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ARTIFICIAL INTELLIGENCE: A GLOBAL REVOLUTION AND ADAPTATION TO NIGERIAN EDUCATIONAL MILIEU

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Abstract
Artificial intelligence (AI) national strategies provide countries with a framework for the development and implementation of AI technologies. The approach of AI national strategies differentiates between developed and developing countries in several aspects including scientific research, education, talent development and ethics. The rapid growth of Artificial Intelligence (AI) presents both significant opportunities and challenges for developing countries like Nigeria. A well structured policy framework is crucial to maximize the benefits of AI while mitigating its risks. This paper proposes a comprehensive AI policy framework emphasizing the need for robust infrastructure, education and training programmes, capacity building, ethical governance to ensure fairness in transparent in AI applications.A lead paper presented at the 5th International Conference of the School of General Education, Federal College of Education, Obudu on 11th March, 2026.

Introduction

Artificial Intelligence (AI) is a cutting-edge technology (Chatterjee et al, 2022). Its application can be found in many fields including computer science, banking, agriculture, healthcare and education (Pham et al 2020; Zhany et al 2020). AI has two domains: weak AI and strong AI. Weak AI is specialized for specific tasks, while strong AI aims to create machines with humanlike general intelligence. Developed countries lead in these advancement with advanced technologies and ample resources (TIZhoosh and Polaris, 2021).

Nations have recognized the transformational potential of AI (Fatima et al, 2020). Therefore more than sixty countries have published their AI national strategies in the past five years following Canada which was the first to publish the strategy in 2017 (Vats et al, 2020). The majority of countries who launched their AI national strategies are developed countries (Holon IQ, 2020).

Radio, television, computers, the internet and social media all transformed education and society, but AI represents a more radical shift than these previous technologies. Al does not merely transmit information. Nor does it merely support some aspects of cognition, as calculators, word processors, or spelling and grammar checkers do, generative AI and large language models in particular are active, agentic participants in cognition itself, more akin to an easily accessible, if somewhat unreliable, expert available at all times. The question is no longer whether students will use AI – the vast majority already do (86% according to a Digital Education Council 16 country survey) – but how to integrate AI in ways that empower learners and educators rather than limiting their agency. From a human development perspective, this means focusing on whether AI expands people's real freedoms to think, learn and live the lives they value (Sen 1999). While AI can enhance functionings – valuable activities and achievements, such as writing faster and solving problems more efficiently, it must also support the expansion of capabilities – the genuine opportunities and freedoms to achieve those functionings – and agency – the power to act on those opportunities in the pursuit of their goals (Nussbaum 2011). When a radically new technology emerges, such as the steam engine, electricity, nuclear power, or the internet, the past can only be a guide – we require first principles thinking and a

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framework for understanding how societies change. AI could prove as disruptive as the Industrial revolution, dangerous as nuclear weapons and is already reshaping how we work and interact faster than the internet and social media did.

A cultural evolutionary perspective provides a guiding framework to navigate AI's role in education. Cultural evolution examines how ideas and technologies are learned, adapted, and transmitted against the backdrop of societal norms and institutions (Muthukrishna 2023). This helps us assess the systemic and long-term effects of AI integration: innovations succeed not just because they work, but because they fit into a culture and evolve through social adoption. Linking the capabilities approach with cultural evolution is valuable because it bridges individual empowerment with collective adaptation. The interdisciplinary lens we propose asks both "Does this AI intervention expand the real freedoms and agency of learners and ultimately all members of society?" and "Will this intervention be selected for and sustained within the cultural and institutional environment?". By combining these frameworks, we can better shape AI in education in ways that actually improve human development expanding what people are able to do and to be - and how it can be steered to fit local values and needs. In short, AI's impact on education must be evaluated not by the capabilities of the technology, but by the human capabilities it expands and the cultural context it evolves within. We start by understanding education itself from a cultural evolutionary perspective.

What is Education and How Does it Change Cognition?

The nature of education and the skills we value have always co-evolved with technology. The instant accessibility of knowledge through the Internet has reduced the value of simply memorising large quantities of information and increased the value of sorting the signal from the noise, finding relevant knowledge, interpreting data and maintaining focus in a noisy world filled with distractions (Sparrow, Liu, and Wegner 2011). The majority of jobs we have today did not exist before 1940 (Autor et al. 2024). AI's growing role means we need to consider what skills and knowledge are actually valuable in a world of ubiquitous AI. For example, if a large language model can draft an essay, what you want to say may matter more than how you want to say it. If a more sophisticated computer algebra system can discover new proofs (Romera-Paredes et al. 2024) or an AI can automate aspects of scientific discovery (Wang et al, 2023), then domain knowledge of the most important problems and how they might be solved becomes more important than the mechanics of solving them.

As AI continues to mediate education experiences and reshape society, we must revisit the capabilities needed in this new context. Just as the introduction of schools reduced spatial navigation abilities in Bolivian children (Davis and Cashdan 2019), the increased use of computing devices for Al-mediated learning may affect child development. Access to AI tools may shift emphasis away from rote memorisation and basic recall, instead elevating the value of interpretive reasoning, critical evaluation and adaptive problem-solving. While this shift could empower some students with greater cognitive flexibility, it also raises concerns about overdependence on AI in ways that harm learning and independent reasoning processes. In other cases, we likely don't want AI to reshape certain aspects of development, particularly physical, social and emotional development. If, for example, children spend more time interacting with machines than peers or teachers, this may harm their very ability to participate in society.

Strategic Al Integration into Education

Al's arrival in classrooms comes with lofty promises: personalised one-on-one tutoring for every student, automated grading that frees teachers' time, intelli gent tutoring systems to pinpoint learning gaps and adaptive content tailored to each learner's level and interests. These innovations could expand several human capabilities if implemented thoughtfully. For example, AI-powered personalised learning can give each student a unique pathway – revisiting tough concepts, accelerating through areas of strength and discovering new interests. In a class of thirty, AI could help enable thirty individualised learning paths, potentially expanding each learner's agency and mastery by allowing them to progress at their own pace. AI

as a teacher's aid can handle rote tasks (like drafting feedback or grading quizzes) and analyse student performance data, freeing teachers to focus on mentoring and creative instruction. In this "force multiplier" role, AI extends educators' reach while leaving professional judgment in human hands – ideally enhancing teachers' capability to support diverse learners. AI can also enable continuous feedback and assessment, giving students immediate, tailored feedback and providing teachers with real-time diagnostics. Scaling up the kind of formative feedback once only available to those who could afford one-on-one tutoring, Al could promote more equitable outcomes. Moreover, AI tools can increase the inclusivity and accessibility of education: text-to-speech, machine translation and content generation can make lesson materials available in any language or modality (audio, visual, sign language), helping overcome geographic, linguistic, or disability- related barriers. By enlarging each learner's freedom to access knowledge past individual barriers, Al has the potential to democratise learning and expand the capabilities of students who might otherwise be left behind.

In essence, AI – if deployed with a human-centred, capability-expanding approach – can help education systems fulfill the expansion of "real freedoms" that define human development. It can empower each child not just to attend school, but to truly flourish in their learning and become whomever they aspire to be.

Current State of AI in Developing Countries

Recent technological advancements, a growing awareness of AI's potential to address urgent socio-economic issues, and the availability of more data have all contributed to the adoption of AI technologies in developing nations, a number of industries, such as healthcare, education, and agriculture, have started to use AI to boost productivity, facilitate better decision-making, and promote sustainable growth (Mhlanga et al., 2021).

AI is being used in agriculture to enhance pest control, maximize agricultural yields, and facilitate precision farming (Raj etal., 2022). For example, businesses in Kenya such as AgriTech use machine learning algorithms to assess crop health, soil quality, and weather trends, giving farmers useful information to increase yield. Drones powered by AI are also being used to monitor crop health, which enables prompt responses and lowers the need for pesticides. Similar to this, Cropln uses AI in India to give farmers access to real-time market data so they can decide on crop choice and price. Another industry seeing a large use of AI is healthcare (Singh etal, 2020). In countries like South Africa and Nigeria, AI technologies are being utilized to improve diagnostic accuracy and streamline patient care. For example, LifeQ in South Africa uses AI algorithms to analyze biometric data, providing insights into an individual's health status and potential risks. Additionally, AI-powered telemedicine platforms are emerging in rural areas, enabling patients to access healthcare services remotely (Pulimamidi, 2021). In addition to reducing the strain on medical facilities, this guarantees that underprivileged groups have prompt medical care. Artificial Intelligence is being used in education to improve learning results and offer individualized learning experiences. Al-driven systems that provide customized learning materials depending on the needs of individual students are being implemented in countries such as Ghana and Rwanda.

Even if AI adoption is encouraging, there are still a number of obstacles preventing these technologies from being widely used in underdeveloped nations. The absence of digital literacy and infrastructure is one of the biggest problems. Inadequate internet connectivity is a problem for many developing countries, particularly in rural regions (Dridi etal, 2020). Access to AI technology is restricted by this digital divide, which also hinders the effective application of data- driven solutions. Furthermore, a barrier to the successful application of AI is the general public's and businesses' inadequate grasp of the technology. People might not be able to use AI products to their full capacity if they are not given the necessary training and education (Johnson, 2020). Limited access to data and computational resources further complicates the AI landscape in developing countries. AI technologies thrive on large datasets for training and optimization, yet many countries lack the necessary data infrastructure to collect, store, and analyze information effectively.

Additionally, concerns about data privacy and ownership may deter organizations from sharing data, further restricting the availability of quality datasets. Furthermore, computational resources required for Al applications, such as cloud computing platforms, can be costly and beyond the reach of many organizations in developing countries (Mustapha etal, 2021).

Significant obstacles to the deployment of AI also come from ethical and regulatory issues. There are issues around liability, accountability, and data protection in many developing countries because of the absence of comprehensive legal frameworks to regulate the use of AI technologies (Gehl etal, 2021). In the lack of explicit regulations, AI can be used in immoral ways, such as biased algorithms that disproportionately harm communities of color. Furthermore, individuals' resistance to the deployment of Al technologies may be heightened by worries about privacy intrusions and surveillance. As a result, the lack of trust in Al systems can hinder their acceptance and utilization, impeding potential benefits. While the current state of AI adoption in developing countries presents numerous opportunities across sectors such as agriculture, healthcare and education, several barriers must be addressed to realize its full potential (Goel etal, 2021).

Enhancing infrastructure, promoting digital literacy, improving data access, and establishing robust regulatory frameworks are crucial steps needed to facilitate the responsible and effective deployment of AI technologies. By overcoming these challenges, developing countries can leverage AI to drive sustainable development, improve social outcomes, and enhance economic growth. A strategic approach to AI adoption, supported by policymakers, stakeholders, and communities, will be essential to ensuring that the benefits of AI are equitably distributed and accessible to all (Elliott eta!., 2021; Yigitcanlar etal, 2021).

Key Components of an Al Policy Framework for Nigeria

The need for a comprehensive policy framework is becoming more and more evident as Artificial Intelligence (AI) continues to advance and permeate numerous industries, especially in developing nations (Thowfeek et al, 2020; Radu, 2021). A structure like this is necessary to optimize Al's advantages while reducing its risks and difficulties. An efficient AI policy framework for developing nations is outlined by the following essential elements, which prioritize infrastructure and capacity building, data governance and privacy, regulatory and ethical AI development, economic policies and incentives, and global collaboration and standards.

Building a strong digital infrastructure is a fundamental part of any AI policy framework (Ashok et al, 2022). To support Al applications, this entails making investments in data centers, cloud computing infrastructure, and high-speed internet connectivity. Access to AI technologies requires stable internet connectivity, especially in poor and rural areas where digital divides are common. To ensure that all citizens may profit from the digital economy, governments must give the construction of telecommunications infrastructure top priority (Hanna, 2020). Education and training initiatives are essential for creating a workforce with the necessary skills to use AI, in addition to infrastructural investments. To promote an understanding of Al principles and applications, developing nations should use AI literacy initiatives at all educational levels, from primary schools to universities. Vocational training and online courses in data science, machine learning, and programming can equip individuals with the necessary skills to engage with AI technologies. Collaborations with international organizations, universities, and tech companies can enhance these educational efforts, providing technical assistance and resources to bolster local capacity (Thomas eta!., 2021; Zhuang and Liu, 2022).

Responsible AI development and application depend heavily on effective data governance. To empower people and safeguard their rights, developing nations must create explicit regulations about data ownership and sovereignty (Oguamanam, 2020). These entails establishing access controls for data and guaranteeing that people maintain control over their personal data.

Governments ought to endeavor to enact comprehensive data protection rules that take local circumstances into account and conform to international norms. It is crucial to make sure that data is collected and used ethically. Since Al systems rely largely on data for training and optimization, data practices need to be governed by ethical standards. This includes obtaining informed consent from individuals before collecting their data and ensuring transparency in how data is used. Additionally, protecting citizen privacy in AI systems is crucial. Robust privacy regulations should be enacted to prevent misuse of personal information, ensuring that AI technologies do not infringe upon individuals' rights (Greenstein, 2022).

Development of ethical AI is greatly aided by regulation. Al technology can be created and used responsibly if explicit ethical standards are established for AI applications. In order to foster a cooperative approach to AI governance, governments should involve stakeholders in the development of these rules, such as academia, business, and civil society (Ulnicane et al, 2021). Fairness and preventing biased algorithms are important issues for AI systems. Establishing frameworks to evaluate and reduce algorithmic bias is crucial for policymakers to guarantee that AI applications do not disproportionately impact underrepresented populations. This could entail using a variety of datasets to train algorithms and conducting routine audits of Al systems. Moreover, AI safety and risk mitigation strategies are essential for safeguarding citizens against potential harms associated with Al technologies (Falco et al, 2021). This includes developing protocols for the safe deployment of AI applications and ensuring that adequate measures are in place to address any unintended consequences or failures.

Developing nations should establish economic policies and incentives that encourage entrepreneurship in the AI industry in order to promote indigenous innovation in AI businesses. This can entail setting up financial resources to support the expansion of companies engaged in artificial intelligence, like grants and venture capital programs. Governments might also encourage AI research and development by offering tax breaks and subsidies to businesses that invest in cutting-edge technology (Shao and Chen, 2022). Creating incentives for private sector Al investment is equally crucial. The development of Al can be significantly accelerated via publicprivate partnerships, which capitalize on the advantages of both industries. Governments should facilitate collaborations between businesses, research institutions, and government agencies to promote knowledge sharing, resource pooling, and technology transfer.

In an increasingly interconnected world, aligning national policies with global Al standards is essential for effective governance. Developing countries should engage with international bodies and organizations to stay informed about emerging AI trends, ethical considerations, and best practices (Schiff et al, 2020). Working together with foreign partners can facilitate the sharing of knowledge and capacity-building related to Al governance. Harmonizing AI methods and establishing cross-border data-sharing agreements are also essential. By establishing frameworks for data sharing, poor nations can ensure that they have access to crucial resources and knowledge for collaboration on AI initiatives and research (Larson etal, 2020). Global norms that support justice, accountability, and transparency in AI technology can also be shaped by taking part in international talks on AI ethics and governance. For developing nations to fully utilize AI's revolutionary potential while tackling its inherent problems, a comprehensive framework for Al policy must be established. By focusing on infrastructure and capacity building, data governance and privacy, regulation and ethical AI development, economic policies and incentives, and international cooperation, these nations can create an enabling environment for responsible AI adoption. A collaborative and strategic approach to AI governance will not only drive economic growth and social progress but also ensure that the benefits of AI are equitably distributed, fostering inclusive development in the digital age (Aderibigbe et al., 2023; George, 2023).

Impact of Al Policy Framework on Developing Countries

The development and implementation of a comprehensive AI policy framework can significantly influence the trajectory of developing countries (Feijóo etal, 2020). A strong AI policy framework can harness the potential of AI technologies to promote sustainable development and enhance citizens' quality of life by

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tackling important areas including economic growth, social and cultural effect, and ethical and legal ramifications. This analyzes the framework's complex effects, emphasizing job creation and economic growth as well as social, cultural, ethical, and legal ramifications.

AI has the ability to boost productivity across a range of industries, which might serve as a driver for economic growth in emerging nations. For example, AI-driven agricultural systems can forecast weather patterns, manage crops more effectively, and allocate resources more efficiently. These advancements may result in reduced production costs and increased yields, which would increase the agriculture sector's GDP contribution. AI can improve supply chain management, automate repetitive tasks, and predict maintenance in the manufacturing and industrial sectors, increasing productivity and competitiveness (Javaid etal, 2022; Fasuludeen etal., 2022). Furthermore, the emergence of AI-driven companies offers chances for employment growth in emerging nations. As new startups emerge in sectors such as fintech, healthtech, and edtech, they can generate employment opportunities that may not have existed previously. For example, AIbased platforms can facilitate financial inclusion by providing microloans to underserved populations, while AI in healthcare can create roles for data analysts and AI specialists. However, the transition to an AI-driven economy is not without challenges. Workforce displacement is a significant concern, as automation may lead to job losses in certain sectors. Therefore, it is imperative to establish reskilling and upskilling programs that equip workers with the necessary skills to thrive in an AI-enhanced job market. By investing in education and training, developing countries can help mitigate the negative impacts of workforce displacement and ensure a smooth transition to an Al-driven economy (Mikic and Malala, 2021).

AI can play a transformative role in improving access to healthcare, education, and public services in developing countries. Through the use of AI in telemedicine, patients can receive medical consultations without having to travel far, thus expanding access to healthcare in distant locations (Haleem eta!., 2021). Additionally, by offering individualized learning experiences that are tailored to each student's needs, AI-driven platforms can improve educational outcomes. To enhance learning outcomes for a variety of groups, AI algorithms, for example, can evaluate student performance data to customize courses and resources. However, the uneven distribution of AI technologies raises worries about rising socioeconomic inequality. Disparities now present could worsen if wealthy communities are the only ones with access to AI technologies and resources, leaving underprivileged populations behind. Policymakers must ensure that AI initiatives are designed with inclusivity in mind, prioritizing equitable access to technology and training for all citizens (Robinson, 2020). Furthermore, the cultural implications of AI-driven systems cannot be overlooked. As AI systems become more integrated into daily life, they may influence societal norms and values. It is crucial to engage diverse stakeholders in the development of AI applications to ensure that cultural sensitivities are respected and that technology aligns with local values.

The implementation of AI technologies in developing countries also raises ethical and legal considerations that must be addressed through a well-structured policy framework (Dara et al, 2022). One of the critical challenges is ensuring social equity by addressing biases inherent in AI systems. Algorithms trained on biased data can perpetuate discrimination and inequality, undermining the very goals of social progress. Policymakers must establish guidelines for data collection and algorithm development that prioritize fairness and transparency, ensuring that AI systems do not reinforce existing biases (Modi, 2023). AI-related legal issues are also crucial, especially those pertaining to accountability and liability. As AI technologies grow more selfsufficient, concerns about accountability surface around AI systems that injure people or make poor choices. Building trust in AI technology and promoting their responsible usage requires the creation of precise legal frameworks that define liability and accountability (Varo 2022). Last but not least, striking a balance between human rights protection and Al advancement is a key challenge that needs serious thought. Legislators need to make that AI programs uphold people's rights to nondiscrimination, privacy, and freedom of speech. In order to protect citizens from potential abuses of AI technologies, notably in surveillance and data collecting, legislative measures must be established.

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The impact of an AI policy framework on developing countries is multifaceted, with significant implications for economic growth, social equity, and ethical considerations (Benefo et al, 2022). By harnessing the potential of AI to boost productivity and create jobs, while simultaneously addressing challenges such as workforce displacement and inequality, developing countries can pave the way for sustainable development. Furthermore, a focus on the ethical and legal dimensions of AI can help ensure that the benefits of these technologies are equitably distributed and aligned with human rights (Fukuda-Parr and Gibbons, 2021). Ultimately, a comprehensive Al policy framework is essential for leveraging Al's transformative potential while safeguarding the interests and rights of all citizens in developing nations.

Challenges in Implementing AI Policy Frameworks

There are many obstacles to overcome before implementing AI policy frameworks in underdeveloped nations, which may prevent AI technologies from being adopted and used effectively (Feijóo etal, 2020). These difficulties arise from a number of causes, such as differences in technology, budgetary limitations, and problems with politics and governance. It's imperative to overcome these challenges if AI is to support sustainable development and raise living standards in these areas.

One of the most significant challenges in implementing AI policy frameworks is the limited political will or understanding of AI's importance among policymakers and government officials (Guenduez and Mettler, 2023). In many developing countries, leaders may lack a comprehensive understanding of how AI can drive economic growth, enhance public services, and address social issues. This gap in knowledge can lead to insufficient prioritization of AI initiatives within national development agendas. Without strong political support, the necessary resources and commitment to create and implement AI policies may be lacking, resulting in stagnation in AI adoption. Additionally, corruption and bureaucratic inefficiencies can further impede the establishment of effective AI policy frameworks (Adam and Fazekas, 2021). In environments where corruption is prevalent, the allocation of funds for AI initiatives maybe mismanaged or diverted for personal gain. Bureaucratic hurdles can slow down the decision-making process and lead to delays in project implementation, exacerbating the challenges faced by Al policy frameworks. To overcome these issues, it is essential to foster transparency and accountability within government institutions and to engage a diverse range of stakeholders in the policymaking process.

A major obstacle to the effective adoption of AI policy frameworks in underdeveloped nations is a lack of funding (Kumar et al, 2021). Building AI infrastructure and developing training programs can be prohibitively expensive, especially in countries with tight budgets and conflicting agendas. Financing for hardware, software, and employee training is necessary for investments in AI technology, but in many emerging nations, this capital may not be easily accessible. Furthermore, relying too much on foreign assistance or money may present new difficulties. Reliance on outside funding can raise sustainability issues even while international aid and investment can be quite helpful in advancing AI programs (Galaz eta!., 2021). Ongoing AI projects may find it difficult to continue operating if donor funding is stopped or curtailed. To address financial constraints, developing countries need to explore innovative funding mechanisms, such as public-private partnerships, to leverage private sector investment and reduce dependence on external aid. Establishing local funding sources and fostering entrepreneurship in the AI sector can also help create a more sustainable financial ecosystem for Al development (Mosteanu, 2020).

Another major obstacle that makes it more difficult to establish AI policy frameworks in poor nations is the technological and digital gap (Jamil, 2021). The lack of infrastructure and essential AI tools in many rural locations can impede the mainstream deployment of AI technologies. These areas lack computing power, dependable internet access, and digital literacy initiatives, which leads to inequities that impede fair access to the advantages of AI. Because of this, AI may develop quickly in urban regions while underserving rural communities continue to exist, escalating already-existing disparities. Moreover, the uneven allocation of AI resources and prospects among nations may provide supplementary obstacles

(OhEigeartaigh et al, 2020). Wealthier regions or urban centers may attract more investment in Al technologies and talent, while marginalized communities may be left behind. This concentration of resources can limit the ability of developing countries to harness the full potential of AI, as benefits become concentrated in specific areas rather than being shared equitably across society (Kitsara, 2022). To address these challenges, policymakers must prioritize investments in digital infrastructure and access to technology in underserved areas. Creating initiatives that promote digital literacy and training programs can help bridge the gap, ensuring that all citizens have the opportunity to engage with AI technologies. Additionally, fostering collaboration between government, private sector, and civil society organizations can help address the digital divide by pooling resources and expertise to expand access to Al tools (Bühler et al, 2023).

The problems involved with adopting AI policy frameworks in developing nations are diverse, originating from political and governance issues, financial limits, and technological divides (Maragno et al, 2023). Governments, businesses, and civil society organizations must work together to create political will, obtain long-term funding, and resolve inequalities in technology access in order to overcome these challenges (Moallemi et al, 2020; Mondschein et al, 2021). By addressing these issues, developing nations may foster the adoption of AI and take advantage of its potential to boost GDP, increase public services, and improve people's quality of life in general. In order to steer this process and guarantee that the advantages of AI are distributed fairly throughout society, effective frameworks for AI policy will be essential (Leslie, 2020).

Pitfalls of Al in Education

For all its promise, AI in education also carries significant risks that, if left unaddressed, could constrain or even shrink the capabilities of learners and teachers. The guiding questions must be: Do AI-driven practices protect and enhance human agency, or do they erode it? Do they promote equity, or exacerbate inequalities? Do they respect students' and teachers' dignity and voice? Without careful design, AI could undermine student agency – for example, if AI spoonfeeds children solutions or is biased towards content trained on a largely Western dataset, it can create dependence and subtly shape values, norms and aspirations. The hallucination of false information is a new form of the old concern about unreliable sources now coming from a confident, authoritative AI. Algorithmic bias is another concern: a personalised learning app might subtly steer boys towards STEM activities more than girls, due to unconscious bias in its algorithm. There are also concerns about privacy and surveillance – AI systems that collect detailed data on student performance or behaviour could be misused, compromising students' rights and creating a climate of monitoring that stifles the freedom to fail and learn. Additionally, heavy reliance on AI might harm teachers and ultimately learning if administrators see AI as a way to cut costs on human educators. And finally AI could widen inequalities if cutting-edge AI education technologies reach only well- funded schools and wealthy countries.

OpenAl's ChatGPT was the fastest-growing application in history. Today, AI is ubiquitous. The task now is to catch up: to formulate policies that ensure AI is a boon for human development. That means placing ethical safeguards (pro tecting rights to privacy, equality and agency), ensuring inclusive access (so AI doesn't become a luxury good), and keeping the focus on human empowerment (training teachers and students to wield AI for their own purposes, not be controlled by it).

Future Trends

Developing nations need to take the initiative to make the most of artificial intelligence (AI) as its potential develops, taking into account the particular difficulties they encounter and maximizing its advantages (Nishant et al, 2020; Borges et al, 2021). Effective AI policy frameworks can be shaped by a number of future trends and recommendations, which will help traverse this changing landscape with success. This talks on how important it is to build publicprivate partnerships, encourage inclusive AI research, and put in place reliable monitoring and assessment systems.

To ensure that the benefits of AI advancements reach all segments of society, particularly marginalized and rural populations, inclusive AI development must be prioritized (Birhane et al, 2022). This involves creating Al solutions tailored to the specific needs and contexts of underserved communities. For example, AI applications in agriculture can significantly enhance food security by optimizing crop yields and improving access to market information for small holder farmers. By involving local stakeholders in the design and implementation of AI technologies, developers can ensure that solutions are culturally relevant and address the unique challenges faced by these communities (Crockett et al, 2021; Madaio etal, 2022). Furthermore, capacity-building initiatives aimed at enhancing digital literacy and technical skills among marginalized groups are essential. Educational programs that focus on AI skills development can empower individuals in rural areas to engage with AI technologies actively. This empowerment will not only facilitate job creation in emerging AI sectors but also foster a sense of ownership and agency among underserved populations, enabling them to leverage AI for their development (Sey and Mudongo, 2021; Jumani, 2021; Rodrigues etal., 2022).

Governments, universities, and the private sector must work together to promote publicprivate partnerships (PPPs). Developing nations can establish an ecosystem that fosters AI innovation and growth by utilizing the resources and knowledge of multiple stakeholders (Wang et al., 2023). By establishing a supportive legislative framework that promotes private sector investment in AI research and development, governments may play a critical role. The creation of innovation hubs and incubators that assist entrepreneurs focusing on Al solutions for regional problems can result from collaborative efforts. These partnerships can also facilitate knowledge sharing between academic institutions and industry, ensuring that research is aligned with realworld needs. Additionally, engaging the private sector in policymaking processes can help identify emerging trends and challenges, allowing for the co-creation of effective AI policies (Panori etal, 2021).

Establishing robust monitoring and evaluation mechanisms is essential to assess the impact of AI policies continually. Developing countries must implement frameworks that enable regular assessments of AI initiatives, tracking their effectiveness in achieving desired outcomes (Chowdhury et al, 2023). These mechanisms should focus on measuring not only economic indicators but also social impacts, such as improvements in health care, education, and overall quality of life. To keep pace with rapid technological changes, policymakers must remain adaptable and willing to revise Al policies based on evaluation findings. This adaptive approach will allow for timely responses to emerging challenges and opportunities in the AI landscape. Engaging stakeholders in the evaluation process can provide valuable insights and foster a culture of accountability and transparency in AI governance (Birkstedt etal, 2023).

The potential for artificial intelligence (AI) in developing nations is enormous, as long as inclusive development, public private collaboration, and strong monitoring mechanisms are given top priority (Alami etal, 2020). Developing public private partnerships will also encourage innovation and help local governments match AI initiatives with needs. Lastly, putting in place efficient monitoring and evaluation mechanisms will allow governments to continuously improve AI

Policies and make sure they stay relevant in an ever-changing technological landscape (Yaseen, 2023; Allioul and Mourdi, 2023). By adapting these trends and recommendations, developing nations can take adantage of AI's transformative power to promote sustainable develoopment and improve the lives of their citizens.

Conclusion

The exponential growth and pervasive application of Artificial Intelligence (AI) in major aspects of human activities viz, Education, Healthcare, Agriculture, Communication, Entertainment etc makes it the new century topic of interest. To achieve meaningful development and integration, reliable national framework of AI policy needs to be developed comprehensively. However identified problems involved

with adopting AI policy framework in Nigeria are diverse, originating from political and governance issues, financial limitations and technological divides. Therefore, governments, businesses and civil society organizations must work together to create the political will, obtain long term funding and resolve inequalities in technology access in order to overcome these challenges. The issues of misinformation, disinformation and sexualized AI deepflakes in the application of AI technologies are now of paramount concern.

REFERENCES

Adam, I. and Fazekas, M., 2021. Are emerging technologies helping win the fight against corruption? A review of the state of evidence. *Information Economics and Policy*, 57, p.100950.

Aderibigbe, A.0., Ohenhen, P.E., Nwaobia, N.K., Gidiagba, 1.0. and Ani, E.C., 2023. Artificial intelligence in developing countries: bridging the gap between potential and implementation. *Computer Science & IT Research Journal*, 4(3), pp.

Alami, H., Rivard, L., Lehoux, P., Hoffman, S.J., Cadeddu, S.B.M., Savoldelli, M., Samri, MA., Ag Ahmed, M.A., Fleet, R. and Fortin, J.P., 2020. Artificial intelligence in health care: laying the Foundation for Responsible, sustainable, and inclusive innovation in low-and middle-income countries. *Globalization and Health,* 16, pp.

Benefo, E.0., Tingler, A., White, M., Cover, J., Torres, L., Broussard, C., Shirmohammadi, A., Pradhan, AK. and Patra, D., 2022. Ethical, legal, social, and economic (ELSE) implications of artificial intelligence at a global level: a scientometrics approach. AI and Ethics, 2(4), pp.

Birhane, A., Isaac, W., Prabhakaran, V., Diaz, M., Elish, M.C., Gabriel, I. and Mohamed, S., 2022, October. Power to the people? Opportunities and challenges for participatory AI. In *Proceedings of the 2nd ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization* (pp. 1-8).

Birkstedt, T., Minkkinen, M., Tandon, A. and Mäntymaki, M., 2023. AI governance: themes, kt gaps and future agendas. *Internet Research*, 33(7), pp. 3-167.

Borges, A.F., Laurindo, F.J., SpInola, M.M., Gonçalves, R.F. and Mattos, C.A., 2021. The strategic use of artificial intelligence in the digital era: Systematic literature review and future research directions. *International journal of information management*, 57, p.102225.

Bühler, MM., Caizada, I., Cane, I., Jelinek, T., Kapoor, A., Mannan, M., Mehta, S., Mookerje, V., Nubel, K., Pentland, A. and Scholz, T., 2023. Unlocking the power of digital commons: Data cooperatives as a pathway for data sovereign, innovative and equitable digital communities. *Digital*, 3(3), pp.146-171.

Chatterjee S. (20200. AI strategy of India: Policy framework, adoption challenges and actions for government. Transform Gov People Process Policy 14(5):757-775.

Chowdhury, S., Dey, P., Joel-Edgar, S., Bhattacharya, S., Rodriguez-Espindola, O., Abadie, A. and Truong, L., 2023. Unlocking the value of artificial intelligence in human resource management through AI capability framework. *Human resource management review*,
33(1), p.

Crockett, K., Colyer, E., Gerber, L. and Latham, A., 2021. Building trustworthy AI solutions: A case for practical solutions for small businesses. *IEEE Transactions on Artificial Intelligence*, 4(4), pp.

Dara, R., Hazrati Fard, S.M. and Kaur, J., 2022. Recommendations for ethical and responsible use of artificial intelligence in digital agriculture. *Frontiers in Artificial Intelligence*, 5, p.

Dridi, M.A., Radhakrishnan, D., Moser-Mercer, B. and DeBoer, J., 2020. Challenges of blended learning in refugee camps: When internet connectivity fails, human connection succeeds. *The International Review of Research in Open and Distributed Learning*, 21(3), pp.250263.

Elliott, K., Price, R., Shaw, P., Spiliotopoulos, T., Ng, M., Coopamootoo, K. and Van Moorsel, A., 2021. Towards an equitable digital society: artificial intelligence (AI) and corporate digital responsibility (CDR). *Society*, 58(3), pp.179-188.

Falco, G., Shneiderman, B., Badger, J., Carrier, R., Dahbura, A., Danks, D., Eling, M., Goodloe, A., Gupta, J., Hart, C. and Jirotka, M., 2021. Governing AI safety through independent audits. *Nature Machine Intelligence*, 3(7), pp.566-571.

Fasuludeen Kunju, F.K., Naveed, N., Anwar, M.N. and UI Haq, M.I., 2022. Production and maintenance in industries:impact of industry 4.0. Industrial Robot*: The international journal of robotics research and application*, 49(3), pp.461-475.

Fatima, S. Desouza KC, Dawson GS (2020). National strategic artificial intelligence plans: A multidimensional analysis. Econ Anal Policy 67:178-198.

Feijóo, C., Kwon, Y., Bauer, J.M., Bohlin, E., Howell, B., Jam, R., Potgieter, P., Vu, K., Whalley, J. and Xia, J., 2020. Harnessing artificial intelligence (AI) to increase wellbeing for all: The case for a new technology diplomacy. *Telecommunications Policy*, 44(6), p.

Fukuda-Parr, S. and Gibbons, E., 2021. Emerging consensus on 'ethical AI': human rights critique of stakeholder guidelines. *Global Policy*, 12, pp.

Galaz, V., Centeno, M.A., Callahan, P.W., Causevic, A., Patterson, T., Brass, I., Baum, S., Farber, D., Fischer, J., Garcia, D. and McPhearson, T., 2021. Artificial intelligence, systemic risks, and sustainability. *Technology in Society*, 67, p.101741.

Gehl Sampath, P., 2021. Governing artificial intelligence in an age of inequality. *Global Policy*, 12, pp.

George, AS., 2023. Future economic implications of artificial intelligence. *Partners Universal International Research Journal*, 2(3), pp.

Goel, R.K., Yadav, C.S., Vishnoi, S. and Rastogi, R., 2021. Smart agriculture—Urgent need of the day in developing countries. *Sustainable Computing: inform atics and Systems*, 30, p.

Greenstein, S., 2022. Preserving the rule of law in the era of artificial intelligence (AI). *Artificial Intelligence and Law*, 30(3), pp.

Guenduez, A.A. and Mettler, T., 2023. Strategically constructed narratives on artificial intelligence: What stories are told in governmental artificial intelligence policies?. *Government Information Quarterly*, 40(1), p.

Haleem, A., Javaid, M., Singh, R.P. and Suman, R., 2021. Telemedicine for healthcare: Capabilities, features, barriers, and applications. *Sensors international*, 2, p.

Hanna, N.K., 2020. Assessing the digital economy: aims, frameworks, pilots, results, and lessons. *Journal of innovation and entrepreneurship*, 9(1), p. 6.

Holon, IQ (2020). 50 National AI strategies – the 2020 AI strategy landscape. Holon IQ. Assessed on 12 July 2022.

Jamil, S., 2021. From digital divide to digital inclusion: Challenges for wide-ranging digitalization in Pakistan. *Telecommunications Policy*, 45(8), p. 02206.

Javaid, M., Haleem, A., Singh, R.P. and Suman, R., 2022. Artificial intelligence applications for industry 4.0: A literature-based study. *Journal of industrial Integration and Management*, 7(01), pp. 11.

Johnson, J., 2022. The AI commander problem: Ethical, political, and psychological dilemmas of human-machine interactions in AI-enabled warfare. *Journal of Military Ethics*, 21(3-4), pp. 71.

Jumani, AK., 2021. Examining the Present and Future Integrated role of Artificial intelligence in the business: A survey study on Corporate sector. *Journal of Computer and Communications*, 9(0 1), p.

Kumar, S., Raut, R.D., Queiroz, M.M. and Narkhede, B.E., 2021. Mapping the barriers of AI implementations in the public distribution system: The Indian experience. *Technology in society*, 67, p.

Larson, D.B., Magnus, D.C., Lungren, M.P., Shah, N.H. and Langlotz, C.P., 2020. Ethics of using and sharing clinical imaging data for artificial intelligence: a proposed framework. *Radiology*, 295(3), pp.

Leslie, D., 2020. Tackling COVID-19 through responsible AI innovation: Five steps in the right direction. *Harvard Data Science Review*, 10.

Madaio, M., Egede, L., Subramonyam, H., Wortman Vaughan, J. and Wallach, H., 2022. Assessing the fairness of ai systems: AI practitioners' processes, challenges, and needs for support. *Proceedings of the ACM on Human- Computer Interaction*, 6(CSCW1), pp.1-26.

Maragno, G., Tangi, L., Gastaldi, L. and Benedetti, M., 2023. Exploring the factors, affordances and constraints outlining the implementation of Artificial Intelligence in public sector organizations. *International Journal of information Management*, 73, p.

Mhlanga, D., 2021. Artificial intelligence in the industry 4.0, and its impact on poverty, innovation, infrastructure development, and the sustainable development goals: Lessons from emerging economies?. *Sustainability*, 13(11), p.5788.

Mikic, M. and Malala, J. 2021. The impact of artificial intelligence on the future of work. In *The Home in the Digital Age* (pp. 143-159). Routledge.

Moallemi, E.A., Malekpour, S., Hadjikakou, M., Raven, R, Szetey, K., Ningrum, D., Dhiaulhaq, A. and Bryan, B.A., 2020. Achieving the sustainable development goals requires transdisciplinary innovation at the local scale. *One Earth*, 3(3), pp.

Modi, T.B., 2023. Artificial Intelligence Ethics and Fairness: A study to address bias and fairness issues in AI systems, and the ethical implications of AI applications. *Revista Review Index Journal of Multidisciplinary*, 3(2), pp.24-35.

Mosteanu, N.R., 2020. Green sustainable regional development and digital era. In Green buildings and renewable energy: Med green forum 2019-part of world renewable energy congress and network (pp. 181-197). *Springer International Publishing*.

Mustapha, U.F., Alhassan, A.W., Jiang, D.N. and Li, G.L., 2021. Sustainable aquaculture development: a review on the roles of cloud computing, internet of things and artificial intelligence (CIA). *Reviews in Aquaculture*, 13(4), pp.2076-2091.

Nishant, R., Kennedy, M. and Corbett, J., 2020. Artificial intelligence for sustainability: Challenges, opportunities, and a research agenda. *Intern ationalJournal of Information Management*, 53, p.

Oguamanam, C., 2020. Indigenous peoples, data sovereignty, and self-determination: Current realities and imperatives. *The African Journal of Information and Communication*, 26, pp.

OhEigeartaigh, S.S., Whittlestone, J., Liu, Y., Zeng, Y. and Liu, Z., 2020. Overcoming barriers to cross-cultural cooperation in AI ethics and governance. *Philosophy & technology*, 33, pp.571-593.

Panori, A., Kakderi, C., Komninos, N., Fellnhofer, K., Reid, A. and Mora, L., 2021. Smart systems of innovation for smart places: Challenges in deploying digital platforms for co-creation and data-intelligence. *Land Use Policy*, 111, p.104631.

Pham Q.V., Nguyen DC, Huynh- The T, Hwang W.J., Pathirana PN (2020). Artificial intelligence (AI) and big data for coronavirus (COVID-19). pandemic: A survey on the state-of-the-arts. IEEE Access 8:130820.

Polaris (2021). PALESTINE Startups Ecosystem Map – Polaris. https://polaris.ps/palestinestartups-ecosystem-map/06/02/2022/. Accessed 29 Oct 2022.

Raj, E.F.I., Appadurai, M. and Athiappan, K., 2022. Precision farming in modern agriculture. In Smart agriculture automation using advanced technologies: Data analytics and machine learning, cloud architecture, automation and IoT (pp. 61-87). Singapore: Springer Singapore.

Robinson, S.C., 2020. Trust, transparency, and openness: How inclusion of cultural values shapes Nordic national public policy strategies for artificial intelligence (AI). *Technology in Society*, 63, p.

Rodrigues, S.M., Kanduri, A., Nyamathi, A., Dutt, N., Khargonekar, P. and Rahmani, A.M., 2022. Digital Health-Enabled Community-Centered Care: Scalable Model to Empower Future Community Health Workers Using Human-in-the-Loop Artificial Intelligence. *JMIR formative research*, 6(4), p.e29 535.

Schiff, D., Biddle, J., Borenstein, J. and Laas, K., 2020, February. What's next for ai ethics, policy, and governance? a global overview. In *Proceedings of the AMI/ACM Conference on AI, Ethics, and Society* (pp. 153-158).

Sey, A. and Mudongo, O., 2021. Case studies on AI skills capacity building and AI in workforce development in Africa. Research ICT Africa. Available from: https://researchictafrica. net/publication/case-studies-on-ai-skills capacity-buildingand-ai-in-workforcedevelopment-in-africa.

Shao, Y. and Chen, Z., 2022. Can government subsidies promote the green technology innovation transformation? Evidence from Chinese listed companies. *Economic Analysis and Policy*, 74, pp.

Singh, R.P., Horn, G.L., Abrarnoff, M.D., Campbell, J.P. and Chiang, M.F., 2020. Current challenges and barriers to real-world artificial intelligence adoption for the healthcare system, provider, and the patient. *Translational Vision Science & Technology*, 9(2), pp.4545.

Thowfeek, M.H., Samsudeen, SN. and Sanjeetha, M.B.F., 2020. Drivers of artificial intelligence in banking service sectors. *Solid State Technology*, 63(5), pp.6400-6411.

Tizhoosh HR, Pantanowitz L (2018). Artificial Intelligence and digital patholocy: Challenges and opportunities. J. Pathol Inform 9(1):38

Ulnicane, I., Knight, W., Leach, T., Stahl, B.C. and Wanjiku, W.G., 2021. Framing governance for a contested emerging technology: insights from AI policy. *Policy and Society*, 40(2), pp.158-177.

Varo I., 2022. On the path to the future: mapping the notion of transparency in the EU regulatory framework for AI. *International Review of Law, Computers & Technology*, 36(2), pp.95117.

Vats A. Natarajan N. et al (2022). G20. AI: national strategies, global ambitions. Observer Research Foundation and Observer Research Foundation America, Washington.

Wang, F., Wong, W.K., Wang, Z., Albasher, G., Alsultan, N. and Fatemah, A., 2023. Emerging pathways to sustainable economic development: An interdisciplinary exploration of resource efficiency, technological innovation, and ecosystem resilience in resource-rich regions. *Resources Policy*, 85, p.

Yigitcanlar, T., Corchado, J.M., Mehmood, R., Li, R.Y.M., Mossberger, K. and Desouza, K., 2021. Responsible urban innovation with local government artificial intelligence (AI): A conceptual framework and research agenda. *Journal of Open innovation: Technology, Market, and Complexity*, 7(1), p.

Zhang Y., Xiong F., ie Y, Fan X, Gu H. (2020). The impact of artificial intelligence and blockchain on the accounting profession. IEEE Access 8:110461-110477.

Zhuang, T. and Liu, B., 2022. Sustaining higher education quality by building an educational innovation ecosystem in China-policies, implementations and effects. *Sustainability*, 14(13), p.7568.