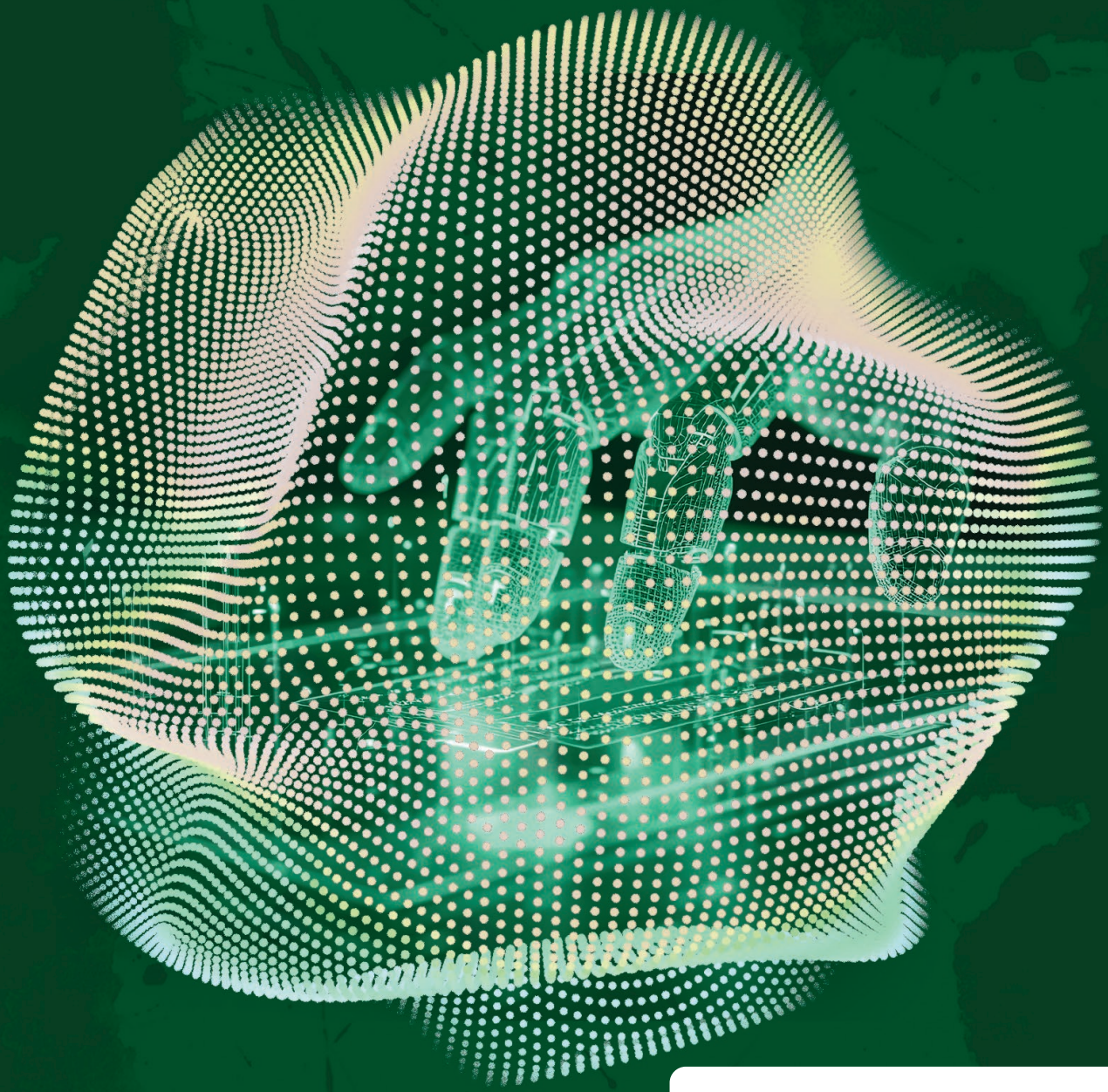
NAIS

NATIONAL ARTIFICIAL INTELLIGENCE STRATEGY



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NCAIR
NATIONAL CENTER FOR ARTIFICIAL INTELLIGENCE & ROBOTICS

NITDA
National Information Technology Development Agency

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Executive Summary

The advent of Artificial Intelligence (AI) has precipitated a paradigmatic shift in global innovation and transformation, driving cutting-edge advancements across nations and industries. The ramifications of its impact on the global ecosystem and specifically on the developmental trajectory of Nigeria and other African nations are profound and far-reaching. Nigeria, as the continent's most populous country, is singularly positioned to harness AI's transformative capacity to address pressing socio-economic conundrums, accelerate economic growth, and pivot the nation into a new epoch of technological empowerment, which will unlock unprecedented opportunities for sustainable development, economic prosperity, and human flourishing.

This National Artificial Intelligence Strategy (NAIS) is a living document to guide Nigeria's adoption of artificial intelligence for socio-economic change. Before presenting the strategy, the document presents a background and explanatory notes on AI, setting the context for AI in an emerging market like Nigeria.

Nigeria's National AI Strategy (NAIS) sets a path to achieve the vision "To be a global leader in AI, leveraging ethical and inclusive innovation, local talent, and strategic collaboration to drive sustainable development."

Strategic Objectives

While the opportunities in AI abound, the NAIS is framed and aligned with Nigeria's national development goals, the Federal Ministry of Communication, Innovation and Digital Economy's strategic plan, Accelerating our Collective Prosperity through Technical Efficiency, the National Information Technology Development Agency's Strategic Roadmap and Action Plan 2.

The key strategic goals of this NAIS are to 1) build economic growth and competitiveness by focussing on AI's impact on industries, jobs and productivity, through local and foreign participation, 2) enhance social development and inclusion by improving outcomes in sectors such as healthcare, agriculture and education, addressing issues like poverty, inequalities and climate change, improve government services leaving no citizen behind and empowering citizens to harness AI benefits; 3) promote Nigeria's technological advancement and leadership by developing the research, development and innovation resources, capabilities and frameworks for responsible and ethical AI and promoting Nigeria as a stakeholder in the global AI ecosystem.

Strategic Pillars

Underpinning these strategic objectives are 5 strategic pillars that form the core of Nigeria's AI aspirations. Summarised in the image below, the 5 pillars are

1) Building Foundational AI Infrastructure,
2) Building and Sustaining a World-class AI Ecosystem,
3) Accelerating AI Adoption and Sector Transformation,
4) Ensuring Responsible and Ethical AI Development and Deployment, and
5) Developing a Robust AI Governance Framework.

These broad strategic pillars form the foundation for the 34 strategies developed to actualise Nigeria's vision.
Implementing these strategies requires a multi-stakeholder approach comprising commitments from the public and private sectors, academia, civil society, and development organisations.

"Our vision is to be a global leader in AI, leveraging ethical and inclusive innovation, local talent, and strategic collaboration to drive sustainable development"

Economic Growth and Competitiveness

1.0 Building Foundational AI Infrastructure

Affordable high-performance computing (HPC) resources that scale local AI developments.

National technological capabilities in AI.

Innovative approaches to deploying AI systems that reduce carbon footprint.

Private sector investment in AI infrastructure.

Reduced carbon footprint and improved energy efficiency.

2.0 Building and Sustaining a World-class AI Ecosystem

Network of stakeholders collaborating on practical AI applications with a positive economic and societal impact.

Network of successful AI startups driving innovation and contributing to economic growth.

AI Centres of Excellence, leading the development of industry-specific AI solutions, training the next-gen AI. talent, and serving as ethical AI thought leaders.

National AI conference attracting international participation, promoting knowledge exchange, and stimulating innovation.

Ecosystem of AI startups and established companies successfully commercialising AI solutions.

Highly skilled AI professionals working in Nigeria.

Increase joint research projects, knowledge transfer, and co development of AI solutions.

Social Development and Inclusion

3.0 Accelerating AI Adoption and Sector Transformation

Portfolio of AI projects demonstrating the value proposition of AI and stimulate investment and adoption.

Availability of high-quality data for AI research and development.

Holistic data governance standards that adhere to the tents of the NDPA.

Increase in individuals with AI skills across various sectors.

Supportive regulatory framework for AI development and adoption, attracting investment and fostering innovation.

Collaboration between stakeholders, leading to commercially viable AI solutions.

Clear and actionable plans for AI adoption across critical sectors, leading to increased productivity and efficiency.

Consistent and reliable data used in AI applications across sectors.

Availability of public sector data for AI applications, stimulating innovation in various sectors.

Awareness and understanding of AI among stakeholders, leading to accelerated adoption and problemsolving through AI.

Portfolio of commercially viable green AI solutions/projects.

Technological Advancement and Leadership

4.0 Ensuring Responsible and Ethical AI Development

Well-respected and diverse AIEEG established, providing independent and objective advice on AI ethics and overseeing AI technologies' ethical development and deployment.

Clear and comprehensive set of ethical principles for AI, addressing fairness, transparency, accountability, privacy, and human well-being.

Standardised assessment tool ensuring that AI projects align with established ethical principles.

Clear understanding of emerging trends, potential challenges and opportunities associated with AI development.

Legal framework that promotes responsible AI development and protects human rights and privacy.

5.0 Developing a Robust AI Governance Framework

Comprehensive National AI Principles that are publicly available, transparent, and inform all AI development and use aspects.

A well-functioning and respected AI Governance Regulatory Body provides clear guidance, enforces ethical standards, and promotes responsible AI development.

Transparent terms and guidelines for responsible AI development.

Comprehensive risk management framework that minimises the potential negative impacts of AI deployment.

Strategic initiatives to be implemented over five (5) years

The strategy recognises that AI implementations and goals are not devoid of risks, identifying risk factors and mitigants.

In conclusion, this AI strategy aligns with Nigeria's national vision of becoming a global leader in responsible and ethical AI innovation, with a high potential for national development, economic growth, and social progress. AI can catalyse solutions to national challenges like unemployment, data quality, and national security. Finally, while ambitious in its vision, the strategy focuses on achievable objectives with clear initiatives for implementation, ensuring practical progress towards the national goals.

Foreword

Nigeria recognises artificial intelligence (AI) as a tool for national development and is taking strides to drive sustainable growth, innovation, national productivity, and human well-being through AI solutions. This national AI strategy, a collective effort between the Nigerian Government led by the Federal Ministry of Communication, Innovation and Digital Economy and Nigerians in academia, the diaspora, and the international tech and development communities, is the first of inclusive and collaborative policy development.

This strategy resonates with the bold and visionary leadership of President Bola Ahmed Tinubu, GCFR, and the quest to build a trillion-dollar economy by 2030. AI is integral to actualising that vision and Nigeria's economic growth.

Our vision and goals are audacious, recognising that Nigeria, despite her developmental challenges, can leverage AI to bridge the gaps. Nevertheless, we acknowledge that such a bold ambition requires multiple stakeholders and partners.

As we embark on this journey, we welcome all our stakeholders to believe in a digital Nigeria where AI drives transformative, ethical, and inclusive innovation for sustainable development and economic prosperity.

Acronyms

3MTT	3 Million Technical Talent
AI	Artificial Intelligence
AIEEG	AI Ethics Expert Group
CAGR	Compound annual growth rate
CRO	Chief Risk Officer
FMCIDE	Federal Ministry of Communications, Innovation and Digital Economy
GBB	Galaxy Backbone
GDP	Gross Domestic Product
IFC	International Finance Corporation
LLM	Large Language Model
LMIC	Low, Middle-Income Country
NAIRS	National Artificial Intelligence Research Scheme
NAIS	National Artificial Intelligence Strategy
NAPCE	Nigerian AI Partnership for Commercialisation Excellence
NCAIR	National Centre for Artificial Intelligence and Robotics
NCC	National Communications Commission
NDEPS	National Digital Economy Policy and Strategy
NDPA	National Data Protection Act
NIST	National Institute of Standards & Technology
NITDA	National Information Technology Development Agency
SDG	Sustainable Development Goals
SRAP	Strategic Roadmap and Action Plan
SWOT	Strengths, Weaknesses, Opportunities and Threats
TRAIN	Top Ranked AI Nations

Introduction

1.1.1. Background

1.1.1.1. Imperatives for a National AI Strategy

The advent of Artificial Intelligence (AI) has precipitated a paradigmatic shift in global innovation and transformation, driving cutting-edge advancements across nations and industries. The ramifications of its impact on the global ecosystem and specifically on the developmental trajectory of Nigeria and other African nations are profound and far-reaching. Nigeria, as the continent's most populous country, is singularly positioned to harness AI's transformative capacity to address pressing socio-economic conundrums, accelerate economic growth, and pivot the nation into a new epoch of technological empowerment, which unlocks unprecedented opportunities for sustainable development, economic prosperity, and human flourishing.

In recent years, Artificial intelligence (AI) has emerged globally as the driving force behind the Fourth Industrial Revolution, a transformative technological phenomenon with far-reaching implications for governments, citizens, and industries. While AI will catalyse new possibilities and open new opportunities for economic development, it poses unprecedented challenges for governments, especially on issues of ethical applications, algorithmic transparency, data privacy and potential labour market displacements. It is, therefore, imperative for the government, as the guardian of public welfare and provider of collective goods and services, to bear a unique responsibility in ensuring that AI yields inclusive benefits for the broader population rather than exacerbating existing inequalities. The process of leading the cultivation of AI-driven economies for the benefit of all citizens must be consultative and participatory to ensure that all societal sectors are engaged in strategic deliberation, given its pervasive applications and direct impact on everyone.

The year 2024 has been described as a watershed year for the advancement of AI, as government, academia, and industry stakeholders endeavour to determine the most effective and pragmatic strategies for integrating this transformative technological innovation into our daily lives, thereby harnessing its vast potential to drive meaningful impact and improvement at scale. This builds on the growing investment in AI by the public and private sectors in the last few years. Global corporate investment in AI has increased significantly in the last five years (1). Research by Deutsche Bank showed that the total global corporate investment in AI has grown 150% since 2019 to nearly $180 billion (N240 trillion naira), while the number of public AI projects rose to almost 350,000 by the end of 2022 (2). More specifically, the Nigerian AI market is poised for substantial growth, with a projected $434.4 million by 2026, representing a compound annual growth rate (CAGR) of 44.2%. This remarkable expansion underscores the escalating adoption of AI solutions across diverse sectors, including finance, agriculture, healthcare, and telecommunications, driven by technological advancements and innovative applications.

Developing a national AI plan is a significant, strategic undertaking that spans the entire value chain, including socio-economic levers. For this reason, it is critical to shape a national AI ecosystem that aligns with a country's strategic priorities, strengths, and weaknesses and with core advantages and assets that can be leveraged at the national and international levels. It is also essential that any nation's foundational challenges be considered when developing an overarching plan. For example, while Nigeria possesses promising opportunities resulting from rapid population growth, a large potential labour force, and a high youth population, other challenges such as illiteracy levels, limited broadband penetration, and constrained physical infrastructure are mitigating factors. Additionally, the strategy must therefore highlight the inherent considerations that must be carefully addressed in developing and deploying local AI solutions in Nigeria, especially as it relates to improving the public education system, deepening adequate data ecosystem, and driving public ownership for shared prosperity of all. These issues and more are why a holistic national AI strategy is imperative, coupled with accountable indicators, measurable objectives, and investment targets (1).

The Nigerian government has demonstrated the need for an inclusive, public-centred, and well-articulated roadmap to harness the benefits of artificial intelligence (AI) for the public good while mitigating the risks of AI's diverse possibilities. This national position is anchored on the enormous importance of AI as a nation-defining capability; hence, the need for a bottom-up approach that integrates a diversity of thought, embeds inclusiveness of expertise, and supports human-centred application of AI across all user groups and expert value chains. It is against this backdrop that Nigeria's Ministry of Communications, Innovation and Digital Economy hosted a 4-day workshop themed "Developing the High-level Strategy and Implementation Plan for a National AI Strategy for Nigeria" between April 15 and 18, 2024, to co-create a National Artificial Intelligence Strategy (NAIS), led in-person by the Honourable Minister of Communications, Innovation, and Digital Economy, Dr Bosun Tijani.

The workshop ran as a knowledge synthesis and ideation workshop, bringing together global and local experts in Artificial Intelligence. The session attested to the immense importance that the Nigerian government places on the active involvement and participation of multiple stakeholders in developing a holistic strategy that aligns the country's strategic priorities, leverageable competitive advantage, strategic assets, strengths, and weaknesses as a baseline for a differentiated and bespoke AI strategy that is designed for all its citizens. The sessions ran as plenary and multiple parallel break-out sessions where experts jointly explored global best practices, analysed the Nigerian context, and defined the unique Nigeria-centric AI strategy pathway. The sessions articulated the national AI vision, measurable impact goals, implementation roadmap, governance structures, and steps needed to catalyse Nigeria into an AI-driven economy with a clear line of sight on critical dependencies. In addition, the outcome of the workshop was further validated and enhanced through follow-up stakeholders' engagement sessions held between July 2024 and January 2025 via public feedback, expert-based review sessions, and online engagements, across the public and private sectors.

Having demonstrated the vital importance of AI development to Nigeria, the next section sets out the reasoning and economic basis that (must) serve as the building block for an achievable and efficient AI strategy for Nigeria

This inaugural National Artificial Intelligence (AI) Strategy, a landmark initiative aimed at harnessing the transformative potential of AI to drive sustainable development, innovation, national productivity, and human well-being, will solidify Nigeria's position as a champion in AI adoption on the African continent, building on the nation's pioneering establishment of the National Centre for AI and Robotics (NCAIR) and many AI-specific government initiatives to foster a knowledge-based economy and promote research and development in AI systems.

This position reinforces the importance of AI as a source of differential advantage in the global ecosystem of fragmented yet intrinsically linked global supply chains of AI knowledge and innovations. It is a strategic bridge that will address most infrastructural constraints in emerging markets and provides a leapfrog for nuanced innovations.

1.1.1.2. Rationale for a National AI Strategy

The national AI strategy serves as a comprehensive roadmap and guiding framework for harnessing the rapidly evolving technological landscape and socio-economic trends, enabling a nation to chart its distinctive course and develop a tailored approach to optimise the benefits of AI for the betterment of society (1). A proactive approach in the formulation of national AI strategy enables nations to enhance the welfare and quality of life of their citizens, primarily through an intentional application of AI to drive meaningful improvements in critical sectors such as healthcare, education, and agriculture, ultimately leading to better outcomes, increased efficiency, and improved citizen experience.

AI's impact on achieving the United Nation's Sustainable Development Goals (SDGs) has been noted (3). The SDGs were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030, all people will enjoy peace and prosperity. Research posits that AI can contribute to nearly 80%% of the SDGs and their targets. Another study, using a consensus-based expert elicitation process, found that AI may enable the accomplishment of 134 targets across all 17 SDG goals. The implication of this is evidenced in the UN estimates that achieving the SDGs in Africa could open $12 trillion in market opportunities and 380 million jobs by 2030 (4)(5). AI innovations with the potential to positively impact the SDGs are already happening in Nigeria. For example, in the agriculture sector, which influences SDG Goal 2, zero hunger, local AI startups have shown great promise with AI-powered precision agriculture solutions that provide data-driven insights to help farmers optimise their outputs. Similarly, startups in renewable energy are influencing SDG Goal 7, affordable and green energy, by demonstrating how AI can be applied to manage solar energy needs and consumption patterns, understand household credit risk and estimate demand for energy solutions (3). These productivity improvements have a direct impact on economic contribution. AI innovations have the potential to contribute to economic growth in Africa. In addition, the African Union Development Agency estimates that AI could double frica's Gross Domestic Growth (GDP) growth rate by 2035 (6).

What makes AI a compelling force for advancement and change is that the technology has the potential to make an impact for all, irrespective of a nation's developmental cycle. It can provide a veritable alternative to address less developed countries' human resource and infrastructure gaps as it can be adapted to serve nuanced development-oriented use cases (5). Attaining significant results such as these, where AI bridges developmental gaps, requires a strategic approach that includes accelerating development and solidifying governmental commitment to a shared vision, long-term orientation, responsible governance frameworks, and values that build trust and cohesion. The upside is the potential for game-changing improvements in core areas that underscore a nation's health and longevity: health, education, food security, energy, and climate action. While there are concerns, among others, that the developing world could be left behind as AI advances rapidly, it is an emerging knowledge that if AI is deployed effectively and harnessed responsibly, it promises to drive inclusive and sustainable growth–reducing poverty and inequality, advancing environmental sustainability, improving lives, and empowering individuals in all societies across all stages of development (7).

AI is, therefore, a developmental equaliser at a scale similar to the internet. It will also be the great differentiator, and the nations that become the leaders in its application will rule the emerging world (8). In an increasingly AI-driven world, countries with a compelling national AI strategy will soar above others, leading to a perhaps impenetrable hierarchy that will benefit some while leaving others behind. This is the AI reality and imperative that each nation faces today, as validated by its potential contribution to global and local economies. PwC estimates the potential contribution of AI to the global economy will be $15.7 trillion by 2030—more than the current output of China and India combined—with a boost of up to 26% in GDP for local economies over the same period (9). Labour productivity improvements will drive initial GDP gains; however, strategic investment in AI technology will be needed to realise the global economy's full productivity and GDP potential. PwC expects developing countries to experience more modest increases due to much lower adoption rates of AI technologies. However, what is intriguing from PwC's analysis is just how big a game-changer AI is likely to be and how much value potential is up for grabs, creating swaths of opportunity for an articulated national strategy (9). Like PwC's findings, McKinsey estimates that AI will contribute $13 trillion by 2030 or about 16% higher cumulative GDP than today. This amounts to 1.2% additional GDP growth per year, with developing countries having a great opportunity to capture as much as 15% (10).

AI is becoming the basis for national competitiveness. Nations with better and more inclusive strategies to drive automation, innovations, and broad-based mass education on AI, complemented with the right levels of investment, will leverage it to win (11). However, while AI presents vast opportunities, its execution requires several trade-offs driven by societal values and the outcomes that each nation wants (12). Therefore, the far-reaching scope of its impact suggests a collaborative and inclusive approach to national strategy development, which has also been proven effective. For example, the work of the Future Society in its support for the development of 3 National AI Strategies between 2020 and 2022 validates the imperatives of holistic stakeholder inclusion. The Future Society's approach included robust stakeholder consultations, facilitating expert exploration sessions, developing governance documents, frameworks, policies, and implementation plans, and creating SWOT analyses of local AI ecosystems, ethical guidelines, and implementation recommendations (13).

In setting a national AI strategy, learnings from other nations, including developing nations, show that AI must be anchored on a compelling national vision aligned with national developmental priorities. This is consistent with the position in Google's "AI Sprinters," a new report that provides a roadmap for developing countries to take advantage of AI's potential. The report outlines four recommendations to hasten the positive impacts of AI: (1) revolutionise infrastructure with 100% adoption of cloud-first policies, (2) support people with national AI skill initiatives, (3) modernise national data systems, and (4) support AI-enabling regulation. The report emphasises that four considerations will help every nation prioritise its development strategies and thus guide the Nigerian AI strategy (14).

1.1.2. AI for Socio-Economic Growth

Nigeria and the broader African continent possess some of the most distinctive and compelling challenges and opportunities that AI could address. From optimising agriculture in diverse climates to improving public health infrastructure, locally developed AI solutions, adapted to local realities, are far better equipped to solve these challenges than externally imposed models created for an entirely different context and people. Therefore, developing a homegrown AI strategy that provides Nigeria with a clear roadmap for AI application will catalyse relevant innovation and aid in rebalancing power structures. This presents a massive opportunity for Nigeria to play as the leader of AI in Africa. This can be likened to how the mobile phone revolution (GSM) swept sub-Saharan Africa in the late 2000s and facilitated access to services with a tangible economic multiplier effect (15).

AI must benefit humanity. This requires a prudent balance of policies to tap AI's potential while reducing its risks. To achieve this end, nations must articulate a thoughtful, comprehensive blueprint addressing how they will seek to harness the benefits of AI for the public good while mitigating its impact on jobs, livelihoods, and other potential harms. This is particularly critical to ensure that low- and middle-income countries (LMICs) are included, given the rapid pace at which AI accelerates. Local communities must be allowed to provide their perspective and cultural context into AI so they can decide on both (1) their thresholds for safe usage and 2) the overall utility of AI within their own lives. Additionally, LMICs must have access to AI tools and approaches to facilitate responsible, global use of AI (16).

AI's potential can be unleashed to catalyse positive social change, ensuring sustainable and equitable progress for communities worldwide. Yet the realisation of social benefits is not without a significant, coordinated work effort at different levels of impact for the developed and underdeveloped countries.

A study published by the Schwab Foundation for Social Entrepreneurship in partnership with the World Economic found that three actions, taken collectively, are imperative to untethering AI: (1) prioritising inclusive and responsible AI practices, (2) fostering cross-sector collaborations, and (3) addressing the existing, country-specific challenges. This is consistent with the IMF assessment of the AI readiness of 125 countries utilising a custom indicator called the AI Preparedness Index that measures readiness on multiple variables, including digital infrastructure, human capital and labour-market policies, innovation and economic integration, and regulation and ethics (17). Not surprisingly, the findings revealed an advanced economic advantage—i.e., wealthier economies demonstrated superior positioning for AI adoption relative to low-income countries. This further rationalises why emerging markets like Nigeria must intentionally devise their unique nation-specific strategies by focusing on IMF's two critical enablers: (1) laying a strong foundation through investments in digital infrastructure and (2) developing a digitally competent workforce (17).

As a general-purpose technology, AI must be made to serve low-income countries like Nigeria by delivering meaningful changes within and across economies, including a sizeable boost to productivity derived from one-off efficiency savings, multi-factor productivity such as facilitating better working practices, and aiding innovation—though this benefit is more uncertain than the others (15). However, potential gains are one thing, and realised gains are quite another. AI will most likely deliver a significant boost to productivity if several factors come together, including a rise in investment, reskilling of the workforce, and a balanced regulatory regime (15). Achieving compelling productivity gains at the national level will hinge on countries possessing the essential factors to help them utilise AI effectively, a challenge that can be addressed through a holistic national AI strategy.

A national AI strategy, therefore, must provide nuanced guiding principles clearly defined and articulated in alignment with country values and goals, as well as ensure consistency with higher-order goals for the future of humanity and civilisation. It must provide a baseline to catalyse homegrown innovations through intentional local capacity building and ecosystem enablement. It must also clarify the right incentive to overcome the hurdles to AI in local markets while emphasising shared societal benefits. It must attract high-impact strategic investment to drive breakthroughs, support national productivity and accelerate the creation and delivery of new or enhanced value for the good of all.

1.1.3. AI in Nigeria

1.1.3.1. Introduction

Nigeria's commitment to artificial intelligence (AI) is evident through various initiatives led by the Ministry of Communication, Innovation and Digital Economy (FMICDE) in recent years. Within the National Information Technology Development Agency, the ministry has established the National Centre for Artificial Intelligence and Robotics (NCAIR). This digital innovation and research facility focuses on AI, robotics, drones, the Internet of Things (IoT), and other emerging technologies, all designed to transform the Nigerian digital economy in alignment with the National Digital Economy Policy and Strategy (NDEPS).

NCAIR is saddled with the responsibility to engender a vibrant ecosystem for innovation-driven entrepreneurship (IDE), job creation, and national development. Before the establishment of NCAIR, Nigeria's Digital Economy Policy and Strategy for 2020–2030 (NDEPS) identified AI as one of its eight strategic pillars. NCAIR currently leads the ongoing nationwide talent development initiative that aims to train three million digital talents, positioning Nigeria as a global hub for AI applications. With the aim of driving home-grown and locally driven research in AI development, FMICDE is providing grants to 45 AI startups and researchers through the Nigeria Artificial Intelligence Research Scheme (NAIRS), focusing on critical sectors of the country. Notably, Nigeria's AI efforts and ecosystem are beginning to gain international recognition. For example, 4 Nigerian innovators won the Gates Foundation Grand Challenge focused on developing global health and development solutions using AI-enabled large language models (LLMs) (19). Similarly, over 10 Nigerian products have been listed in the UNESCO IRCAI Global Top 100, a list of the top 100 projects solving problems related to the 17 United Nations Sustainable Development Goals (20).

The country's inventive AI research ecosystem has also been recognised with high-profile funding. One example is the Artificial Intelligence for Development Africa (AI4D Africa) initiative, which specially funded the EduAI Hub—an African-based research network on responsible AI innovations aimed at advancing education across the continent. The hub is managed by the University of Lagos in partnership with Data Science Nigeria (DSN). This initiative falls under a US $20 million intervention programme funded by Canada's International Development Research Centre (IDRC) and the Swedish International Development Cooperation Agency (Sida), designed to promote excellence in addressing development challenges through responsible and inclusive AI (21)

As a signal to the international AI community and technology investors, in 2023, Nigeria signed the Bletchley Declaration on AI, alongside 28 other nations, including the UK and France. The Declaration is a commitment to responsible AI development that mitigates risks. Further to this, Nigeria joined 18 countries that adopted a US-led initiative to ensure AI is secure by design (18). Relatedly, the Nigeria Data Protection Act, 2023 is a piece of legislation that mandates the limitation of purpose, privacy of data subject of care, necessity, and proportionality in data processing. Though not framed specifically for AI, the Act provides crucial guiding principles for emerging technologies such as AI (18).

1.1.3.2. Nigerian AI Ecosystem Mapping

The Nigerian AI ecosystem exemplifies a complex technological ecosystem wherein diverse entities engage in symbiotic relationships to facilitate value creation and delivery, benefiting all stakeholders. The ecosystem mapping presented in this segment provides a systematic and comprehensive representation of the various players and roles contributing to the ecosystem's functioning, including the mainstream, enabler, and adjacent players. This underscores the significance of a systems or network approach in understanding how AI ecosystems generate value, a crucial consideration in developing an inclusive strategy that supports all entities within the value chain. This systemic thinking and the interconnectedness among stakeholders, including actors, organisations, and other factors influencing the AI community, facilitate intentional collaboration and mutually beneficial value creation. Furthermore, recognising the multifaceted interactions between disparate groups enables a nuanced understanding of the ecosystem's dynamics, fostering effective collaboration and strategic decision-making. Below is the schematic summary of the ecosystem.

1.1.3.2.1.

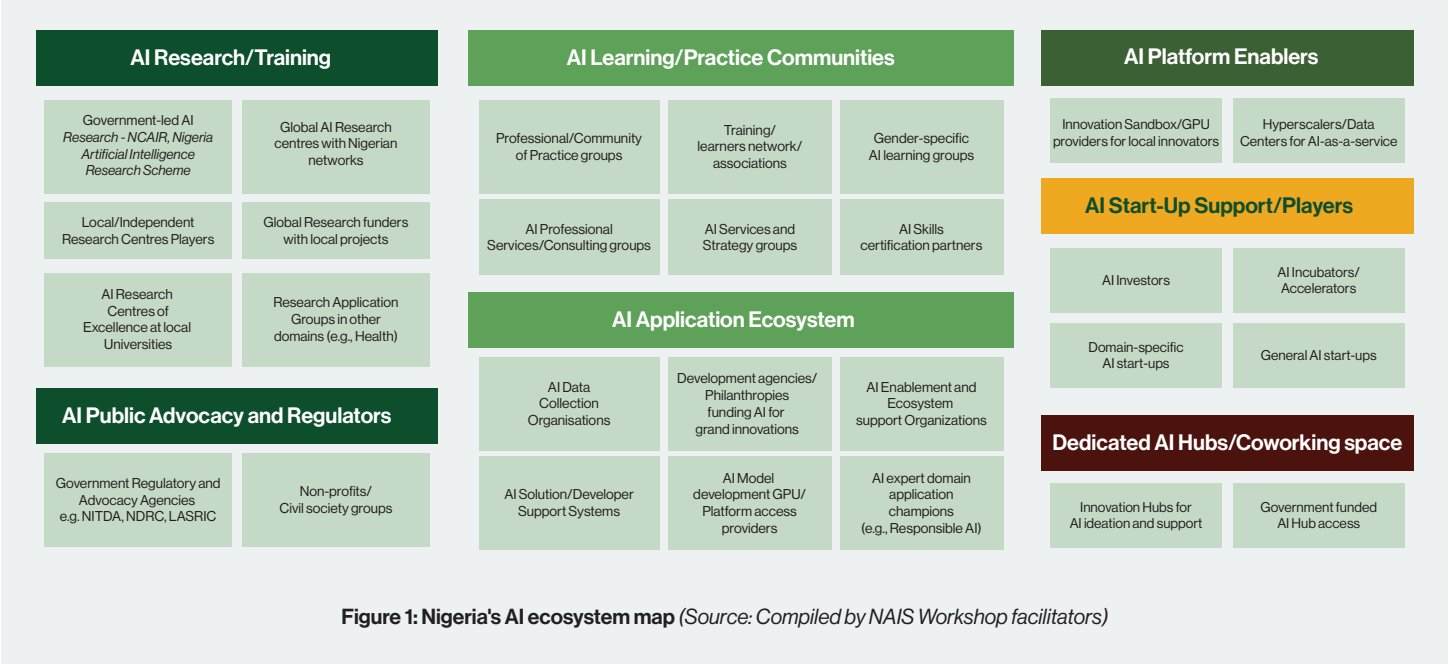

Figure 1: Nigeria's AI ecosystem map *(Source: Compiled by NAIS Workshop facilitators)*

1.1.3.3. Opportunities and Benefits

Nigeria, Africa's largest economy, stands at a massive opportunity in leveraging AI for high-impact transformation. On the one hand, its youthful population and growing tech scene present fertile ground for the development and adoption of AI. On the other hand, infrastructure limitations and a nascent AI ecosystem pose significant challenges. This SWOT analysis attempts to profile key strengths, weaknesses, opportunities, and threats that can inform the development of a holistic AI strategy for Nigeria.

Formulating effective strategies for fostering a thriving AI ecosystem in Nigeria necessitates a critical and introspective approach. Understanding the interplay between internal strengths, like a youthful population and a budding technology sector, and external factors, such as global trends and market demands, is paramount. By identifying these elements, policymakers, investors, and entrepreneurs can leverage Nigeria's unique potential in the international AI landscape. Recognising internal weaknesses, such as infrastructure deficiencies and lacking skilled personnel, allows for targeted interventions to bridge these gaps. Capitalising on emerging opportunities presented by the AI revolution can unlock significant economic growth and societal benefits for Nigeria. However, a critical lens is also crucial to mitigate potential threats associated with AI development, safeguarding the nation's future and ensuring it reaps the rewards of responsible technological advancement.

1.1.3.3.1. SWOT

A SWOT analysis—examining a nation's strengths, weaknesses, opportunities, and threats—is a crucial step in developing a context-specific and effective national AI strategy. It provides a clear understanding of internal capabilities and external conditions, helping identify areas for improvement, leverage, innovation, and risk management. By grounding the strategy in evidence-based insights, nations can align AI development with local realities while remaining globally competitive. This ensures policies are not only aspirational but also actionable, sustainable, and responsive to both national priorities and emerging global dynamics.

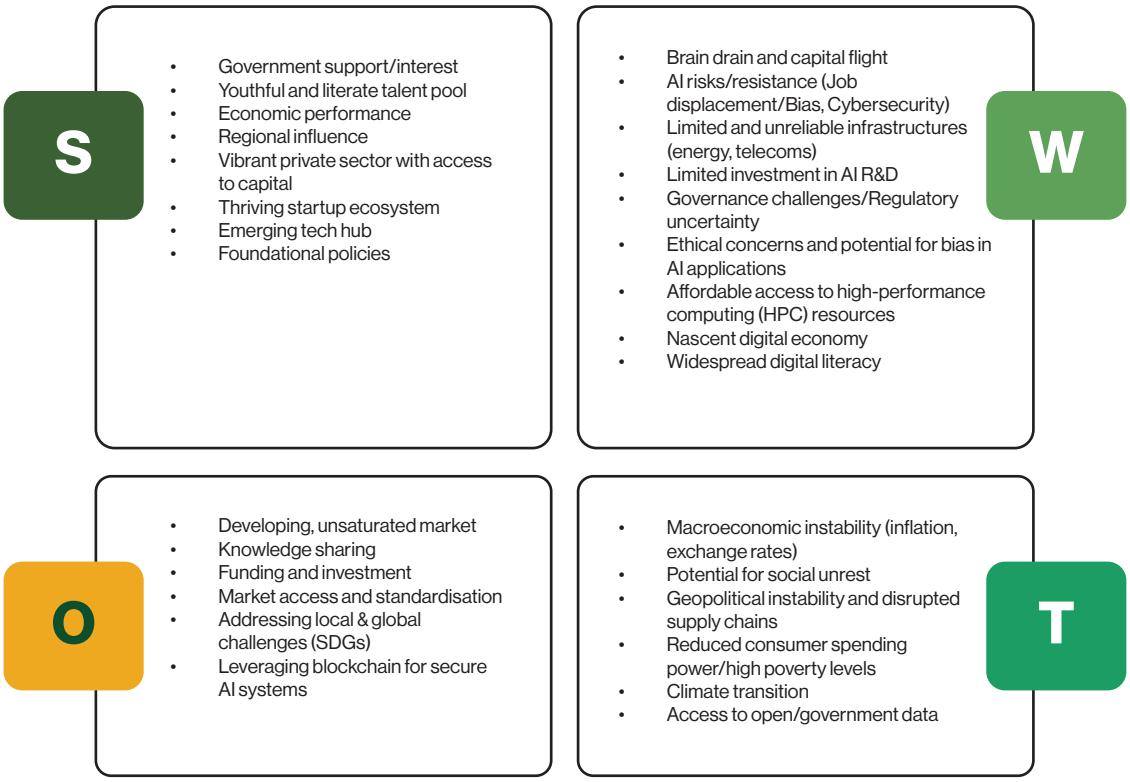

Figure 2: AI ecosystem SWOT *(Source: Compiled by NAIS Workshop facilitators)*

1.1.3.4. Enablers

The need to identify critical enablers and limitations is a foundational step in the formulation of a national AI strategy, particularly in low- and middle-income countries (LMICs) where resources may be constrained. A clear understanding of the factors that enable or hinder AI readiness—such as digital infrastructure, data ecosystems, human capital, regulatory frameworks, and access to financing—allows for the development of a strategy that is both ambitious and grounded in reality. This profiling approach ensures that the strategy is contextually relevant, cost-effective, and capable of driving inclusive and scalable AI adoption aligned with national development priorities.

Enablers

- Government interest and investment in innovation, digital economy and emerging technologies
- AI vision and strategy
- Inclusive and well-enabled ecosystem
- Access to open data and data governance practices
- Funding
- Talent
- Infrastructure
- Partnerships and collaborations
- Demand driven by development challenges

Limitations

- Poor standing in global ratings
- Inconsistent and fragmented policies
- Fragmented ecosystem
- Talent
- Strategic/Project implementation capabilities/track record

Figure 3: AI enablers and barriers *(Source: Compiled by authors)*

1.1.3.5. NAIS in Context with Other Existing Strategies

This National Artificial Intelligence Strategy (NAIS) builds upon existing policies and regulatory frameworks, reflecting the government's commitment to responsible innovation and inclusive digital transformation.

The conceptualisation of this National AI strategy is rooted in the blueprint, "Accelerating our Collective Prosperity through Technical Efficiency: A Strategic Plan for the Federal Ministry of Communications, Innovation and Digital Economy", recognised AI as an emerging technology for knowledge development as well as the need of this National AI Strategy to improve our global readiness and adoption of AI. In addition, the blueprint advocates other policies, such as the Nigeria Data Policy, to review and implement Nigeria's Open Data Policy.

Given AI's reliance on data, the statutes of the National Data Protection Act, 2023 (NDPA), are essential for protecting data subjects and guiding the responsible processing of personal data. The NDPA intersects with AI development in several key ways:

- Responsible data collection: Adherence to the data minimisation and purpose limitation principles ensures AI solutions collect only the right amount of data for the intended purposes.
- Individual rights: Align AI principles with personal rights and rectify or erase their data as outlined in the NDPA.
- Data security: protecting sensitive data used in AI systems
- Transparency and trust: Complying with NDPA transparency requirements and building public confidence in AI development and data use

While data protection laws such as the NDPA establish the ethical and legal foundation for responsible AI, these protections alone are not sufficient. For AI to thrive in practice, citizens and organisations must have reliable and equitable access to the digital highways that enable AI tools to function at scale. This is where the National Broadband Plan becomes pivotal.

Attaining the goals of the National Broadband Plan to deliver data speeds of 25Mbps in urban areas and 10Mbps in rural areas is critical to promoting AI adoption and development. Improved broadband infrastructure enables data flows, boosts digital literacy, supports cloud computing and innovation, and empowers participation.

As digital access expands and AI integration deepens across sectors through improved broadband infrastructure, it becomes imperative to complement this progress with robust cybersecurity frameworks. Without adequate safeguards, the benefits of connectivity and AI adoption could be undermined by rising vulnerabilities and threats in the digital space.

Online safety and security of citizens are part of the purview of Cybercrimes (Prohibition and Prevention, etc.) Act 2015 (amendment Act 2024) addresses cyber threats and online safety. Cybersecurity is an essential component of the AI strategy, incorporating cybersecurity measures specific to AI systems, mitigating potential vulnerabilities, and ensuring the security of AI-powered applications.

In its first iteration, NITDA's Strategic Roadmap and Action Plan (SRAP) established the National Centre for Artificial Intelligence and Robotics (NCAIR) to advance AI research and development. The second version, aligning with the Ministry's strategic plan, highlights AI as one of the focus emerging technologies and the need for industry-academia collaboration and technology centres of excellence.

Applying Nigeria's intellectual property laws - the Copyright Act, Chapter C28 Laws of the Federation of Nigeria 2004; the Trademarks Act, Chapter T13 Laws of the Federation of Nigeria 2004; the Patents and Designs Act, and Chapter P2 Laws of the Federation of Nigeria 2004 - to inventions and creative works like algorithms and AI models are critical to promoting innovation and protecting the intellectual property rights of developers.

AI algorithms and data use impact competition within various sectors, fostering a fair and competitive AI landscape. The Federal Competition and Consumer Protection Commission Act 2020 also protects against unfair competition.

The National Science, Technology and Innovation (STI) Policy promotes research and development. Aligning the AI strategy with this policy can leverage existing STI initiatives and funding mechanisms to support AI research and development.

1.1.3.5.1. Box: Broadband Connectivity

Limited Internet Access and Bandwidth Slows Innovation: Nigeria's internet speeds are considerably slower than developed nations. According to the Speedtest Global Index (22), Nigeria's average download speed is around 35 Mbps, significantly lower than the global average of 93 Mbps (as of April 2024), placing Nigeria at a worldwide rank of 111th and 140th on mobile and fixed broadband, respectively. According to the Portulans Institute's Network Readiness Index (23), Nigeria scored 35.73, ranking 106 out of 134 economies.

1.1.4. Global Trends and Benchmarks

1.1.4.1. Global AI Strategy Developments

Every nation must develop its unique and compelling AI strategy that centres on its unique assets and opportunities while mitigating shortcomings and risks. With the plethora of national AI strategies today—and the growing number of studies and reports assessing those strategies nationally and globally—embarking on the journey to develop a national plan must be very intentional, especially for developing nations where the transformational impact is even more imperative.

The World Economy Forum has provided a standard methodology and relevant template for developing a "minimum viable" AI strategy for a nation (24). This methodology entails a comprehensive assessment of a country's strategic priorities, strengths, and weaknesses, focusing on aligning the deployment of limited resources with the nation's demographic needs, strategic priorities, citizen aspirations, resource constraints, and geopolitical considerations. This framework ensures a nuanced and contextualised approach to AI strategy development, acknowledging the complex interplay of factors that shape a nation's AI trajectory.

Similarly, Boston Consulting Group (BCG) provided a blueprint, ASPIRE, as a valuable tool for carving a path to AI national strategy development leadership. The premise of the BCG model to frame national AI strategy is about how each nation must find its specific and competitive foothold in this fast-evolving digital landscape, anchored on six foundational elements: 1. Ambition, 2. Skills, 3. Policy and Regulation, 4. Investment, 5. Research/innovation, and 6. Ecosystem (25). At the heart of the AI strategy is the need for nations to have a compelling national ambition, which will guide what is possible, determine overall objectives, and direct the allocation of resources. Based on about 50 existing national AI strategies reviewed by BCG, the document identified three central archetypes of how nations can articulate their AI national ambition that is (1) national enabler (AI ambition to create and nurture local champions, improve their socio-economic condition, enhance quality of life, and pursue other national objectives primarily by encouraging responsible AI and reskilling their workforce); (2) Specialist (AI ambition aimed to develop specific expertise that can be promoted globally); and (3) Industry Leader (AI ambition archetype that focuses on being global leaders in a broad set of AI capabilities from R&D to implementation) (25).

According to the work by BCG, most countries fit into one of the three archetypes, although strategic details and progress along their chosen AI paths vary substantially. As a strategic framework, the BCG model is an exceptional starting point for countries looking to initiate national AI strategy development, primarily when used with the World Economic Forum guidelines, as both provide actionable templates for ambition-driven and context-realistic strategy development. Therefore, Nigeria must have a higher-order strategy that clarifies our national strategic intent, expressed through goals and objectives. With the boundless complexity of AI policy and strategy development, using these frameworks and tools as guidelines helps to narrow the strategic landscape in crafting and launching a robust AI strategy that unites a nation and leads to successful outcomes.

Additionally, AI strategy must progress from abstract ideas to practical processes with an intentional focus on its ethical development and implementation of AI, as provided for in UNESCO's Recommendation on the Ethics of AI (26). AI strategy, accompanied by ethical imperatives, must allow for a robust embedding of principles and values through institutional and regulatory provisions (27). As represented by UNESCO's RAM (Readiness Assessment Methodology), this approach provides a macro-level template that helps countries understand where they stand on the preparedness scale to adopt, apply, and safeguard AI deployment. The science of evaluating AI preparedness at a national level paves the way for the ethical imperative to be put into practice and with full consideration in the strategy design phase (28). For a high-impact national AI strategy, UNESCO's RAM approach specifies the need for a rigorous qualitative and quantitative evaluation that will include an all-encompassing ecosystem mapping to reveal ethical strengths and opportunities and specific areas that require development and improvement (29).

1.1.4.2. Lessons from National AI Strategies

With the race to AI in full swing, the number of nations with AI strategies is increasing, and so are the number of studies and reports analysing these strategies at a micro, nation-specific level and, separately, at a macro, global landscape level, as reflected upon in the previous section. At this nascent stage of AI, it is clear that nations are developing distinctive, compelling AI strategies in the same spirit and manner enterprises develop unique, compelling competitive strategies – i.e., to yield sustainable advantage. In the race to become a leader (or even a relevant player) in AI, no national strategy today is alike, each focusing on different aspects of AI policy. This fact is no more apparent than in the body of work released by HolonIQ, a global data platform. Holon's 2020 AI Strategy Landscape Report provides a granular analysis of the AI strategies of fifty nations (30).

Other approaches stand out as well. For example, unlike other national strategies, which focus on research and development or private sector uptake, Italy's early emphasis has been on how the government can facilitate the adoption of AI technologies in public administration. Japan's strategy is notable for its Industrialisation Roadmap, which envisions AI as a service and organises the development of AI into three phases: (1) application in targeted domains, (2) the public use of AI, and (3) the creation of ecosystems connecting domains. Ten nations agreed to collaborate in the Nordic-Baltic region to "develop and promote the use of artificial intelligence to serve humans." They specified that they would collaborate on (1) skills development, (2) access to data, (3) ethics and transparency, (4) hardware and software standards, (5) EU prominence, (6) avoiding unnecessary regulations, and (7) policy cooperation (31).

1.1.4.2.1

Status
In-Development
Launched

Figure 4: AI strategy development
(Source: Compiled by NAIS Workshop facilitators with data from Brookings Institute)

1.1.4.3. Nigeria vs. Other Nations

Governments must play a vital role in AI by creating an enabling environment for the private sector and civil societies to build and deliver value that benefits citizens. Various metrics, rankings, benchmarks, and comparative indicators have been employed to assess national preparedness for AI adoption, utilisation, and implementation. While these frameworks have limitations in capturing the nuanced context of national AI evolution, they provide valuable insights into strategic considerations crucial for developing a forward-looking AI strategy. Moreover, they facilitate cross-national learning, enabling countries to adopt best practices suited to their unique contexts. A review of pivotal enablers of AI may indicate that Nigeria is still fledgling in key areas such as infrastructure and investment. Despite this, Nigeria is recognised as a highly valuable AI powerhouse, alongside Brazil, India, Indonesia, Mexico, Saudi Arabia, and South Africa, due to its demonstrated potential for short-to-medium term investment in supercomputing capabilities, talent development, and anticipated growth in cloud and data centres (32).

Nigeria has made notable progress in its ranking in the Oxford Government AI Readiness Index, rising from 103rd place in 2023 to 94th in 2024. This improvement of nine positions underscores Nigeria's increasing commitment to developing and implementing a national AI plan, which was a key factor in its improved score in the "vision" dimension of the measurement framework (33). However, despite Nigeria's efforts in data policy and regulations, the report shows a sizeable gap in the "Data and Infrastructure Pillar", which is vital for sustainable ecosystem development.

Similarly, the country ranks 61 out of 62 in the Global AI Index, a benchmark of nations based on their level of investment, innovation, and implementation of artificial intelligence (34). Viewed more granularly, the findings indicate that Nigeria under-indexes dimensions such as operating environment, infrastructure, and development—core starters for national capability development and innovation.

In addition, Nigeria's lack of an enablement platform in the form of computer power has been identified in the Tony Blair Institute Report on National Compute Power. Specifically, the Institute categorised Nigeria as a "Rising Giant," a level 3 player on a 7-level scale (35). A more integrated framework, the Top Ranked AI Nations (TRAIN) Index, reported in the December 2023 edition of Harvard Business Review, maps the emerging geography of AI leadership based on the work by The Fletcher School at Tufts University, USA (32). To compare the state of AI across twenty-five leading AI-creator countries, the researchers considered four broad variables, data, capital, rules, and innovation, that, when combined, formed the new measure called the TRAIN index. The model offers both a look into actual and anticipated competitive strategies (e.g., as some countries tighten AI regulation to attract those that prefer safety, others might lure companies that prefer openness by promising unfettered "pro-innovation" environments) while also providing a competitive snapshot of the global leader's strategies for other, non-leading nations to isolate potential gaps and opportunities for competitive differentiation. This is where the TRAIN model delivers its greatest potency: as a global benchmark and general rubric for assessing the global AI competitive landscape over time to assist in developing or refining country-specific or regional AI strategy for differential advantage. Nigeria currently ranks No 25 in the 25-country evaluation framework (36).

Brookings Institute also published an in-depth analysis of the AI strategies of thirty-four nations, providing both benchmarking and insight into unique positioning opportunities in the global AI terrain. This is consistent with the Top Ranked AI Nations (TRAIN) Index and demonstrates a high-level global AI landscape segmentation map (much like a competitive positioning map) (37). The work evaluated various national AI strategies against six criteria —data management, algorithmic management, AI governance, research and development (R&D), capacity development, education capacity development, and public service reform capacity development—to provide insight into how individual countries approach AI deployment. The research demonstrated similarities and differences among nations based on each nation's WEIRD-ness—i.e., how Western, Educated, Industrialised, Rich, and Democratic they are. The WEIRD framework describes a set of countries with a particular psychology, motivation, and behaviour that can be differentiated from other countries (37). By analysing country strategies via a dual lens of the six elements and WEIRD attributes, the researchers could segment the thirty-four nations in review into ten groups—each with similar AI strategies and, importantly, similar drivers underscoring that strategy. Additionally, the framework yielded apparent differences between the strategic priorities of Western and non-Western nations.

1.1.4.4. Variations in National AI Strategy: Developed vs. Developing Countries

A study published in AI & Society also found that national AI strategies differ between developed and developing countries, particularly in scientific research, education, talent development, and ethics (38). Not surprisingly, the findings revealed significant advantages to developed countries with advanced economies and solid technological infrastructures. Researchers noted, "These countries prioritise the development of ethical AI frameworks, invest in education and workforce development, and foster global collaborations to sustain their AI leadership. Their dedication to AI innovation places them at the vanguard of technology, shaping the future of AI-driven industries and applications."

Developing countries, on the other hand, are navigating the AI landscape with varying degrees of progress. The pursuit of AI remains challenging for these nations due to inadequate research infrastructure and funding constraints. Priorities centre on capacity building, fostering local talent, and seeking international collaborations—all crucial to materialising future socio-economic benefits (38). Like the preceding frameworks, the methodology, evaluation criteria, and findings published in AI & Society are useful, tangible, and actionable for developing the Nigerian AI strategy.

1.1.5. Risk Mitigation Strategies

1.1.5.1. Trade-offs

As noted previously, governments will ultimately have to make several trade-offs to define AI policy at a national level. Some countries have started to explore them, recognising that the task is arduous given that businesses, individual consumers, and academics must work collectively to ascertain how these issues are managed. According to the domain theories and practice across nations, there are three primary AI trade-offs for consideration: innovation versus regulation, the individual versus the state, and transparency versus system vulnerability. In all cases, countries must determine how best to balance one side and the other. None of the trade-offs is mutually exclusive, and the right balance for each nation depends on various factors (39).

Innovation vs. regulation: An abundance of regulations or those that are too rigid hinder AI developers' ability to introduce new AI solutions by excessively restricting the use of consumer data, for example, leading to improperly trained algorithms. Some policymakers, such as the U.K.'s Financial Conduct Authority, are experimenting with new approaches like creating a regulatory sandbox. Canada, alternatively, is experimenting with AI superclusters to attract funding and talent and to transfer IP from academia to industry to accelerate innovation (39).

Individual vs. the state: There is a delicate balance between data privacy and the government's need to access data to advance good or prevent harm. Cultural differences drive varying levels of consumer concern regarding data usage and privacy protections. The annual CEO Survey conducted by PwC found that respondents in Germany, the U.S., and the U.K. are open to government regulations on data collection. At the same time, those in China, India, and Japan favour fewer such limitations (40). Nigeria must define its unique approach to privacy matters, which should be ascertained via attitudinal research with citizens before embarking on policy development.

Transparency vs. system vulnerability: Policymakers must also balance the need for people to trust AI systems by understanding how they work against the desire to protect the systems from attacks. Striking the appropriate balance on these variables will be heightened for industries where data privacy and integrity are paramount, such as banking and healthcare (40). AI and related technologies will indelibly transform every nation with far-reaching implications. Citizens and leaders across society would do well to express their views and get actively involved in helping their governments shape policies that will define humanity's future.

1.1.5.2. Mitigating AI Risks

The government plays a pivotal role in elevating equity and ethics and ensuring accurate outcomes in AI via technology policy. Mitigating the risks of artificial intelligence is essential to the technology's positive impact on people's rights and opportunities. Although there are myriad frameworks for assessing risk and more will emerge ahead to address evolving needs as technology advances, the significant factors to AI risk assessment are fourfold: accuracy, bias, transparency, and governance (41).

Accuracy: Any AI errors or erroneous predictions could result in injurious consequences to individual humans and/or humanity at large, necessitating system accuracy. Accuracy is associated with robustness and sensitivity, further complicating measuring an already complex variable. Additionally, there are trade-offs between bias and accuracy. Where each nation strikes the balance aligned with their particular country's values and priorities will lead to several outcomes, including varying tolerance levels for bias.

Bias: When an AI system is biased, it is not representative of the larger population—a population that will experience the effects of the system's output, like it or not. Bias is difficult to circumvent in a world built on biases. Societal biases bring bias to training data or may enter the system from the AI algorithms, for example. Criteria that drive protected characteristics (e.g., ethnicity) may be excluded from systems to mitigate bias. However, the action reduces system accuracy, thus requiring difficult trade-offs.

Transparency: The explainability of AI – or transparency – is the third prominent area of risk mitigation. Although a new trajectory of research in computer science, called explainable AI (XAI), has emerged, to date, most AI systems cannot explain the "how" to their "what", leaving humans ill-equipped to understand the happenings from input to outcome. Among other issues, without transparency, assigning accountability for (inaccurate, harmful etc.) AI-generated decisions become challenging.

Governance: Governance processes are crucial to risk mitigation. There is a particular need for data governance, which is the fuel for AI systems. One best practice that is being leveraged today (borrowed from software development) is keeping prior copies of datasets to enable the reconstruction of past versions of applications if needed. Engaging diverse subject matter experts, testing, and monitoring are other best practices that serve as ongoing controls.

All these activities are favourable steps forward toward better AI systems ahead. Moreover, taking cues from the efforts and guidelines for safety in fields such as transportation and healthcare – cross-disciplinary learning – is another solid foundational effort to move the needle forward about AI safety. However, anticipating the effects of emerging technologies has proven difficult, and AI is no exception. In addition to the preceding, robust testing and validation, ongoing monitoring and maintenance, human oversight and intervention, ethical considerations and compliance, regular auditing and documentation and engaging a range of disciplines and perspectives in strategy development and execution are the best tools available today to reduce the potential risks of AI systems (41).

Vision and Guiding Principles

1.2.1. Vision Statement

"To be a global leader in AI, leveraging ethical and inclusive innovation, local talent, and strategic collaboration to drive sustainable development."

1.2.2. Guiding Principles

Nigeria's national AI vision statement embodies the guiding principles and aspirations the country seeks to achieve in AI over 2025 - 2029. Some themes in the vision statement include:

Responsible and Ethical Conduct
Commitment to responsible AI development and deployment, ensuring that they are designed and used with consideration for their societal impacts and implications, and upholding ethical principles and values in AI-lifecycle activities, including transparency, fairness, accountability, and respect for human rights.

Inclusivity and Shared Prosperity
Ensuring AI innovation is all-encompassing, leaving no one behind and accessible to all stakeholders, regardless of background, gender, or circumstances. Actively promote diversity and representation in AI research, development, and deployment. Ensuring that the benefits of AI innovation are shared equitably among all members of society, including marginalised and vulnerable populations.

Innovation and Adaptation
Fostering a culture of transformative creativity in AI, encouraging experimentation, risk-taking, and continuous improvement, and embracing a culture of continuous improvement and adaptation in AI development and deployment, incorporating feedback, insights, and lessons learned to improve AI systems and practices over time.

Sustainability
Integrating AI into lasting development efforts, leveraging its potential to address pressing societal challenges, promote environmental conservation, and contribute to achieving long-term economic, social, and environmental goals.

Collaboration
Emphasising cooperation and partnership among stakeholders, including government, industry, academia, civil society, and international organisations, to leverage collective expertise, resources, and networks for mutual benefit and shared progress.

Global Leadership
Aspiring to be an international leader in AI innovation and governance, setting high standards for responsible AI development and deployment, and actively contributing to international efforts to shape AI's future for humanity's benefit.

Transparency and Accountability
Commitment to openness and clarity in AI systems design, development, deployment, and decision-making processes. This entails providing clear and understandable information about how AI systems work, their intended purposes, and potential limitations or biases, as well as holding individuals, organisations, and institutions accountable for AI technologies' ethical and responsible use.

Human-Centric
Prioritising the well-being and values of all stakeholders in the design and implementation of AI technologies, ensuring that they enhance human capabilities, autonomy, and dignity rather than replacing or undermining human agency.

Risk Management and Resilience
Implementing robust risk management strategies to identify, assess, and mitigate potential risks and challenges associated with AI technologies. This ensures that risks are managed effectively to protect individuals, organisations, and society and build adaptable and resilient AI systems and ecosystems that respond effectively to changing circumstances, emerging risks, and unforeseen challenges.

Data Protection
Adhering to good data management principles in the collection, use, and sharing of data for AI applications, including respect for privacy, consent, data minimisation, and fairness, and adherence to the Nigeria Data Protection Act, 2023. Providing individuals and communities with the knowledge, skills, and resources to understand and engage with AI technologies, enabling them to make informed decisions, advocate for their rights, and participate meaningfully in shaping AI policies and practices.

Strategic Objectives

1.3.1. Goals

Considering Nigeria's strengths, weaknesses, opportunities, and threats, this National AI strategy has three broad objectives for leveraging AI. First is using AI as a tool for economic growth and competitiveness; second, for social development and inclusion; and third, for technological advancement and leadership. The sub-goals are enumerated below:

1. Economic Growth and Competitiveness

- Boost economic productivity: Enhance efficiency and innovation across agriculture, manufacturing, and services sectors.
- Create new industries and jobs: Fostering the development of AI-driven industries and upskilling the workforce for new opportunities.
- Attract foreign investment: Positioning Nigeria as a leader in responsible AI development, attracting investment and collaboration.

2. Social Development and Inclusion

- Improve access to essential services: Utilising AI to enhance healthcare delivery, education, and financial inclusion for all Nigerians.
- Address social challenges: Leveraging AI to tackle challenges such as poverty, inequality, and climate change.
- Empower citizens: Equipping individuals with the skills and knowledge necessary to participate actively in the AI-driven future.

3. Technological Advancement and Leadership

- Develop indigenous AI expertise: Building a strong research and development ecosystem to foster innovation and local solutions.
- Establish ethical and regulatory frameworks: Ensuring responsible and transparent development and deployment of AI.
- Become a regional and global leader: Positioning Nigeria as a key player in the global AI landscape.

Strategic Pillars

1.4.1. Introduction

This comprehensive National AI Strategy outlines five key pillars that will propel Nigeria towards achieving its vision. Each pillar is supported by strategic objectives and actionable initiatives designed to drive progress across the AI development and adoption spectrum.

- Building Foundational AI Infrastructure
- Building and Sustaining a World-class AI Ecosystem
- Accelerating AI Adoption and Sector Transformation
- Ensuring Responsible and Ethical AI Development
- Developing a Robust AI Governance Framework

1.4.1.1.

"Our vision is to be a global leader in AI, leveraging ethical and inclusive innovation, local talent, and strategic collaboration to drive sustainable development"

Economic Growth and Competitiveness

1.0 Building Foundational AI Infrastructure

Affordable high-performance computing (HPC) resources that scale local AI developments.

National technological capabilities in AI.

Innovative approaches to deploying AI systems that reduce carbon footprint.

Private sector investment in AI infrastructure.

Reduced carbon footprint and improved energy efficiency.

2.0 Building and Sustaining a World-class AI Ecosystem

Network of stakeholders collaborating on practical AI applications with a positive economic and societal impact.

Network of successful AI startups driving innovation and contributing to economic growth.

AI Centres of Excellence, leading the development of industry-specific AI solutions, training the next-gen AI. talent, and serving as ethical AI thought leaders.

National AI conference attracting international participation, promoting knowledge exchange, and stimulating innovation.

Ecosystem of AI startups and established companies successfully commercialising AI solutions.

Highly skilled AI professionals working in Nigeria.

Increase joint research projects, knowledge transfer, and co development of AI solutions.

Social Development and Inclusion

3.0 Accelerating AI Adoption and Sector Transformation

Portfolio of AI projects demonstrating the value proposition of AI and stimulate investment and adoption.

Availability of high-quality data for AI research and development.

Holistic data governance standards that adhere to the tents of the NDPA.

Increase in individuals with AI skills across various sectors.

Supportive regulatory framework for AI development and adoption, attracting investment and fostering innovation.

Collaboration between stakeholders, leading to commercially viable AI solutions.

Clear and actionable plans for AI adoption across critical sectors, leading to increased productivity and efficiency.

Consistent and reliable data used in AI applications across sectors.

Availability of public sector data for AI applications, stimulating innovation in various sectors.

Awareness and understanding of AI among stakeholders, leading to accelerated adoption and problemsolving through AI.

Portfolio of commercially viable green AI solutions/projects.

Technological Advancement and Leadership

4.0 Ensuring Responsible and Ethical AI Development

Well-respected and diverse AIEEG established, providing independent and objective advice on AI ethics and overseeing AI technologies' ethical development and deployment.

Clear and comprehensive set of ethical principles for AI, addressing fairness, transparency, accountability, privacy, and human well-being.

Standardised assessment tool ensuring that AI projects align with established ethical principles.

Clear understanding of emerging trends, potential challenges and opportunities associated with AI development.

Legal framework that promotes responsible AI development and protects human rights and privacy.

5.0 Developing a Robust AI Governance Framework

Comprehensive National AI Principles that are publicly available, transparent, and inform all AI development and use aspects.

A well-functioning and respected AI Governance Regulatory Body provides clear guidance, enforces ethical standards, and promotes responsible AI development.

Transparent terms and guidelines for responsible AI development.

Comprehensive risk management framework that minimises the potential negative impacts of AI deployment.

Strategic initiatives to be implemented over five (5) years

Figure 5: Nigeria's AI strategy - vision, goals and outcomes *(Source: Compiled by NAIS Workshop facilitators)*

1.4.2. Pillar 1: Building Foundational AI Infrastructure

Nigeria aspires to be a global leader in AI, but achieving this vision requires a foundational infrastructure for AI and other emerging technologies. This pillar addresses building affordable and localised infrastructure foundations and the compute capacity to support the thriving AI ecosystem in Nigeria.

1.4.2.1. Objective 1.1 - Establish strong foundational infrastructure and compute capacity

Nigeria can foster a thriving AI ecosystem by establishing a solid foundation in infrastructure and computing capacity.

Outcomes

- Affordable high-performance computing (HPC) resources for scaling local AI developments.
- Increase AI research and development capacity, fostering faster innovation cycles and time-to-market for AI solutions.
- Reduce the cost and dependence on virtual AI environments.
- Enhanced national technological capabilities in AI, supporting job creation opportunities in the AI hardware and software sectors.
- Innovative approaches to deploying AI systems that reduce carbon footprint, optimise resource utilisation and improve energy efficiency.
- Increased private sector investment in AI infrastructure within a 3-year timeframe

Strategies

1.1.1 Deploy High-Performance Computing (HPC) Resources

Establish national HPC centres with cutting-edge computing capabilities and facilitate access for researchers, startups and businesses working on AI projects.

1.1.2 Invest in AI-specific hardware and software development

Support the development of AI hardware (e.g. specialised chips) and software tools, with a preference for domestically produced solutions, thereby reducing the dependence on foreign technology and creating a self-sustaining AI ecosystem.

1.1.3 Increase dependence on clean and sustainable energy sources

Power AI clusters with clean or sustainable energy sources keep the dependence on the existing national grid to less than 50% of the power needed for each cluster to maintain the needs of general households. Establish and increase reliance on clean energy-powered AI clusters, providing reliable and sustainable infrastructure for AI development, deployment, and innovation in Nigeria.

1.1.4 Pursue "Pioneer status for AI"
Tax breaks and other incentives will encourage investment in critical AI infrastructure, such as AI edge computing stations and HPC data centres.

1.4.2.1.1. Box: Data Storage, Compute and Research

The current era of AI requires modern data centres with accelerated computing, data and model stacks. Consequently, Nigeria's data centre infrastructure needs to be upgraded and scaled to meet the demands of AI research and use. Nigeria has one Artificial Intelligence and Robotics centre and 6 data centres operated by 5 entities (43). Nigeria has an AI infrastructure index of 42.67, according to Oxford Insight (33).

1.4.3. Pillar 2: Building and Sustaining a World-class AI Ecosystem

In addition to infrastructure, Nigeria's aspiration to be a global AI leader requires a robust and vibrant ecosystem. This pillar focuses on building that ecosystem of partners, collaborators, academia, STEM-focused research centres, and a highly skilled workforce. Initiatives include strengthening technology-based training programmes and providers like industry-academia partnerships, as well as funding mechanisms to nurture a vibrant AI landscape. The pillar also positions the country as a key player on the global stage. International collaborations with leading research institutions and companies will fuel domestic AI development.

1.4.3.1. Objective 2.1 - Foster Sustainable AI Partnerships

Collaboration is vital to achieving long-term success in AI. This objective emphasises building strong partnerships to leverage diverse expertise and resources.

Outcomes

- A thriving network of stakeholders collaborating on practical AI applications with a positive impact on society and the economy.

Strategies

2.1.1 Establish a Sustainable Applied AI Partnership Platform (SAAPP)/Collaborative Innovation Platform

This platform will bring together stakeholders from academia, industry, government, and civil society to collaborate on developing and deploying commercially viable AI solutions that address real-world challenges. This collaborative innovation platform will be a strong foundation for AI development in Nigeria. The platform will facilitate knowledge sharing, resource pooling and general collaboration among AI stakeholders. The platform will also be used to co-create and implement AI solutions to address social and institutional problems.

1.4.3.2. Objective 2.2 – Champion International Collaboration and Leadership

Nigeria must achieve AI leadership through collaboration. This objective fosters strategic partnerships and positions Nigeria as a critical player in the global AI landscape.

Outcomes

- Increased partnerships with international stakeholders, joint research projects, knowledge transfer, and co-development of AI solutions.
- Increased number of highly skilled AI professionals working in Nigeria within five years.
- A thriving ecosystem of AI startups and established companies successfully commercialising AI solutions.

2.2.1 Establish the "AI Synergy Alliance/National AI Collaboration Office"

This initiative will create a formal alliance with top-tier global AI research institutions and companies and facilitate partnerships with international AI stakeholders.

2.2.2 Launch the "Nigerian AI Talent Transfer Program"

Attracting and retaining global AI talent is crucial. This programme will offer incentives and support systems for international AI experts to work in Nigeria.

2.2.3 Create the "Nigerian AI Partnership for Commercialisation Excellence" (NAPCE)

Bridging the gap between research and commercialisation is essential and facilitates collaboration between researchers, entrepreneurs, and investors to bring innovative AI solutions to market.

1.4.3.2.1. Box: Talent and Youth

The global demand for AI talents and skills is growing, and a highly skilled workforce is a critical long-term need of any well-functioning AI ecosystem. Frontrunner nations, regions, and companies have made and continue to make significant efforts for many years to attract, develop, and train talent to build and use AI.

The issue of skills and talent in an ecosystem is monumental. It includes the education of future workforce on many levels, training the existing workforce, attracting and retaining talent to AI, and attracting international talent to Nigeria.

Nigeria shall also emphasise technical skills and talent to drive AI adoption and initiatives, as well as change management, interaction design, legal and business models, communication, innovation management, and many more context-dependent skills.

Nigeria aims to reduce unemployment by five percentage points by equipping at least 70% of Nigeria's young workforce (16-35 years, including 50% of women and a good representation of people living with disabilities) with AI-related skills and knowledge. Nigeria shall also actively contribute to the local and global workforce, job creation and entrepreneurial endeavours in AI-driven industries.

Nigeria's youth population is one of its most significant assets for promoting economic development, especially in AI. With a large youth population (44), Nigeria boasts a median age of about 18. Approximately 70% (44) of Nigerians are under 30, and 42% are younger than 15, positioning the country uniquely regarding potential human capital. According to the World Bank Report (45) on global demographic trends, between 2015 and 2035, 74% of the worldwide increase in youth aged 18–23 will occur in Nigeria and nine other countries. This demographic trend underscores the critical role that Nigeria's youth will play in the global economy, especially in providing a digitally enabled workforce for the global AI ecosystem requirements.

Furthermore, the International Finance Corporation (IFC) (46) forecasts that by 2030, 28 million jobs in Nigeria will demand digital skills, highlighting a market valued at $130 billion. This indicates a burgeoning opportunity for the country to leverage its youthful, tech-savvy labour force in driving economic transformation. Additionally, an Analyst Data Services and Resources report (47) notes that 75% of the Nigerian population is of working age, underscoring the urgency of creating conducive employment and skill development environments. However, despite these promising statistics, Nigeria needs help in realising the full potential of its youth demographic dividend. The country grapples with high levels of poverty, unemployment (48), and insecurity.

The shortage of skilled AI professionals poses a significant hurdle and weakness to Nigeria's ambition of becoming a frontrunner in global AI development. The limitation of adequate AI literacy and skilled labour must be addressed to harness and integrate AI potential to solve local problems in Nigeria. Following an interview by the president of Nigeria Computer Society (49), only 3% of IT professionals focus on AI and robotics. The educational infrastructure in Nigeria is not yet robust enough to support widespread AI education. Although there are initiatives to introduce AI curricula in schools, the implementation and reach are limited. Many institutions lack the resources to effectively teach AI-related courses, including technology and trained educators. In 2023, the Federal Government directed the Nigerian Educational Research and Development Council (NERDC) to ensure that robotics and artificial intelligence are integrated into the country's primary education curriculum" (50). There is also the more significant issue of brain drain ("the japa syndrome"). Nigeria is experiencing considerable brain drain as skilled professionals emigrate in search of better opportunities abroad. This outflow of talent deprives the country of valuable, talented people and exacerbates the talent shortage. According to a report by TechCabal (51), between 2014 and 2021, 474 Nigerian tech talent moved to the UK via the UK government's Tech Talent Visa. The Tech Nation Visa report of 2021 states that Nigeria is the African country with the most applicants for the UK Global Tech Talent Visa, ranking third in the world with 11.3% of applicants globally

1.4.3.3. Objective 2.3: Nurture a Culture of Innovation

A vibrant innovation ecosystem is crucial for sustained AI advancement. This objective fosters a culture that encourages creativity, risk-taking, and continuous improvement.

Outcomes

- A flourishing network of successful AI startups driving innovation and contributing to economic growth.
- Established AI Centres of Excellence that spearhead the development of industry-specific AI solutions, train the next generation of AI talent, and serve as ethical AI thought leaders.
- A well-established national AI conference that attracts international participation promotes knowledge exchange and stimulates innovation.

Strategies

2.3.1 Establish Deep Tech AI Accelerators across Nigeria
These accelerators will provide concentrated support and resources to high-potential AI startups, fostering research collaboration and accelerating commercialisation.

2.3.2 Create AI Centres of Excellence
These centres will focus on developing practical applications of AI in specific sectors, nurturing skilled individuals, and promoting ethical AI practices.

AI Centres of Excellence (CoEs) will ensure further localisation and application of AI solutions and mainstream AI knowledge across urban and rural areas. The CoEs will provide computing resources and technology infrastructure to support the experimentation of novel ideas that would lead to implementing localised solutions. This initiative will develop new innovative ideas that can be commercialised.

2.3.3 Establish an accredited National AI Conference
This annual conference will provide a platform for knowledge sharing, showcasing advancements, and fostering collaboration between academia and industry.

1.4.3.3.1. Box: Thriving Startup Ecosystem

Nigeria has been seen as a fertile land for innovation, and this is evident in the country's fast-growing technological ecosystem. Nigeria is among the "big four" African countries known for its innovation activity, startup funding, and globally acclaimed unicorns (52). Her reputation as the African technological powerhouse continues to soar, boasting the highest number of tech startups on the continent and showing no signs of deceleration. According to Statista, Nigeria witnessed a surge in startups, reaching over 3,360 in 2022. Most of these were established in 2019, accounting for approximately 15% of the total 481 ventures recorded in 2022 (53).

The global startup ecosystem report (54) of 2023 shows that Lagos held its place in the 50 - 60 range of emerging tech ecosystem rankings. Nigeria is undergoing an unprecedented tech revolution, creating fertile ground for emerging trends and remarkable opportunities.

The Nigerian tech landscape is experiencing remarkable growth, drawing interest from both local and global investors. Startups are increasing at an unprecedented pace, generating employment opportunities and bolstering the nation's economic progress. Various subsectors collectively fuel the overarching surge observed in the ecosystem from 2015 to 2022.

1.4.4. Pillar 3: Accelerating AI Adoption and Sector Transformation

Nigeria's AI ambitions extend beyond building an ecosystem; it aims to harness this technology for real-world impact. Pillar 3 focuses on driving widespread AI adoption across various sectors, transforming industries and propelling economic growth.

1.4.4.1. Objective 3.1 - Drive Locally led AI Innovation

Replicating Nigeria's social context and cultural diversity with AI tools and solutions will drive AI accessibility across education, agriculture, healthcare and other sectors.

Outcomes

- A portfolio of successful AI projects that demonstrate the value proposition of AI and stimulate further investment and adoption
- Clear and actionable plans for AI adoption across key sectors, leading to increased productivity and efficiency.

Strategies

3.1.1 Implement "Roadmapping"

Identify and spearhead strategic lighthouse projects showcasing the potential of AI across vital economic sectors (e.g., agriculture, healthcare, education, finance) and government that showcase the ingenuity of the local AI ecosystem.

3.1.2 Launch sector-specific AI adoption roadmaps

These roadmaps will provide tailored guidance for different industries on integrating AI effectively.

1.4.4.1.1. Box: Strategic Government Initiatives for AI

The Nigerian government is dedicated to fostering innovation and entrepreneurship through initiatives like the National Information Technology Development Agency (NITDA). This commitment is most evident in the establishment of various innovation hubs and technology parks across the country. For example, NITDA has funded NitHub at the University of Lagos, a premier technology innovation hub that provides a supportive environment for developers, startups, and students to collaborate, receive mentorship, and build digital skills. Other notable examples of this nationwide effort include the Lion Science Park at the University of Nigeria and the Technology Park and Incubation Centre (Tech-PIC) at the Federal University of Technology, Akure.

Public service and policymakers are crucial in creating a conducive environment for AI growth in Nigeria. For instance, the House of Representatives Committee on Information and Cybercrime is developing and implementing AI policies, regulations, and frameworks that promote ethical standards, data privacy, and security. By encouraging AI use in public services, such as healthcare, education, and transportation, they aim to improve service delivery and foster public-private partnerships. These efforts ensure that AI development aligns with national goals and addresses societal challenges (55).

1.4.4.2. Objective 3.2: Drive Data-Driven Decision-Making

High-quality data fuels AI. This objective emphasises leveraging data effectively to optimise decision-making across sectors.

Outcomes

- Consistent and reliable data used in AI applications across sectors, leading to more accurate and trustworthy results.
- Increased availability of high-quality data for AI research and development
- Increased availability of public sector data for AI applications, stimulating innovation in various sectors.
- Improve transparency and replication of AI research
- Holistic data governance standards that adhere to the tents of the NDPA

Strategies

Initiative 2.1.1: Adopt globally recognised AI data quality standards across sectors.
Standardisation ensures data quality and facilitates the interoperability of AI systems.

Initiative 2.1.2: Create an Open Data Initiative (ODI) to foster collaboration between public and private sectors.

Fostering collaboration between public and private sectors unlocks valuable data resources for AI development.

1.4.4.2.1. Box: Access to Data

Access to quality data is fundamental to developing robust and reliable AI systems. Unfortunately, Nigeria faces significant challenges with data across collection, quality, availability, and accessibility. On data collection, a 2020 report by the World Bank titled "Nigeria Digital Economy Diagnostic" (22), revealed that Nigeria has a low data collection rate. This implies a need for more data in various sectors, hindering the development of AI models that could address critical issues in significant sectors. Additionally, the quality of available data is another crucial issue. Many datasets in Nigeria suffer from inaccuracies, incompleteness, and a lack of standardisation. This data quality needs to be improved to ensure the reliability and effectiveness of AI algorithms, which require clean and accurate data to function optimally. Even when data is available, they must be more cohesive and consistent. Different sectors and organisations maintain their data repositories with varying standards and formats. The lack of a unified data system makes gathering comprehensive datasets necessary for robust AI training challenging.

1.4.4.3. Objective 3.3: Cultivate an AI-Ready Workforce

A skilled workforce is essential for successful AI adoption. This objective focuses on developing a talent pipeline with the necessary knowledge and skills.

Outcomes

- Increased number of individuals with AI skills across various sectors within five years.
- Increased number of scholars producing AI-related intellectual contributions.
- Enhance research collaboration across institutions and improve access to data and resources for AI education.

3.3.1 Develop and implement AI and AI-driven training and education systems that identify, nurture, and develop diverse AI talent across the different AI domains and related areas like cybersecurity and data protection.

Launch a comprehensive AI skills development programme, including curriculum reform, teacher training, and reskilling initiatives. These programmes will identify, nurture, and develop talent from diverse backgrounds, ensuring an inclusive AI workforce across the public and private sectors.

3.3.2 Develop a National AI Research and Development (R&D) Fund
In support of cutting-edge research and attracting global talent, create an AI Research and Development Fund (AI-R&D Fund) to facilitate the research and development of AI in Nigeria.

3.3.3 Develop a National Research and Education Network (NREN)
Build a high-speed, reliable network for research institutions and educational facilities to enable seamless collaboration and data sharing within the AI community.

1.4.4.3.1. Box: AI and Jobs

Job displacement, bias, and privacy are among the top ethical and social concerns associated with artificial intelligence, posing significant threats to its development in Nigeria. According to the World Economic Forum Report, the global job market is expected to see a net reduction of 14 million jobs over the next five years, with 83 million jobs projected to be lost and 69 million created (56). While new roles, such as data analysts, scientists, and AI and machine learning specialists, are emerging, this shift can exacerbate unemployment and social inequality in Nigeria, where the job market may need to adapt more quickly to absorb displaced workers. The fear of job losses can also fuel resistance to AI adoption, hindering technological advancement and economic growth. According to the Harvard Business Review (57), bias is inherent in all AI systems, as they make decisions based on training data that may include biased human decisions or reflect historical and social inequities. Even when sensitive variables like gender, race, or sexual orientation are removed, these biases can persist. This is a critical issue for Nigeria, where diverse cultural and social dynamics must be carefully considered to ensure that AI systems do not perpetuate existing inequalities or create new forms of discrimination.

1.4.4.3.2. Box: AI Research and Development

The development and implementation of AI in Nigeria faces significant challenges, with funding constraints as a critical weakness. These financial limitations manifest in several ways. For example, public investment in AI research and development could be much higher. According to a report by the World Bank (58), Nigeria spends only about 0.2% of its GDP on research and development, compared to the global average of 2.2%. While there is a growing interest in technology investments, private-sector funding for AI-specific projects remains sparse. The Global AI Index ranks Nigeria low due to its insufficient venture capital investments in AI startups compared to countries like South Africa and Kenya. The UNESCO Science Report 2021 (22) states that 80% of investment in Nigeria's 101 tech hubs comes from offshore sources. The funding constraints also extends to educational institutions, which are crucial for nurturing future AI professionals. Nigerian universities often struggle with inadequate funding for advanced research facilities and AI-focused programmes. The UNESCO Science Report 2021 (22) highlights that only a fraction of Nigerian universities offer AI-related courses, and those that do often lack the necessary resources.

1.4.4.4. Objective 3.4: Achieve Widespread AI Integration Across Sectors

This objective focuses on promoting and integrating AI solutions across diverse industries, maximising its impact on the Nigerian economy and society.

Outcomes

- A supportive regulatory framework for AI development and adoption, attracting investment and fostering innovation
- Increased collaboration between stakeholders, leading to the development and deployment of commercially viable AI solutions
- Increased awareness and understanding of AI among stakeholders, leading to accelerated adoption and problem-solving through AI

Strategies

3.4.1 Implement AI Policy Advocacy and Incentivise Research, Investment, and Adoption
Creating an enabling policy environment that encourages investment and accelerates AI adoption, including green AI across sectors.

3.4.2 Establish a tripartite AI Transfer Partnership Program
This program will connect research institutions, businesses, and the government, facilitating knowledge and technology transfer.

3.4.3 Organise annual AI Adoption Summits and Hackathons
These events will bring together stakeholders to showcase AI advancements that will support national goals, foster collaboration, and identify innovative solutions.

1.4.4.4.1. Box: Sectoral Integration

The Government of Nigeria recognises ICT as a catalyst for developing critical sectors such as education, healthcare, agriculture, and manufacturing. The government is promoting partnerships between local ICT companies and foreign investors to diversify the economy from oil and gas. AI will drive innovation, increasing partnerships with both local and international companies.

1.4.4.5. Objective 3.5: Ensure AI Contributes to Sustainable Development and Environmental Well-being

AI's energy and resource consumption warrants a specific focus on green and sustainable AI initiatives.

Outcomes

- Portfolio of commercially viable green AI solutions/projects
- A portfolio of green AI projects that demonstrate the value proposition of AI and stimulate further investment and adoption.

Strategies

3.5.1 Establish Green AI Challenge and Grant Programme
Establish a national competition where developers create AI solutions that address environmental challenges (like climate change, waste management, or sustainable resource utilisation) and smart city initiatives. The programme will encourage the development of AI-powered applications that optimise urban infrastructure, enhance resource management, improve energy efficiency, and promote sustainable living in cities nationwide.

3.5.2 Foster adoption of green AI projects across sectors
Support green AI projects and innovations across sectors.

1.4.5. Pillar 4: Ensuring Responsible and Ethical AI Development

The transformative power of AI comes with inherent risks. This pillar ensures that Nigeria's AI development and adoption occur within a responsible and ethical framework.

1.4.5.1. Objective 4.1: Establish a Robust AI Ethics Framework

A clear and comprehensive framework is essential to guide the development and deployment of trustworthy AI.

Outcomes

- A well-respected and diverse AI Ethics Expert Group (AIEEG) established, providing independent and objective advice on AI ethics and overseeing AI technologies' ethical development and deployment.
- A clear and comprehensive set of ethical principles for AI addressing fairness, transparency, accountability, privacy, and human well-being
- A standardised assessment tool ensuring that AI projects align with established ethical principles.

Strategies

4.1.1 Create a High-Level AI Ethics Expert Group (AIEEG)/National AI Ethics Commission
This initiative aims to create a diverse and inclusive expert group of stakeholders from academia, industry, government, and civil society. This group of experts will guide the development and implementation of ethical AI principles in Nigeria.

4.1.2 Develop National AI Ethical Principles
Guided by universal policies, this initiative will define the ethical principles that align with critical Nigerian values. These principles will represent the core values and standards shaping AI design, development, and deployment in Nigeria. Some suggestions of these principles include decoloniality, humanity, technical robustness and safety, inclusion, diversity, non-discrimination, accountability, solidarity, transparency, and responsible data governance.

4.1.3 Develop a comprehensive AI ethics assessment framework
This AI ethics assessment framework will provide a structured approach for evaluating the ethical implications of AI projects before deployment. The framework will evaluate the moral implications of AI technologies throughout their lifecycle. It provides a systematic approach for identifying, analysing, and addressing ethical considerations for designing, developing, deploying, and using AI systems.

1.4.5.1.1. Box: AI Ethics

Biased AI systems may also undermine public trust in technology, leading to decreased adoption and potential rejection of new technologies (59). This mistrust can have severe economic and social implications for Nigeria. If the public perceives AI as discriminatory rather than a means of advancement, the country may still need to realise the benefits of AI fully. Such mistrust can even have far-reaching economic and social repercussions, as the promised benefits of AI may remain unrealised if the technology is perceived as discriminatory or untrustworthy. This could result in missed opportunities for innovation and growth and exacerbated social tensions. Therefore, addressing ethical and social concerns is crucial for fostering a supportive environment for AI development in Nigeria.

1.4.5.2. Objective 4.2: Shaping a Human-Centred AI Transition

AI can disrupt society in various ways. This objective focuses on anticipating these potential disruptions and preparing for them.

Outcomes

- A clear understanding of emerging trends, potential challenges and opportunities associated with AI development.
- A legal framework that promotes responsible AI development and protects human rights and privacy.

Strategies

4.2.1 Conduct a horizon scan/foresight study

This initiative will involve mapping the dimensions and extent to which AI adoption could exacerbate existing inequalities, including but not limited to driving skills and educational wedge, resulting in increased unemployment. It will identify industries and job roles most susceptible to automation and the potential scale of job displacement and highlight jobs and sectors that can be augmented by AI. It will also assess the possible impact on vulnerable groups and communities with limited technology or digital skills access.

4.2.2 Implement legislative reforms

As AI evolves, legal frameworks need to adapt. This initiative will identify and address emerging legal and ethical challenges AI poses. Examples include protecting workers' rights through retraining programmes, tailored unemployment benefits, and policies encouraging job sharing and reduced work hours. Additionally, bridging the digital divide requires legislation promoting digital literacy and equitable access to technology through initiatives like affordable internet access, skills training, and community technology hubs.

1.4.6. Pillar 5: Developing a Robust AI Governance Framework

The responsible and successful development of AI requires clear and consistent governance principles, building on emerging global standards such as the recently enacted EU AI Act. In this context, the AIGN (Artificial Intelligence Governance Network) Framework provides a modular, operational, and certifiable governance system for AI and data usage. This pillar establishes a robust foundation that advances core principles of trust, transparency, and accountability, while aligning Nigeria's AI development with contemporary international best practices.

1.4.6.1. Objective 5.1: Establish Clear and Consistent Governance Principles

By embedding structured governance domains and lifecycles into Nigeria's AI ecosystem, the AIGN framework creates a pathway from principles to practice (74). This ensures that ethical standards are not just aspirational, but operationalised through concrete systems that safeguard compliance, reduce risks, and enable responsible innovation. The logical outcomes of such an approach are provided below.

Outcomes

- A set of comprehensive National AI Principles that are publicly available and transparent guiding all aspects of AI development, deployment, and usage in Nigeria.
- A well-functioning and respected AI Governance Regulatory System promoted by NITDA providing clear guidance, enforcing ethical standards, and promoting responsible AI development, deployment and usage.
- Transparent terms and guidelines for responsible AI development, deployment and usage.
- A comprehensive risk management framework that minimises the potential negative impacts of AI deployment and usage.

Strategies

5.1.1 Develop National AI Principles

Establish fundamental values that guide the responsible development, deployment and use of AI systems. These principles will articulate Nigeria's core values and vision for AI development and deployment, such as achieving the SDGs.

5.1.2 Establish an AI Governance Regulatory Body

This independent body will oversee the implementation of the National AI Principles, ensure compliance with ethical standards, and mediate potential disputes. This cross-functional AI governance group will also be responsible for the ability to adjudicate, review, and evaluate the use cases and deployment of AI across entities.

5.1.3 Develop a National AI Policy Framework
A national framework that defines the governance guidelines and principles to guide the design, development, deployment and use of responsible AI systems.

5.1.4 Develop a National AI Risk Management Framework
This framework will outline protocols for identifying, assessing, and mitigating potential safety and security risks associated with AI systems.

1.4.6.2. Box: Regulatory Acts and Initiatives Supporting an AI Ecosystem

In the dynamic landscape of technological advancement, Nigeria has embarked on a journey to foster innovation and embrace the transformative potential of artificial intelligence (AI) with the call for developing the National Artificial Intelligence Policy (NAIP) as early as 2022 (60). Central to this endeavour are the regulatory acts and policies established by the government (61) to provide a conducive environment for the AI ecosystem's growth (62). These include the National Policy on AI and Robotics, the National Information Technology Development Agency (NITDA) Act (63), additional Acts on Data Protection Regulation, Cybercrime, the National Office for Technology Acquisition and Promotion (NOTAP), and the National Universities Commission (NUC). These regulations collectively address crucial aspects such as data protection, cybersecurity, technology transfer, and research, laying a foundation for robust AI innovation. One of the latest initiatives is the Three Million Technical Talent (3MTT) programme by the Nigerian Government to train three million Nigerians in tech skills over the next four years. The programme aims to enhance the digital economy and create digital jobs, positioning Nigeria as a net exporter of tech talent (64) (65). Such initiatives will include relevant data protection best practices to the existing Acts and Regulatory frameworks to accommodate the nuanced application of Artificial Intelligence, especially when personally identifiable datasets are involved in model development and decision-making. Through these concerted efforts, Nigeria aims to harness AI to drive economic growth, enhance public services, and tackle societal challenges.

Risks and Mitigation Strategies

1.6.1. AI Risks and Mitigation Strategies

1.6.1.1. Introduction

Artificial Intelligence (AI) is on the cusp of revolutionising business, governance, and the pursuit of social welfare, with transformative implications for education, healthcare, and the mitigation of pressing global challenges such as climate change, poverty, and hunger. Nevertheless, the rapid advancement of AI has generated concerns regarding its potential pitfalls, and rightly so, as the unintended consequences of emerging technologies are a historical inevitability. Therefore, developing national AI strategies must prioritise leveraging country-specific strengths and opportunities while concurrently and proactively addressing potential risks through thorough assessment, anticipation, and mitigation measures.

This is not an insignificant undertaking. Government leaders are confronted with a profound paradox as they strive to leverage AI at scale while simultaneously fulfilling their responsibility to safeguard citizens' interests and harness Artificial Intelligence (AI) for the greater good. This dichotomy necessitates a delicate balance between fostering innovation and exercising control over the far-reaching societal implications of emerging technologies. In addition to articulating six critical risks associated with AI adoption at both the business and national levels, certain crucial trade-offs are necessary for governments to navigate in conjunction with businesses, consumer advocacy groups, and international organisations, (66).

Grouping of risks is characterised as “National-Level,” if such risks include economic risks (e.g., job displacement, loss of institutional knowledge), ethical risks (e.g., lack of values, goal misalignment), and societal risks (e.g., reputation, intelligence divide.) The National-Level risks are far-reaching and impact the socio-economic environment in which AI systems operate. These are issues that need to be resolved at the national, supranational, or societal level across the globe (66). Potential harms of poorly implemented AI systems, including misleading models, bias, and vulnerability to adversarial actors, are an additional risk area that has already manifested since generative AI made its mark on the global stage last year. Drivers behind substandard outcomes include the brittleness of current systems, making them easy to mislead and manipulate with variations in input, and shifts in dataset characteristics over time that threaten model reliability, thus leading to unintended consequences (67).

1.6.1.2. Applying NIST Framework in Nigeria

The U.S. National Institute of Standards & Technology (NIST) Framework for AI Risk Management is a valuable tool for designing, developing, implementing, and using responsible AI systems while elevating reliability (68). The industry-neutral guideline provides a framework for measuring AI risks, optimising the benefits of AI technologies and addressing their drawbacks by providing a systematic way to recognise, evaluate, and lessen the hazards related to AI systems. The NIST's AI Risk Management System (RMF) defines a "trusted AI system" as possessing six characteristics: (1) validity and dependability, (2) security and resiliency, (3) improved privacy, (4) transparency and accountability, (5) interpretability and explicability and, (6) fairness, with zero negative biases. In addition to defining the features of trustworthy AI systems, the RMF frames risks associated with AI. Together, the defining and framing aspects of the RMF provide organisations and nations with a baseline understanding of how to evaluate an existing AI system or develop a new one according to the standards (69).

In addition to providing a comprehensive overview of the attributes a trustworthy AI system should possess, the AI RMF provides four essential functions – Govern, Map, Measure, and Manage – that a nation can adopt to develop and deploy trustworthy AI systems across use cases and domains. The AI RMF Playbook facilitates the framework's application, which offers detailed, actionable, and adaptive guidance to implement each of the four essential functions (Govern, Map, Measure, Manage) for trustworthy AI development (69). Notably, the NIST AI RMF is a working framework updated periodically with real-world results, applications, outcomes, and expanded expertise, leveraging the organisation's vast network and resources. The NIST approach is a practical but fluid systematic approach to accommodate emerging developments in AI and enable successful outcomes across diverse entities and systems.

According to PwC, AI risks can be at the business or national levels. The National-Level risks are more critical and far-reaching and impact the socio-economic environment in which AI systems operate. These are issues that need to be tackled at the national, supranational, or societal level across the globe. They are categorised into economic, ethical and societal risks (66).

Similarly, KPMG surveyed executives across multiple sectors to determine their views of the risks associated with their AI (70). The risks identified were data integrity, statistical validity, model accuracy, transparency, fairness, resiliency and reliability (70).

Furthermore, McKinsey has compiled a comprehensive catalogue highlighting the unintended consequences of Artificial Intelligence (AI). According to McKinsey, adopting AI can lead to significant and far-reaching unintended consequences, both maliciously intended and unintentional, affecting individuals, organisations, and society. These unintended consequences can have a profound impact, making it crucial to address and mitigate them proactively to ensure responsible AI integration and minimise potential harm (71).

According to the World Economic Forum's Global Risks Outlook Survey, Chief Risk Officers (CROs) from leading corporations and international organisations warn that Artificial Intelligence (AI) poses significant risks if not properly understood and mitigated. They emphasise that AI has the potential to cause substantial harm if we fail to address the risks associated with its development and deployment (72). The NIST AI Risk Framework further highlights the potential harm related to AI systems, with an intentional emphasis on the harm to people (individual, group/community, and societal) (68).

1.6.2.4.

Economic	Ethical	Societal	AI Model
Job displacement	Lack of value risk	Reputational risk	Cybersecurity Risks
Unable to quantify ROI	Value alignment risk	Risk of intelligent divide	Lack of Transparency
Loss of institutional knowledge	Goal alignment risk	Dependence on AI	Resiliency and reliability
Concentration of Power	Privacy Concerns	Loss of Human Connection	AI Arms Race
Economic Inequality	Legal and Regulatory Challenges	Misinformation and Manipulation	Data Integrity
Skill shortage		Unintended Consequences	Statistical validity
		Existential Risks	Model accuracy

Figure 6: AI risk factors by category *(Source: Source: Compiled by NAIS Workshop facilitators)*

1.6.1.3.1.

Figure 7: AI risk factors impact by category *(Source: Compiled by NAIS Workshop facilitators)*

1.6.1.3.2.

Figure 8: AI risk factors probability by category *(Source: Compiled by NAIS Workshop facilitators)*

1.6.1.3.3.

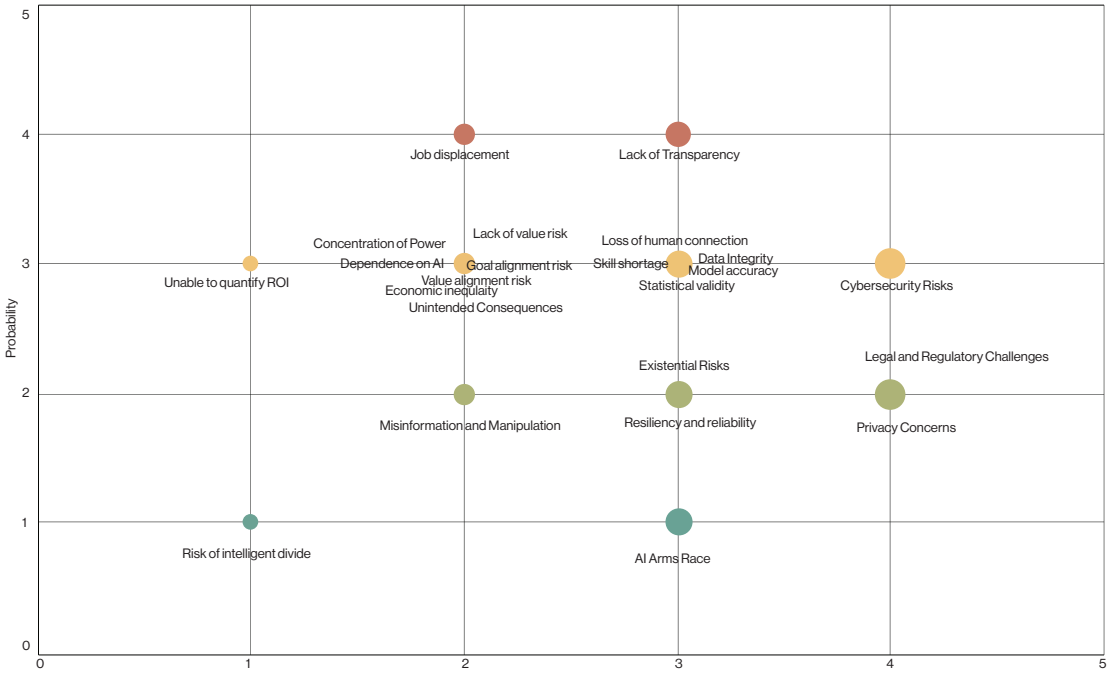

Figure 9: AI risk matrix *(Source: Compiled by NAIS Workshop facilitators)*

1.6.2. Risks in NAIS

1.6.2.1. Risk Process

Identify	Assess	Mitigate	Monitor & Review
Identify potential risks of implementing the National AI Strategy	Evaluate each risk based on its likelihood of occurring (probability) and the potential impact on the strategy's success Based on assessment, categorise risks using risk matrix	Develop strategies to mitigate each risk, aiming to reduce the likelihood of occurrence or the severity of the impact	Review the risk management plan Updated periodically to reflect changes in the AI landscape and the strategy's progress

Figure 10: NAIS risk management process *(Source: Compiled by NAIS Workshop facilitators)*

1.6.2.2. Risk Factors and Outcomes

Risk Factor	Description	Likelihood	Impact	Mitigation Strategy	Risk Rating
Funding Shortfall	Insufficient resources allocated for implementing the strategy.	Medium	High	• Secure additional funding from the public and private sectors. • Prioritise initiatives based on costeffectiveness. • Explore innovative financing mechanisms (e.g., public-private partnerships).	High
Lack of Skilled Workforce	Shortage of AI professionals to implement and manage AI projects.	Medium	High	• Implement AI Talent Transfer Programme and expand training initiatives. • Partner with universities to offer AI degree programs. • Encourage international collaboration and knowledge sharing.	High
Ethical Concerns	Public distrust in AI due to ethical issues like bias and privacy violations.	High	High	• Develop and implement robust AI ethics principles. • Establish clear and transparent regulatory frameworks. • Conduct public awareness campaigns to promote trust in AI.	Extreme
Data Security Breaches	Vulnerability of sensitive data use in AI projects to cyberattacks.	Medium	High	•Implement stringent data security measures (e.g., encryption, access controls). • Promote data privacy best practices among stakeholders. • Invest in cybersecurity infrastructure and expertise.	High
Slow Adoption by Private Sector	Limited private sector interest in investing in and adopting AI technologies.	Medium	Medium	•Develop tax incentives and funding mechanisms to attract private investment. • Showcase successful AI applications to demonstrate potential benefits. • Partner with industry associations to address adoption challenges.	Medium
Rapid Technological Change	Difficulty keeping pace with the rapid evolution of AI technologies.	High	Medium	Establish mechanisms for continuous monitoring of AI trends. • Foster a culture of innovation and adaptation within the AI ecosystem. • Allocate resources for ongoing research and development.	High

1.6.3.2.1. Risk Matrix

Figure 9: AI risk matrix *(Source: Compiled by NAIS Workshop facilitators)*

Conclusion

1.7.1. Strategic Alignments

In conclusion, the NAIS pillars:

Align with the National Vision
Each pillar and its objectives directly contribute to Nigeria's vision of becoming a global leader in responsible and ethical AI innovation.

Prioritise Impact
The objectives focus on areas with the highest potential for national development, economic growth, and social progress. These include fostering a robust AI ecosystem (Pillars 1 and 2), driving sector-specific adoption for tangible benefits (Pillar 3), and ensuring responsible AI development (Pillar 4).

Address National Challenges
The strategy prioritises objectives that leverage AI to address critical national issues identified during the workshop, such as unemployment (Talent and Workforce Development), data quality (Adoption and Sector Focus), and national security (Talent and Workforce Development).

Balance Ambition and Actionability
While ambitious in its vision, the strategy focuses on achievable objectives with clear initiatives for implementation. This ensures practical progress towards the national goals.

1.7.2. Workshop Working Group Alignments

The synthesised pillars align with the workshop groups:

International Collaboration and Engagement
The strategy translates these goals into Pillar 2, focusing on establishing Nigeria as a global AI leader through partnerships and knowledge exchange.

Infrastructure and Ecosystems
Pillars 1 and 2 directly addresses these goals by outlining initiatives to build the necessary infrastructure, data resources, and talent pool.

Adoption and Sector Focus
The strategy incorporates these goals into Pillar 3, prioritising targeted AI adoption in critical sectors for economic and social benefits.

Ethics and Social Impact
The focus on responsible AI development is reflected in Pillar 4, with objectives to establish ethical frameworks and build public trust.

Policy and Governance
The strategy incorporates these goals through objectives in Pillar 4 (ethical frameworks) and potential future considerations under Pillar 5 (developing a robust AI governance framework).

Research and Innovation
These goals are central to Pillars 1 and 4, with objectives focused on building research capacity, establishing AI centres, and fostering innovation.

Talent and Workforce Development:
The strategy addresses these goals through objectives in Pillar 2 (skills development) and Pillar 3 (workforce training for AI adoption).

1.7.2.1.

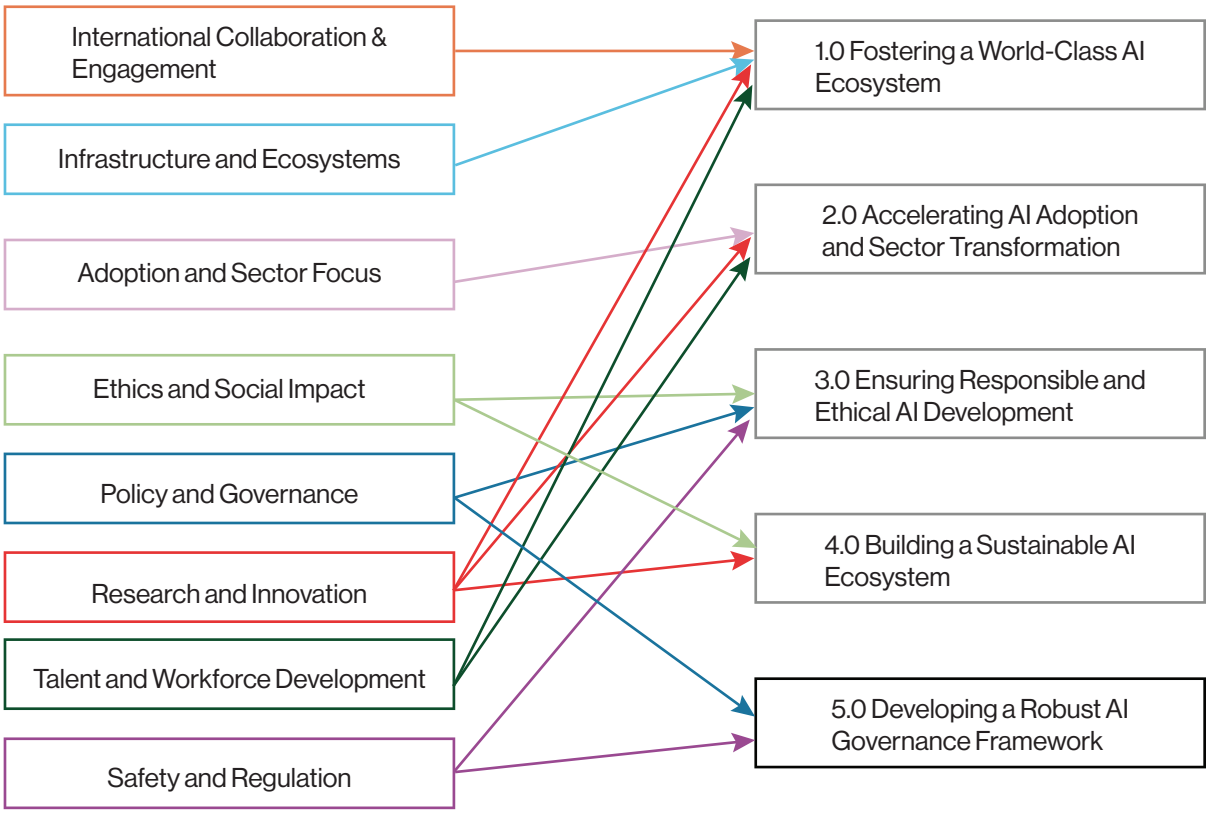

Figure 12: NAIS strategy and workshop alignment *Source: Compiled by NAIS Workshop facilitators)*

Conclusion

The National AI Strategy was developed using a structured and inclusive methodology that ensured stakeholder engagement, evaluation across key analytical dimensions, and strategic alignment with national goals. The approach combined preliminary research and a dedicated workshop to guide the process and ensure the development of a comprehensive, actionable AI strategy.

1.8.1.1. Stakeholder Engagement

A broad range of critical stakeholders in AI, including policymakers, industry experts, renowned researchers and startups of Nigerian descent, were identified. A four-day intensive National Artificial Intelligence Strategy Workshop brought together over 120 stakeholders from within and outside Nigeria to develop the strategy. These stakeholders were organised into eight working groups based on previously defined strategic pillars. The workshop proceeded in clearly defined stages, including context-setting, deep-dive pillar sessions, cross-pillar synthesis, and the final validation of strategic initiatives.

1.8.1.1.1.

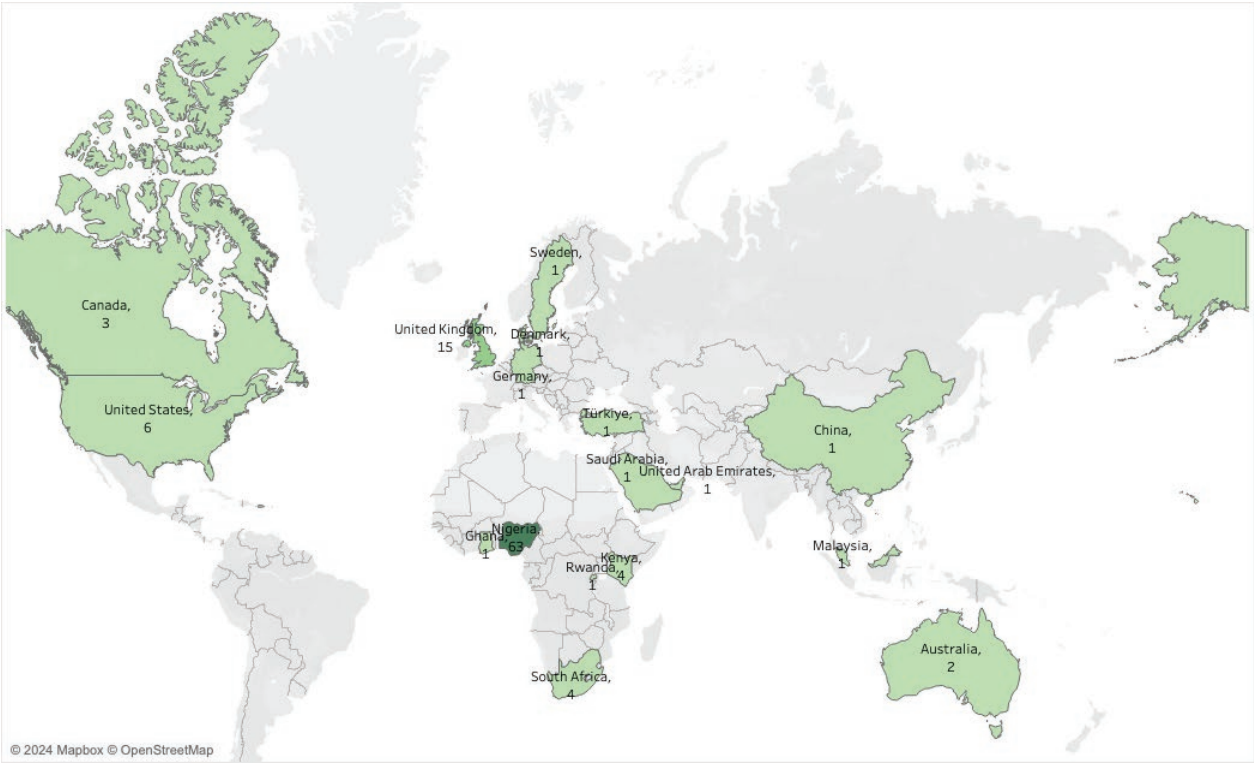

Figure 13: NAIS stakeholder workshop participation *(Source: Compiled by NAIS Workshop facilitators)*

1.8.1.2. Co-Creation Activities

Vision Development
A national vision statement for AI in Nigeria was created through brainstorming sessions of the various sub-groups to determine the 2030 goal and priorities for Nigeria in AI and further review and harmonisation by the group. This vision outlines the aspirations for the role of AI in national development.

Goals Setting
Each working group focused on their specific pillar and defined SMART goals aligned with the national vision.

Strategic Initiative Development
Each working group identified strategic initiatives that would aid the attainment of their goals. They refined the strategic initiatives by identifying dependencies, key stakeholders, resource requirements, timelines, benefits and risks.

Roadmap for Implementation
A high-level roadmap for each pillar was developed, outlining timelines, key performance indicators (KPIs) for progress tracking, and process owners responsible for specific initiatives.

1.8.1.3. Analytical Dimensions

The evaluation of the Strategy was conducted across seven analytical dimensions:

Strategic Alignment
the extent to which it aligns with the overall national development goals and priorities of Nigeria while clearly stating the role of AI in Nigeria's future.

Social
the extent to which it assesses the social impacts of AI, both positive and negative, and identifies measures to mitigate potential risks as it prioritises equitable access for all Nigerians irrespective of their background or location.

Economic
the extent to which AI can be leveraged to drive economic growth in Nigeria and enhance Nigeria's competitiveness in the global marketplace.

Technological
the extent to which it realistically assesses Nigeria's current state of technological preparedness for AI adoption and the need for skilled human resources.

Ethical and Legal
the extent to which it addresses potential ethical concerns surrounding AI development and deployment and complies with legal and regulatory frameworks.

Governance
the extent to which a clear and effective governance framework exists for AI development and deployment.

Sustainability
the extent to which it considers the long-term environmental and social sustainability implications of AI adoption.

The diverse stakeholder group brought various perspectives to the determination of Nigeria's priorities in AI and its goal for 2030, recognising that other nations have had a head start. However, one common factor that drove the discussions was the need for an AI strategy that considers Nigeria's national context and reflects Africa's dynamism, i.e., an AI strategy that looks at the development of AI for Africa while considering best practices.

The eight working groups of the workshop addressed the various analytical dimensions to ensure a holistic approach. Group 3 (Adoption and Sector Focus) ensured strategic alignment by prioritising AI development in sectors aligned with national goals. Several pillars address social and economic dimensions. Group 1 (Talent and Workforce Development) and Group 7 (Ethics and Social Impact) influence who benefits from AI by fostering access to skills and ensuring fair development. Economic growth is driven by Group 3's focus on specific sectors and Group 5's (Infrastructure and Ecosystem) creation of a foundation for economic activity. Technological advancement is tackled by both Group 2 (Research and Innovation) and Pillar 5. The Ethical and Legal Dimension is a combined effort of Group 4 (Policy and Governance) establishing ethical frameworks, Group 7 addressing concerns like bias, and Group 8 (Safety and Regulation) defining risk mitigation strategies. Finally, Group 4 establishes governance structures, and while there is no dedicated Sustainability pillar, Group 7 can be used to consider AI's long-term social and environmental implications.

Recognising the importance of synergy to avoid duplication of efforts and waste of resources, presentations were made by each sub-group at every distinctive stage to allow for feedback and comments on the practicality of the goals and initiatives and to identify areas of collaboration between the sub-groups.

The working group sessions fostered collaboration and ensured that the strategy would reflect national priorities, industry expertise and ethical considerations, considering the need to close the gap between academia and the industry.

Furthermore, to ensure broad and representative input in the review of the final draft of the workshop sessions, a comprehensive stakeholder consultative approach was adopted. This included a public review of the first draft which was open to individuals and organisations, in-depth sessions with domain experts for technical evaluation, targeted user community review workshops, and the establishment of a general online portal to facilitate inclusive public engagement and feedback.

SWOT Descriptors

Strengths	Rationale
A large and youthful talent pool	Nigeria's population of over 200 million, with 75% in the working age bracket, represents a significant talent pool for AI development and adoption. This young demographic is often tech-savvy and eager to learn new skills, providing a strong foundation for AI human capital development.
Strong economic performance	Nigeria's position as Africa's largest economy, with a nominal GDP of $477.39 billion, signifies a robust financial base. This economic strength can translate into resources for investment in AI research, development, and infrastructure, fuelling the growth of the AI ecosystem.
Strong regional influence and established diplomatic networks	Participation in global organisations like the African Union and the Economic Community of West African States allows for strategic partnerships on AI development with neighbouring countries, fostering knowledge sharing and potentially creating a larger market for AI solutions.
Vibrant private sector with access to capital	Nigeria boasts a thriving private sector, fostering a dynamic and competitive environment. This entrepreneurial spirit aligns well with AI development, where innovation and agility are crucial. The presence of a large stock exchange attracting domestic and international investors further strengthens this advantage. This readily available pool of capital can be a significant advantage for funding AI startups and research initiatives.
High youth literacy rate	Nigeria boasts a young population with a literacy rate of 75%. This creates a strong foundation for building an AI workforce. A literate youth population is more adaptable to learning new skills and concepts, including those related to AI development, data analysis, and machine learning. This translates to a readily available talent pool that can be trained and upskilled to support the growth of the AI ecosystem.

Thriving startup ecosystem	Nigeria boasts one of Africa's largest startup ecosystems, according to The Global Startup Ecosystem Report 2023. This vibrant environment fosters innovation and risk-taking, which are essential for developing and deploying cutting-edge AI solutions. Lagos, a regional leader in ecosystem value and early-stage funding, with prominent deals like OPay's $400 million Series C and Flutterwave's $250 million Series D, demonstrates the potential for attracting investment in AI ventures.
Emerging tech hub	Lagos' ranking in the 51-60 range of the Emerging Ecosystems ranking showcases its potential as a hub for AI development. This ranking suggests existing infrastructure and talent that can be leveraged tobuild a strong foundation for AI initiatives.

Weakness	Rationale
High and unstable inflation	Nigeria's current high inflation rate (26.72% in September 2023) creates significant economic uncertainty. This discourages long-term investments, a crucial factor for developing a sustainable AI ecosystem. Investors become hesitant to commit resources to AI projects with potentially long payback periods due to the risk of inflation eroding returns.
Reduced consumer spending power	As inflation increases, the purchasing power of Nigerian citizens shrinks. This can lead to decreased demand for AI-powered products and services, hindering the potential market growth needed to support a thriving AI industry. Consumers may prioritise necessities over adopting new technologies.
Potential for social unrest	High inflation rates are often linked to increased poverty and crime rates. Social unrest can create an unstable environment that discourages investment in long-term projects like AI development, hindering the creation of a sustainable AI ecosystem.

Currency fluctuation and exchange rate instability	The sharp depreciation of the Nigerian Naira against the US Dollar (over 70% in a year) creates significant uncertainty for AI development. This makes it difficult for companies and researchers to accurately cost projects, secure funding, and manage international collaborations – all crucial aspects of a thriving AI ecosystem.
Limited foreign exchange generation	Nigeria's reliance on oil exports makes its foreign currency reserves vulnerable to fluctuations in oil prices. A more diversified export base, particularly in technology-driven sectors, could generate a more stable flow of foreign exchange, benefiting AI development by facilitating access to essential resources.
Unstable and high energy costs	Fluctuating and high energy prices, particularly after the fuel subsidy removal in 2023, create uncertainty for businesses and individuals. This discourages investment in AI infrastructure and development, which often requires significant computational resources. High operational costs due to expensive energy can make AI adoption less attractive for companies, hindering the growth of the AI ecosystem.
Limited access to reliable power	The rising cost of energy is often coupled with unreliable power supply. This disrupts training and deployment of AI models, impacting their reliability 57 and performance. Frequent power outages hinder research and development efforts, slowing down progress in the field.
Limited investment in AI R&D	Nigeria's growing public debt can constrain government funding for research institutions, universities, and initiatives critical for fostering domestic AI development. This limits the nation's ability to compete in the global AI race and develop homegrown solutions.

Focus on debt servicing over innovation	A large portion of government revenue might be directed towards servicing the national debt, leaving fewer resources available for investments in critical infrastructure upgrades that support AI development, such as high-speed internet and computing power.
Governance challenges	Nigeria's performance in key global Governance Indicators falls below the average of selected comparator countries. This weak governance environment can hinder AI development by creating uncertainties for investors, hindering transparent data collection and use practices, and potentially stifling innovation due to cumbersome regulations.
Ethical concerns and potential for bias in AI applications	Insecurity can heighten societal tensions and increase the risk of bias creeping into AI algorithms used for security purposes, potentially exacerbating existing social issues.

Opportunities	Rationale
Knowledge sharing	Partner with leading AI nations (e.g., China's Belt and Road Initiative) to facilitate knowledge exchange through joint research projects, student exchange programs, and technology transfer agreements.
Funding and investment	Collaborate with development institutions (e.g., African Development Bank) and explore funding opportunities for AI research, infrastructure development, and startup incubation. This can accelerate the growth of a robust AI ecosystem.
Market access and standardisation	Regional market access through continental and sub-regional trade agreements to establish clear regulations and standards for AI development and deployment. This can create a larger market for Nigerian AI solutions and foster cross-border collaboration. An example of such is the African Continental Free Trade Area

Addressing global challenges	Partner with international organisations (e.g., UN Sustainable Development Goals) to develop bespoke and nuanced AI solutions to address unique local problems with global consequences (e.g., poverty, climate, etc.)
Leveraging blockchain for secure AI systems	The Nigerian government's recent National Blockchain Policy recognises the potential of blockchain technology in various industries. This presents an opportunity to explore how blockchain can be integrated with AI systems to enhance security, trust, and transparency in areas like data provenance, identity management, and access control for AI models.

Threats	Rationale
Geopolitical instability and disrupted supply chains	The ongoing war in Ukraine and the potential for similar conflicts in neighbouring West African countries create significant uncertainty. This disrupts global supply chains for essential resources like hardware components and rare earth elements crucial for AI development and infrastructure. Rising food insecurity can lead to social unrest, potentially impacting the stability needed for sustained investment and innovation in AI.
Brain drain and capital flight	While international migration can generate valuable remittance inflows, it presents a significant challenge to Nigeria's AI development. The mass exodus of skilled labour weakens the talent pool necessary for developing and deploying AI solutions. Furthermore, increased movement of capital can create challenges around regulation and financial stability, potentially hindering investment in domestic AI initiatives in sectors such as: banking, IT, health, education etc.
Cybersecurity risks	The growing dependence on digital assets and the escalating nature of cyber threats emphasise the urgent need for strong cybersecurity measures to protect against potential threats in Nigeria's rapidly changing digital landscape.

Resistance to AI due to feared Job loss/Bias	Workforce reduction and inherent bias due to AI uptake can pose resistance to adopting Artificial Intelligence. The result will be an increased unemployment rate and social inequality.

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