillance-in-ai.html>.

- Nnamani, K., & Bello, R. (2021). AI and women's empowerment: A localized study of digital literacy gaps in Southeastern Nigeria. *Journal of African Women in Science and Technology*, 6(4), 77-94.
- Nwachukwu, O. (2021). AI in healthcare: Gender implications and biases in medical diagnostics. *International Journal of Health Informatics*, 10(2), 92-104.
- Ogunyemi, B., & Okere, C. (2018). Postcolonial technoscience and African feminism: The politics of inclusion in Nigeria's digital future. *African Journal of Science, Technology and Society*, 4(2), 34-50.
- Okon, I., & Ibukun, D. (2020). Ethical frameworks and inclusive design in Sub-Saharan AI policy: A feminist technoscience perspective. *Journal of Public Policy and Technology*, 3(1), 53-70.
- Ololube, N. P. (2025). Public-private partnership dynamics for economic development of Nigeria. In N. Baporikar (Ed.), *Public Private Partnership Dynamics for Economic Development* (pp. 105-130). Information Science Reference (an Imprint of IGI Global). DOI: 10.4018/979-8-3693-9153-2.ch006.
- Ololube, N. P., Cheta-Maclean, S., & Ananyi, S. O. (2024). Infrastructure development strategies for empowerment and inclusion in Nigerian public universities. In N. Baporikar (Ed.), *Infrastructure development strategies for empowerment and inclusion* (pp. 38-66). Information Science Reference (an Imprint of IGI Global). DOI: 10.4018/979-8-3693-2917-7.ch003.
- Ololube, N. P., Uriah, O. A., & Agbor, C. N. (2013). The nature of social change and its implications for educational management and planning. *International Journal of Educational Foundations and Management*, 1(1), 49-58.
- Olorunsola, D. (2021). Virtual mentorship programs for women: Exploring the role of AI in narrowing the gender gap in education and leadership. *Journal of Gender and Education*, 18(4), 112-124.
- Smith, B., & Ogbogu, C. (2021). Algorithmic decision-making and the inclusion of women: Challenges and policy recommendations. *Journal of African AI and Society*, 6(1), 21-35.
- The Guardian. (2025a). *A dystopian surveillance fear has become reality in Texas*. <https://www.theguardian.com/commentisfree/2025/may/31/a-dystopian-surveillance-fear-has-become-reality-in-texas>.
- The Guardian. (2025b). *AI tools used by English councils downplay women's health issues*. <https://www.theguardian.com/technology/2025/aug/11/ai-tools-used-by-english-councils-downplay-womens-health-issues-study-finds>.
- UN Women. (2021). *Women in the digital economy: Bridging the gender gap*. UN Women. <https://www.unwomen.org/en/digital-economy>.
- UN Women. (2022). *Gender equality and digital technology: An urgent call to close the digital divide*. <https://www.unwomen.org/en/news-stories/feature-story/2022/03/closing-the-gender-digital-divide>.
- UNDP. (2021). *Bridging the gender digital divide in Africa: An urgent call for equitable AI*. United Nations Development Programme. <https://www.undp.org/publications/ai-and-gender-africa>.
- UNESCO. (2022). *AI for gender equality: Transforming technology to empower women and girls*. UNESCO. <https://www.unesco.org/en/ai-gender-equality>.

- UNESCO. (2023). *Artificial intelligence and gender equality: Key challenges and policy recommendations*. United Nations Educational, Scientific and Cultural Organization. <https://unesdoc.unesco.org/ark:/48223/pf0000384212>.
- Wagner, A. (2020). *The importance of diversity in artificial intelligence leadership*. *Ethics and Information Technology*, 22(3), 175-188.
- West, S. M., Whittaker, M., & Crawford, K. (2019). *Discriminating systems: Gender, race, and power in AI*. Data & Society Research Institute. https://datasociety.net/pubs/ia_ds_discriminating_systems_2019.pdf.
- Williams, A. E. (2020). Intersectionality, technology, and African women: Navigating overlapping barriers in digital innovation. *Journal of Gender, Technology and Development*, 24(3), 302-319.
- Williams, O. (2021). Navigating gender barriers in African technology sectors: Pathways to leadership and representation. *African Journal of Gender and Development*, 18(4), 93-110.
- Wired. (2018). *Argentina's controversial teen pregnancy prediction program*. <https://www.wired.com/story/argentina-algorithms-pregnancy-prediction>.
- WomenTech. (2024). *Are current privacy laws sufficient to combat gender bias in AI?* <https://www.womentech.net/en-ph/how-to/are-current-privacy-laws-sufficient-combat-gender-bias-in-ai>.
- Wougnet. (2024). *Gendered aspects of artificial intelligence and its impact on data protection for women and girls in Africa*. Retrieved from <https://wougnet.org/gendered-aspects-of-artificial-intelligence-ai-and-its-impact-on-data-protection-for-women-and-girls-in-africa/>.
- Zwitter, A. (2020). The ethics of surveillance and privacy in AI systems: Challenges for women in the digital age. *International Journal of Digital Ethics*, 8(2), 107-123.