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Attitudes, Perceptions, and Challenges Towards Artificial Intelligence Adoption in Ghana and Nigeria: A Systematic Review with a Narrative Synthesis

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Abstract

Artificial Intelligence (AI) is increasingly pivotal in driving global economic growth and technological advancement. However, there is a significant disparity in AI adoption, particularly in Ghana and Nigeria, where unique opportunities and challenges exist for integrating AI technologies. This paper aims to synthesise current literature on attitudes towards AI in Ghana and Nigeria, examining awareness levels, perceptions, and factors influencing AI adoption across various sectors. A systematic search was conducted using PubMed, Scopus, Medline, and Google Scholar databases. Following inclusion criteria and study objectives, 28 published articles from 2000 to 2023 were included in this narrative review. We found that attitudes towards AI in Ghana and Nigeria vary across sectors and demographics. There is generally a positive perception in education and healthcare, with high enthusiasm for AI's potential benefits. However, scepticism persists, particularly in financial sectors, due to security concerns. Key factors influencing AI perceptions include trust, social influence, and perceived usefulness. Challenges to AI adoption include limited infrastructure, insufficient technical expertise, and varying digital literacy levels, especially in rural areas. While enthusiasm for AI exists in Sub-Saharan Africa, particularly in education and healthcare, significant challenges remain. Policymakers must focus on developing comprehensive AI strategies that enhance digital infrastructure, integrate AI education, establish appropriate regulatory frameworks, and encourage public-private partnerships to foster responsible AI adoption aligned with local needs and development goals.

Keywords: artificial intelligence, attitudes, perceptions, technology adoption, Ghana, nigeria, systematic review.

1. Introduction

Artificial intelligence (AI) is increasingly pivotal in driving economic growth, technological advancement, and social transformation globally (Qin et al., 2023). Generally, AI encompasses technologies such as machine learning, natural language processing, and robotics, which enhance machines' abilities to perform tasks requiring human intelligence (Soori et al., 2023). Despite global enthusiasm, there is a significant disparity in AI adoption, particularly in Sub-Saharan Africa (Ade-Ibijola, Okonkwo, 2023). This region presents unique opportunities and challenges for integrating AI technologies, influenced by cultural, educational, and economic factors (Ade-Ibijola, Okonkwo, 2023). Understanding attitudes towards AI in Sub-Saharan Africa, specifically in growing digital economies like Ghana and Nigeria, is essential for formulating effective policies to harness

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AI's potential for sustainable development (Adigwe et al., 2024; Bello et al., 2023; Edzie et al.,2023; Eiriemiokhale et al., 2023; Ibrahim et al.,2024; Muhammad et al.,2023; Uzir et al., 2023).

Ghana and Nigeria's engagement with AI, like several Sub-Saharan African countries, is shaped by a combination of technological infrastructure, educational levels, and governmental policies (Ade-Ibijola, Okonkwo, 2023; Eiriemiokhale et al., 2023; Ibrahim et al.,2024; Muhammad et al.,2023; Uzir et al., 2023). Despite a burgeoning digital landscape, these countries face significant challenges, including limited access to high-quality data, insufficient technical expertise, and underdeveloped infrastructure (Ahmed et al., 2023; Muhammad et al., 2023; Uzir et al., 2023). These hurdles impede the widespread adoption of AI technologies. Moreover, public perception and acceptance of AI are critical to its successful implementation (Baidoo-Anu et al., 2024; Gerlich, 2023; Mustapha et al., 2024; Nyarko, 2024; Uzir et al., 2023). Attitudes towards AI range from optimism about its potential to drive economic growth and solve local problems to concerns about job displacement, privacy issues, and ethical implications (Ade-Ibijola, Okonkwo, 2023; Suleiman, 2024). For instance, in countries like Nigeria, there is growing enthusiasm for AI-driven solutions in agriculture and healthcare (Ade-Ibijola, Okonkwo, 2023). However, scepticism remains prevalent, particularly in rural areas where digital literacy is low and fears about AI replacing human jobs are high (Aderibigbe et al., 2023; Ogolodom et al., 2023). Examining the attitudes of various stakeholders, including policymakers, educators, entrepreneurs, and the general populace, is imperative for fostering an environment conducive to AI innovation. Policymakers must navigate these attitudes carefully to create supportive regulatory frameworks, while educators and entrepreneurs need to address both the opportunities and concerns associated with AI.

Notwithstanding these concerns, positive attitudes towards AI correlate with its successful adoption and integration into society (Cao et al., 2021). In developed countries, research has shown that awareness and education about AI significantly contribute to a more favourable disposition towards its use across various sectors, such as healthcare, education, and finance (Fadel et al., 2019). Sub-Saharan Africa's diverse cultural landscape and varying levels of economic development necessitate a tailored approach. In this region, the perception of AI can vary widely depending on local contexts, such as urban versus rural settings or countries with different stages of technological advancement (Ade-Ibijola, Okonkwo, 2023). Addressing these varied perceptions requires targeted awareness campaigns, education programs, and policy initiatives that resonate with local realities. Thus, a nuanced understanding of regional attitudes towards AI is crucial for devising strategies that promote its acceptance and effective utilisation.

Besides, the literature emphasizes contextualising AI to local needs, involving technological adaptation and fostering a positive societal outlook (Alhosani,Alhashmi, 2024). Previous studies in Sub-Saharan Africa highlight AI's potential to address critical issues like healthcare delivery, agricultural productivity, and educational access (Kudama et al., 2021; Owoyemi et al., 2020). The success of these initiatives depends on prevailing attitudes towards technology. Thus, this systematic review aims to synthesise existing evidence on attitudes towards AI in Ghana and Nigeria, identifying key attitudes, perceptions, and challenges to inform policymakers, researchers, and practitioners in promoting AI for sustainable development in the region.

2. Material and methods

Systematic Review Approach

This study adopted a systematic review approach, employing the narrative synthesis method as described by Popay et al. (2006). The focus was on identifying, extracting, and synthesizing data related to artificial intelligence (AI), knowledge, and awareness in sub-Saharan Africa.

Literature Search Strategy

A comprehensive literature search was conducted across several major databases, including PubMed, Scopus, and Medline, using a combination of search terms such as "Artificial Intelligence," "AI," "Knowledge," "Awareness," "Understanding," "Attitude," and "Perceptions." An additional search was performed on Google Scholar to capture studies that were not indexed in the primary databases. The search was confined to studies conducted in Ghana and Nigeria, published in English, and spanning the period from January 2000 to July 2024. Studies conducted outside these countries, in languages other than English, or before 2000 were excluded.

Study Selection and Data Extraction

After the initial search, reference lists of relevant systematic reviews were screened to identify additional studies that met the inclusion criteria. A total of 28 studies were selected for inclusion in this review. Data extraction was conducted by two authors (EKA and PM) using a standardised Microsoft Excel template under the supervision of JOS. To ensure accuracy and comprehensiveness, GT-D, a chartered librarian and expert in information science, provided technical support and performed an expert review of the extracted data and themes.

Data Categorisation and Synthesis

The studies were systematically categorized into coherent themes or groups, facilitating a structured analysis. The narrative synthesis process involved an in-depth exploration of the findings within each category, examining the interrelationships and identifying potential sources of variation among the studies. This iterative process led to the identification of overarching themes, contributing to a holistic understanding of attitudes toward artificial intelligence in sub-Saharan Africa. A detailed search strategy is provided in Table 1, and the record screening process is illustrated in Figure 1.

Quality Assessment

We assessed the quality of the included studies using simple criteria based on appropriate and published checklists (Page et al., 2018). We assessed the studies on their methodologies and their interpretations of findings. Additionally, the quality of the included studies was rigorously assessed using an enhanced framework based on well-established checklists by the Critical Appraisal Skills Programme (Long et al., 2020; Singh, 2013). This assessment involved evaluating the methodological rigour, reliability, and validity of each study. Specific criteria included the clarity of research objectives, appropriateness of study design, sampling methods, data collection techniques, and the robustness of data analysis. Additionally, the relevance and transferability of the findings to the broader context of attitudes, perceptions, and challenges facing AI use in Ghana and Nigeria were considered. All discrepancies in the quality assessment were resolved through discussion meetings among the reviewers, ensuring consistency in the evaluation process.

Ethical Considerations

This study was part of a larger research project that received ethical approval from the Institutional Review Board of the University of Cape Coast (ID: UCCIRB/EXT/2023/56). All sources were properly cited, and the review adhered to strict standards of academic integrity and transparency throughout the process.

Table 1. Search Strategy for Articles on Attitudes towards artificial intelligence in Ghana and Nigeria

Search strategy item	Search strategy
Databases	PubMed, Scopus, Medline, Google Scholar
Language filter	English Language
Time filter	2000–2024
Spatial filter	"Ghana" OR "Nigeria"
Keywords	1. "Artificial Intelligence" OR "AI" 2. "Knowledge" OR "Awareness" OR "Understanding" 3. "Attitude" OR “Perceptions" 4. "Challenges" OR “Concerns” OR “Apprehensions” OR “perceived risks”
Inclusion criteria	The paper should be: 1. A peer-reviewed or grey literature 2. A published paper from 2000 and later 3. Conducted in Ghana and Nigeria 4. Published in the English language 5. Conducted amongst various age groups 6. Knowledge, awareness, attitudes and perceptions of Artificial Intelligence amongst Sub-Saharan Africans.
Exclusion criteria	The paper should be: 1. Conducted in countries outside Ghana and Nigeria 2. A study published online before the 2000

Search strategy item	Search strategy
	3. A report, review, abstract, minutes, commentary, letter to editors, preprint, literature reviews 4. Outside the variables of interest

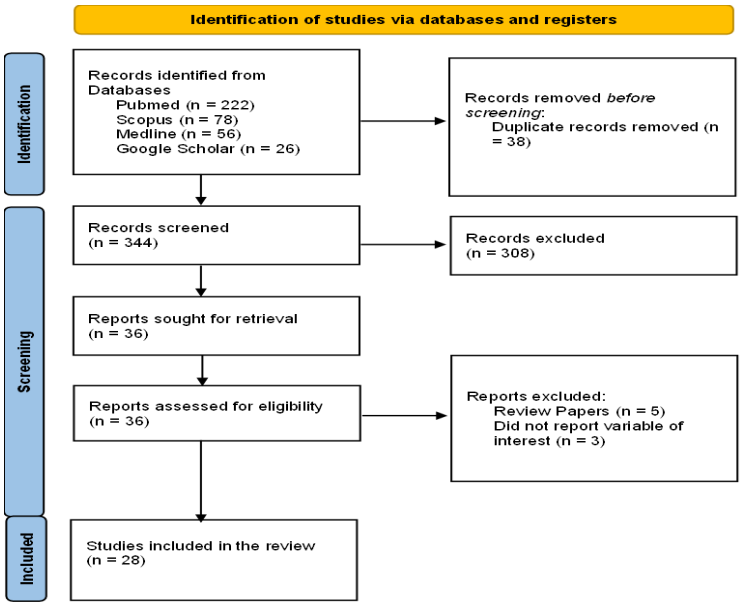

Fig. 1. PRISMA Flow Chart of the Record Screening Process

3. Results

Initial Findings

This review includes twenty-eightpublished articles. The majority of the papers used the quantitative approach with approximately 57% of the studies were conducted in Nigeria. See Figures 2, 3, Tables 2, 3 for further details.

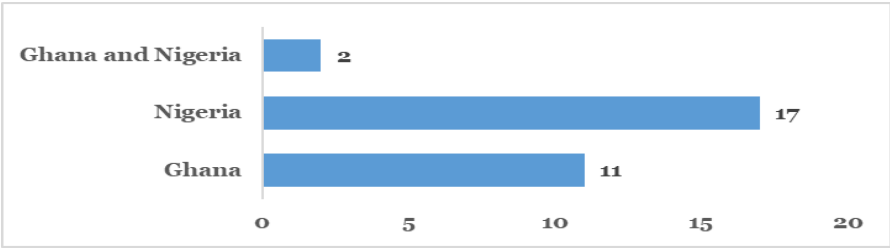

Fig. 2. Geographical Distribution of Studies

Table 2. Organisation of Themes: Attitudes towards AI

Major Themes	Author(s) and year
Attitudes and perceptions towards AI	(Adamu et al, 2020; Adelana, Akinyemi, 2021; Botwe et al., 2021; Ayanwale et al., 2022; Akinmoladun et al., 2022; Salifu et al., 2023; Adarkwah et al., 2023; Nja et al., 2023; Bello et al., 2023; Eiriemiokhale et al., 2023; Edzie et al., 2023; Muhammad et al.,2023; Uzir et al., 2023; Adigwe et al., 2024; Ibrahim et al., 2024; Rueben, Kabilan, 2024; Daniel et al., 2024; Omolo,Fasina, 2020; Suleiman, 2024; Baidoo-Anu et al., 2024; Mustapha et al., 2024; Nyarko, 2024; Ofosu-Ampong, 2023; Ogolodom et al., 2023)
Challenges influencing AI adoptions	(Adarkwah et al., 2023; Adigwe et al., 2024; Akinmoladun et al., 2022; Aminu, 2024; Botwe et al., 2021; Ejikrm et al., 2022; Jibril et al., 2024; Mohammed, 2023; Muhammad et al., 2023; Ogolodom et al., 2023)

Summary of Findings on Attitudes, Perceptions, and Challenges towards AI in Ghana and Nigeria

As indicated in Table 3, our systematic review included 28 studies. All studies included assessments of the attitudes and perceptions of participants towards AI use in education, health care and its delivery, journalism, economic mobility, agriculture, construction industry, media, and banking sectors. For most studies that centred on AI and education, there is a high level of awareness of AI, with positive attitudes towards it (Adarkwah et al., 2023; Eiriemiokhale et al., 2023; Rueben, Kabilan, 2024; Sani, 2024).

Regarding the attitudes and perceptions, Adamu et al. (2020) concluded that their population, which consisted of teachers in technical and vocational fields, is highly proficient in using digital tools. Adelana and Akinyemi (2021) revealed that the students were aware of the existence of AI and were ready to adopt AI-based tutoring systems for learning in senior secondary schools. Salifu et al. (2023) reported that Economics students at the University of Cape Coast saw artificial intelligence, particularly ChatGPT, as a valuable tool for enhancing learning and providing quick, individualised help. It was found that factors like perceived trust, social influence, and hedonic motivation significantly drive students' behavioural intentions to use AI tools (Salfiu et al., 2023).

Furthermore, studies like Mohammed (2023) reported that the educators who participated in the study perceive AI as vital for enhancing teaching and learning experiences. In pinpointing variables affecting the effective usage of AI by science teachers, the science teachers showed a high level of approval of the utilisation of AI during teaching and learning. Ogqo et al. (2023) concluded that applications of AI in academic libraries have the potential to increase productivity and overall operational effectiveness. The paper also revealed that poor ICT skills and technical expertise, high initial costs of implementation, phobia of job displacement, epileptic power supply, poor maintenance culture, resistance to change, poor network connectivity, privacy and ethical implications etc. were some challenges to AI faced by academic libraries in Nigeria.

Table 3. Summary of Studies Included (n = 28)

Author, Year, Country	Purpose	Methodology/ Design	Sample	Sector	Attitudes and Perceptions	Challenges
Adamu et al. (2020)/ Nigeria	To investigate the competencies required by technical and vocational teachers towards computer and related technology for classroom teaching and learning	Cross-sectional survey	TVE teachers	Education	Teachers in technical and vocational fields are highly proficient in using digital tools, with a strong relationship between competence and teaching experience and a weaker relationship between competence and gender.	
Adelana and Akinyemi (2021)/ Nigeria	To examine students' awareness and readiness to adopt the system for learning.	Quantitative approach, Descriptive survey design of non-experimental type	304 students	Education	Students are aware of and ready to adopt artificial intelligence-based tutoring systems for learning in senior secondary schools.	There was no significant difference between senior secondary students' level of awareness and readiness to adopt AI-based Tutoring Systems for learning across gender, class, and subject specialisation.

Author, Year, Country	Purpose	Methodology/ Design	Sample	Sector	Attitudes and Perceptions	Challenges
Botwe et al. (2021)/ Ghana	To explore Ghanaian radiographers' perspectives on the integration of AI into medical imaging.	Quantitative approach, cross-sectional online survey	151 radiographers	Health	Majority agreed that AI technology is the future of medical imaging. Most of them pointed out that AI would have an overall positive impact on medical imaging practice. Negative attitudes included fears about AI-related errors and concerns relating to job security.	High equipment costs, lack of knowledge, and fear of cyber threats were identified as factors hindering AI implementation in Ghana.
Ejikem et al. (2022)/ Nigeria	To explore the perspectives of anesthesiologists in Nigeria on the use of AI in their practice	Cross-sectional survey	44 anesthesiologists	Health	Anesthesiologists do not have sufficient knowledge of AI, and while they are open to applying AI to their practice, anesthesiologists do not expect AI to replace physicians in their practice	
Ayanwale et al. (2022)/ Nigeria	To understand how ready teachers are to teach AI	Quantitative methodology	385 teachers		Confidence and relevance predicted teachers' readiness to teach AI	
Akinmoladun et al. (2022)/ Nigeria	To evaluate knowledge level, attitude and perception of radiologists in Nigerian towards the introduction of AI to the practice of radiology	Cross-sectional survey	163 radiologists	Health	A greater proportion had a positive perception toward the opportunity of using AI systems in radiology practice within their facilities.	Acceptability of these systems is dependent on the level of knowledge of their applications in medical imaging.
Salifu et al. (2023)/ Ghana	To identify factors that influence the behavioural intentions and the actual usage of ChatGPt among economics students in Ghanaian higher education institutes.	Qualitative approach, Descriptive cross-sectional study design	306 students	Education	Design and interactivity have a significant impact on perceived trust. Similarly, perceived trust, social influence, performance expectancy, hedonic motivation, and habits drive behavioural intentions.	Among the various factors influencing behavioural intentions, hedonic motivation emerged as the most dominant. Moreover, behavioural intentions and facilitating conditions significantly drive students' actual use of the ChatGPT.

Author, Year, Country	Purpose	Methodology/ Design	Sample	Sector	Attitudes and Perceptions	Challenges
Mohammed (2023)/ Ghana	To explore educators' experiences, concerns, and expectations regarding integrating AI technologies into their teaching practices	Qualitative approach	8 educators	Education	Perceive AI as vital for enhancing teaching and learning experiences, providing personalised instruction, and facilitating early childhood development. AI will support cognitive, social, and emotional growth among young learners.	Concerns are expressed regarding the implications of AI on human interaction, child privacy, and the role of educators in fostering holistic development.
Muhammad et al. (2023)/ Ghana and Nigeria	The objective of this study is to examine the impact of AI and machine learning on the future of workforce skills and economic mobility in Ghana and Nigeria, and to identify policies and strategies that can be employed to address the skills gap and promote economic mobility	Qualitative approach	The workers, educators, employers,and policymakers in both countries		Participants in the study identified a growing demand for workers with skills that are complementary to AI and machine learning, including data analysis, programming, and critical thinking. However, the education systems in both countries are struggling to keep up with the demand for these skills, leading to a skills gap in the workforce.	The study also found that there are significant challenges associated with the adoption of AI and machine learning technologies in both countries, including limited access to technology, insufficient training opportunities, and cultural attitudes towards technology
Adarkwah et al. (2023) / Ghana	To present an overview of why there is a slow pace of digital transformation in education in Ghana using ChaptGPT as a case scenario	Mixed-method design (qualitative followed by quantitative)	34 academics for qualitative, 50 for quantitative	Education	High enthusiasm about the educational possibilities ChatGPT can afford after being exposed to it	Most of the participants did not have a conceptual understanding of ChatGPT and how it could be applied to learning, teaching and personal development
Nja et al. (2023) /Nigeria	To pinpoint the variables affecting the effective usage of AI among science teachers	Qualitative	79science teachers	Education	Science teachers showed a high level of approval for the utilisation of AI during teaching and learning in science class	

Author, Year, Country	Purpose	Methodology/ Design	Sample	Sector	Attitudes and Perceptions	Challenges
Bello et al. (2023) /Nigeria	To examine journalists' level of awareness and adoption of AI in their journalistic engagements	Survey approach	376 journalists	Journalism	High level of awareness of AI among the population	Due to perceived professional and ethical challenges that undermine their ingenuity, creativity and skillfulness, many of journalists have not adopted AI to their daily practice
Eiriemiokhale et al. (2023) /Nigeria	To explore the awareness and perceptions of AI among librarians in university libraries in Kwara State, Nigeria	Cross-sectional survey	37 professional Nigerians	Education	There is a level of awareness of certain AI, and respondents have a perception that AI tech can be adopted in university libraries, capable of replacing human librarians in future and is a positive development for librarians.	
Edzie et al. (2023) /Ghana	To evaluate the perspectives of Ghanaian radiologists on the integration of AI	Cross-sectional prospective study	77 radiologists	Health	Positive opinions on capabilities of AI, with average awareness of and below average expertise in the usage of AI applications in radiology	Inadequate radiological AI infrastructure in Ghana
Uzir et al. (2023) /Ghana	To identify the intention to use, purchase, satisfaction and spread positive word of mouth	Multiple (three approaches)	550,320,170 people of the general population	Health	Where a crisis or pandemic interrupts regular life, AI-enabled smartwatches can help customers, especially elderly customers, in managing their health issues. The moderating effect of fear of the pandemic indicates that a high level of fear will instigate people to adopt AI-enabled healthcare devices, which can be used easily and conveniently at an affordable price	
Adigwe et al. (2024) /Nigeria	To assess the knowledge and perception of healthcare professionals in Nigeria regarding the application of AI and machine learning in the health sector	Cross-sectional study	404 healthcare professionals	Health sector	Significant proportion of the study population had good knowledge of AI, with high levels of readiness and enthusiasm for the adoption and enthusiasm of its adoption and implementation	A significant proportion of the population believed that the integration of machine learning in Nigeria's health sector could increase the cost of health services

Author, Year, Country	Purpose	Methodology/ Design	Sample	Sector	Attitudes and Perceptions	Challenges
Ibrahim et al. (2024) /Nigeria	To determine if university teachers' perception of AI use in educational assessment reinforces their belief in academic integrity concerns and if the use of diverse AI tools reinforces their perception of innovative assessment concerns	Inferential design	3083 university teachers	Education	Academic integrity concerns have an influence on how they perceive AI use in assessment. Their perception of innovative assessment concerns influences their utilisation of diverse AI tools in educational assessment. There was a significant relationship between their perception of AI tools and their predisposition to personalise AI use	
Aminu (2024)/ Nigeria	To find out the types of AI technologies that are available for library operations in Federal universities' libraries in North Western states of Nigeria	Quantitative method	73 ICT Staff in the university libraries	Education		The study concluded that the University libraries in the North West States of Nigeria have not adopted many AI technologies in their libraries despite the potential it has for library operations
Rueben andKabilan (2024) /Nigeria	To assess the readiness of North-East universities' lecturers to adopt and integrate AI into their teaching and administrative practices	Quantitative approach	100 university lecturers	Education	Moderate levels of readiness among lecturers with positive attitudes towards the adoption of AI	
Daniel et al.(2024) /Nigeria	To assess the knowledge, practice, perception and expectations about AI tech among staff of Federal Medical Centre Makurdi, Benue state, Nigeria	Cross-sectional study	384 respondents	Health	In-depth knowledge of AI technology was low	Most of the staff thought AI did not make their task easy

Author, Year, Country	Purpose	Methodology/ Design	Sample	Sector	Attitudes and Perceptions	Challenges
Omole andFasina (2024)/ Nigeria	To investigate the adoption of AI among agricultural entrepreneurs in Ondo State, Nigeria	Cross-sectional survey	120 participants involved in agriculture	Agriculture	The majority of farmers who know about and use AI-enabled technologies are those connected in some way or another to the organisations that provide the sieves to them.	
Suleiman (2024)/ Nigeria	To investigate students' perceived readiness for adoption of AI support services in Nigerian universities	Qualitative	45 students	Academics	Generally positive attitude towards the integration of AI in the educational environment	
Baidoo-Anu et al.(2024) /Ghana	To examine the perspectives of Ghanaian high education students on the use of ChatGPT	Quantitative approach	277 students	Education	majority of students are using ChatGPT for their academic work	students' concerns (especially around academic integrity) about the use of Gen AI tools like ChatGPT can limit their potential use of these tools for academic purposes
Mustapha et al.(2024) /Ghana	This study aimed to identify potential obstacles that prevent the implementation of artificial intelligence (AI) in construction health and safety in Ghana.	Questionnaire survey	110 construction experts	Construction industry	According to varied demographic responses, AI increases design and engineering, safety and security, and human resources efficiency, decision-making, and safety. Using AI promises to overcome these hurdles by minimising risks, improving worker well-being, and creating a safe work environment	
Nyarko(2024) /Ghana	to explore Ghanaian tertiary students' perceptions toward AI-driven health information platforms	Cross-sectional survey	50 tertiary students	Healthcare delivery	More than half of the respondents knew of AI-driven health platforms	

Author, Year, Country	Purpose	Methodology/ Design	Sample	Sector	Attitudes and Perceptions	Challenges
Ofosu-Ampong(2023)/ Ghana	To investigate the gender differences in AI-based tools in higher education schools	Quantitative approach	128 students	Education	Significant disparity in the overall levels of perceived innovation characteristics based on gender	
Ogolodom et al. (2023)/ Nigeria	to assess the knowledge and perception of healthcare workers towards the application of AI in healthcare services in Nigeria	Cross-sectional survey	263 healthcare workers	Health	Good knowledge of both medical areas of application of Alas well as the benefits of AI application in healthcare services	Most of the respondents were afraid that their jobs would be taken over by AI in the near future.
Jibril et al. (2024)/ Ghana	To assess how online risk and socio-economic factors influence customers' intention to engage in Internet banking activities.	Quantitative approach, descriptive study	672 bank customers	Banking		Fear of financial loss, fear of reputation damage and avoidance motivation were the perceived online risk factors.

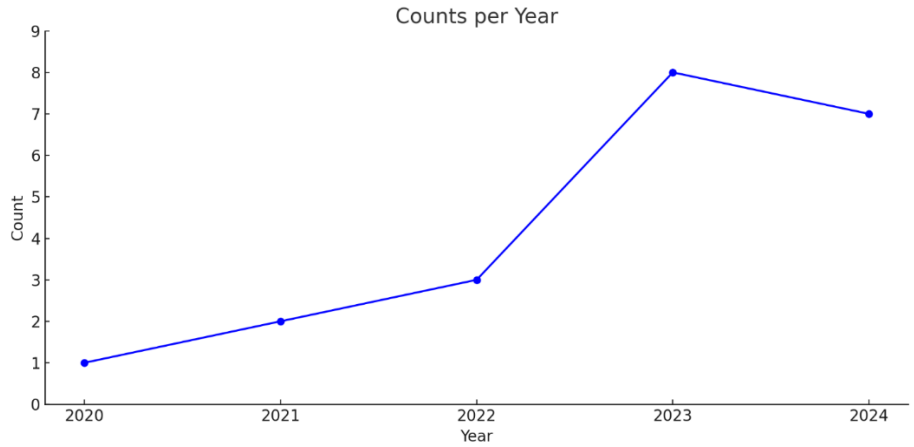

Fig. 3. Distribution of Studies (in Years)

4. Discussion

This systematic review synthesises current literature on attitudes towards AI in Ghana and Nigeria, revealing a complex landscape of attitudes, perceptions, and challenges shaped by various factors, including sector, economic, technological, and social contexts. The findings highlight both enthusiasm for AI's potential and concerns about its implications, reflecting the unique challenges and opportunities present in the region.

Attitudes and Perceptions Towards AI Adoption

Ghana

The level of AI attitudes and perceptions in Ghana from our synthesis is primarily positive, with several studies indicating high levels of awareness and readiness to adopt AI technologies across various sectors. In the education sector, studies revealed that students and educators were aware of AI tools like ChatGPT and had positive perceptions towards their integration into learning and teaching processes. For instance, Salifu et al. (Salifu et al., 2023) reported that economics students at a Ghanaian university viewed AI as valuable for enhancing learning. In the healthcare

sector, Botwe et al. (2021) found that radiographers in Ghana agreed that AI is the future of medical imaging despite challenges like high equipment costs and lack of knowledge. The construction industry also showed promise, with Mustapha et al. (2024) reporting that AI was perceived to increase efficiency in design, engineering, safety, and decision-making.

Nigeria

The level of AI attitudes and perceptions in Nigeria appears to be generally positive across various sectors. Multiple studies reported high levels of awareness and readiness to adopt AI technologies among different groups, including students, educators, healthcare professionals, and journalists (Adelana, Akinyemi, 2021; Adigwe et al., 2024; Akinmoladun et al., 2022; Bello et al., 2023; Ejikem et al., 2022). For instance, in the education sector, students showed awareness and readiness to adopt AI-based tutoring systems (Adelana, Akinyemi, 2021), while science teachers demonstrated high approval for utilising AI in teaching and learning (Nja et al., 2023). In healthcare, radiologists and other professionals exhibited positive perceptions towards incorporating AI systems in their practice (Adigwe et al., 2024; Akinmoladun et al., 2022).

Challenges Facing AI Adoption

Ghana

There are several challenges associated with implementing AI in Ghana. The study by Botwe et al. (Botwe et al., 2021) identified high equipment costs, lack of knowledge, and fear of cyber threats as key factors hindering AI implementation in Ghana's medical imaging sector. Additionally, Edzie et al. (Edzie et al., 2023) noted inadequate radiological AI infrastructure in Ghana as a challenge. The research by Muhammad et al. (2023), which covered both Ghana and Nigeria, highlighted broader challenges, including limited access to technology,insufficient training opportunities, and cultural attitudes towards technology as significant obstacles to AI adoption. These challenges span across different sectors and indicate that Ghana faces both technical and socio-cultural barriers in its efforts to integrate AI technologies.

Nigeria

Several studies highlighted significant challenges to AI adoption and implementation in Nigeria across various sectors. In academic libraries, obstacles included poor ICT skills and technical expertise among staff, high initial costs of implementation, fear of job displacement, unreliable power supply, poor maintenance culture, resistance to change, inadequate network connectivity, and privacy and ethical concerns (Ogqo et al., 2023). The education sector struggled to keep pace with the growing demand for AI-related skills, leading to a skills gap in the workforce (Muhammad et al., 2023). In the journalism field, perceived professional and ethical challenges hindered AI adoption in daily practice, as many journalists felt it could undermine their creativity and skillfulness (Bello et al., 2023). Healthcare professionals expressed concerns about potential job losses due to AI integration (Ogolodom et al., 2023). Additionally, there was a general lack of sufficient knowledge about AI among professionals in various fields, including anesthesiology (Ejikem et al., 2022), while some groups, such as journalists, have not fully adopted AI in their daily practices due to perceived professional and ethical challenges, despite high awareness levels (Bello et al., 2023). These challenges collectively point to a need for improved infrastructure and education, as well as for addressing ethical concerns to facilitate smoother AI integration across Nigerian industries.

5. Conclusion

Attitudes towards AI in Ghana and Nigeria are characterised by a blend of enthusiasm and caution, shaped by factors such as education, sector-specific needs, and technological readiness. While challenges exist, particularly in infrastructure and expertise, there is significant potential for AI to contribute to sustainable development in the region. Realising this potential will require tailored policies, targeted education initiatives, and continued research to understand and shape AI perceptions in the unique context of Sub-Saharan Africa.

Policy, Practice and Research Implications

Based on the review's findings, policymakers in Ghana and Nigeria should prioritise developing comprehensive AI strategies tailored to the region's unique context. These strategies should focus on enhancing digital infrastructure, especially in rural areas, and integrating AI education into curricula at all levels to improve literacy and skills. Regulatory frameworks should be established to promote innovation while addressing privacy and security concerns. Policies should encourage public-private partnerships to drive AI research and development that are

aligned with local needs, particularly in high-potential sectors like healthcare and education. Additionally, efforts should be made to align AI initiatives with broader development goals, ensuring that AI adoption addresses pressing challenges in areas such as healthcare delivery, agricultural productivity, and educational access.

Limitations

This systematic review, notwithstanding its valuable contributions, has the following limitations. Firstly, it focused exclusively on studies published in the English language. Although English is the official language in both Ghana and Nigeria, it may have limited the coverage and depth of the included studies as there may be a possibility of excluding relevant research published in other languages from these countries. Moreover, most of the included studies were cross-sectional surveys that relied on self-reported behaviours and perceptions that were subjective. Despite these limitations, the review successfully incorporated studies from both Ghana and Nigeria, providing valuable insights and helping to review systematically the emerging issue that has a valuable impact on development.

6. Acknowledgements

We appreciate the valuable support of the librarians at Sam Jonah Library during the preparation of this study. Also, we acknowledge the editing support provided by staff at the Centre for Behaviour and Wellness Advocacy in writing this manuscript.

Authors' contributions

JOS and GT-D conceptualised and designed the study. JOS, GT-D, PM, and EKA collected and conducted the review and wrote the initial draft. All authors read and approved the final version of the manuscript for publication.

Ethics approval and consent to participate

This study was part of a larger research project that received ethical approval from the Institutional Review Board of the University of Cape Coast (ID: UCCIRB/EXT/2023/56). All sources were properly cited, and the review adhered to strict standards of academic integrity and transparency throughout the process.

Availability of data and material

All data generated or analysed during this study are available online as published articles.

Competing interests

The authors declare that they have no competing interests.

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