

Cultivating AI Governance: Strategic Insights from Estonia's Framework for Nigeria's Digital Ecosystem

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ABSTRACT

This paper elucidated how Estonia's robust AI governance frameworks can serve as a paradigm for Nigeria. A comparative analytical method was employed, juxtaposing Estonia's mature AI governance structures with Nigeria's burgeoning framework. The research synthesised insights from academic literature, governmental reports. The discourse traverses Estonia's comprehensive legal and regulatory framework for AI, emphasising its centralised coordination mechanism, the Government CIO Council, and the pivotal AI Ethics Council. These structures, alongside vigorous public-private collaboration and investments in digital literacy, form Estonia's cohesive AI governance model and identified actionable insights drawn from Estonia's approach. The conclusion synthesises the lessons that Nigeria can assimilate from Estonia, advocating for a centralised AI governance body, ethical AI frameworks, multi-stakeholder collaboration, and enhanced digital infrastructure. These recommendations are pivotal for Nigeria to build a robust AI governance framework that mirrors Estonia's success.

Keywords: Artificial Intelligence Governance, Ethical AI Frameworks, Digital

1. Introduction

In the contemporary era, the brisk evolution of artificial intelligence (AI) technologies stands as a transformative force across myriad sectors and industries on a global scale (Floridi, 2020). Nations with burgeoning economies, exemplified by Estonia and Nigeria, are progressively acknowledging the myriad benefits that AI promises for catalysing economic development, refining public services, and ameliorating societal welfare. The allure and tangible advantages of AI have spurred these nations to embrace AI technologies eagerly, aiming to foster innovation and augment their competitive edge on the international stage.

In Nigeria, the government has initiated a plethora of measures to catalyze the development and assimilation of AI across diverse sectors such as healthcare, agriculture, and the financial services industry. Concomitantly, the Nigerian technological ecosystem is experiencing an unprecedented boom in AI startups and research endeavours (Ajibade, & Onovakpuri, 2020). Estonia, renowned as a vanguard of e-governance and digital innovation, has undertaken significant measures to exploit AI technologies for enhancing the delivery of public services and elevating government operational efficiency. The nation's sophisticated digital infrastructure, embodied by the X-Road platform and e-Residency program, facilitates an unparalleled ease in data interchange and the provision of digital services for the citizens (Ministry of Economic Development of Estonia, 2017).

Nonetheless, the rapid deployment of AI technologies is not devoid of ethical quandaries. Issues pertaining to privacy, bias, accountability, and transparency have engendered considerable scepticism towards the integration of AI in governance, precipitating the emergence of ethical AI frameworks. These frameworks are instrumental in ensuring the development and application of AI technologies in a manner that is ethically responsible and sound. They aim to tackle pivotal ethical issues such as safeguarding data privacy, mitigating algorithmic bias, enhancing accountability, and promoting transparency in governance. Governments believe

that by instituting well-defined guidelines and principles for the ethical development and deployment of AI in governance, nations can effectively mitigate potential risks and bolster societal trust in these technologies (Biniok, & Maedche, 2019).

In Nigeria, where the regulatory framework for AI is still in its infancy and the adoption and development of AI technologies are somewhat limited, there's a palpable interest from the government in leveraging AI to stimulate economic growth and societal development. The government is placing a high priority on ethical standards in the development of AI in governance that can champion fairness, equity, and transparency in governance and administration, thereby nurturing a broader public acceptance and trust. Estonia's approach to AI governance offers invaluable lessons for Nigeria in the crafting of ethical AI frameworks. Estonia has put in place stringent data protection regulations, such as the General Data Protection Regulation (GDPR), which are designed to protect individual privacy rights in the digital era (Ministry of Economic Development of Estonia, 2017). Moreover, the Estonian Artificial Intelligence Strategy sets forth explicit principles for the responsible development and utilization of AI technologies, providing a model that combines regulatory foresight with technological innovation (Estonia Ministry of Information Technology and Communications, 2020).

This paper explored how Estonia's AI governance frameworks can serve as a model for countries like Nigeria, focusing on the development and implementation of AI governance structures that prioritize ethics and development.

2. Exploring the concept of AI governance

The concept of AI governance has emerged as a pivotal area of focus against the backdrop of rapid advancements in artificial intelligence technologies observed over the recent decades. As delineated by Floridi (2020), the genesis of AI governance is intrinsically linked to the evolution of AI systems, which are increasingly autonomous and capable of making independent decisions. This evolution prompts critical inquiries regarding the regulation and oversight of AI behavior, accentuating the pressing need for robust governance frameworks. The potential risks associated with the deployment of AI, including algorithmic biases, opacity in decision-making processes, and significant societal impacts, underscore the imperative for establishing governance measures to ensure AI's responsible and ethical utilization.

AI governance is characterized by its multidimensional nature, encapsulating a broad spectrum of rules, norms, and processes that oversee the development, deployment, and application of AI technologies within a societal context. Floridi (2020) articulates AI governance as a comprehensive set of regulations that guide the lifecycle of AI technologies, while the Organisation for Economic Co-operation and Development (OECD, 2019) conceptualizes it as the mechanisms and frameworks that promote the ethical and responsible use of AI in society. Despite the variations in definitions, there is a consensus on the crucial role of AI governance in mitigating the risks and challenges posed by AI technologies.

One of the paramount challenges in the realm of AI governance is the swift pace of technological innovation and the inherent complexity of AI systems. Unlike conventional technologies, AI systems possess the capability to learn and adapt autonomously, which introduces unpredictability in their behavior and potential societal consequences. This complexity presents significant hurdles in crafting governance frameworks that are both effective in regulating AI technologies and conducive to fostering innovation and technological advancement (Jobin, Ienca, & Vayena, 2019). Furthermore, the governance of AI is complicated by the absence of a unified international consensus on regulatory standards and norms. The global landscape is marked by disparate regulatory approaches adopted by various nations, leading to a fragmented regulatory milieu that complicates international cooperation and coordination in AI governance. This fragmentation poses particular challenges for multinational corporations and organizations that operate across different legal jurisdictions, necessitating compliance with a diverse array of regulatory requirements and standards.

Despite these obstacles, there is an increasing acknowledgment of the necessity for international collaboration and harmonization in the governance of AI technologies. Leading global institutions, including the United Nations and the OECD, have been at the forefront of formulating guidelines and principles for the ethical employment of AI. Initiatives aimed at establishing universal standards for AI governance are in progress, though substantial efforts are required to ensure the effective implementation of these guidelines and to guarantee that AI technologies are utilized in a manner that is responsible and ethical. The journey towards a cohesive and universally accepted framework for AI governance remains ongoing, with the collective goal of harnessing AI's potential while safeguarding against its risks.

3. Overview of AI Governance Structures in Estonia and Nigeria

A. An In-Depth Exploration of Estonia's Digital Transformation and AI Endeavours

Estonia's ascent as a beacon of digital innovation on the global stage is underpinned by a strategic and forward-thinking approach to digital transformation. The genesis of Estonia's journey into becoming a quintessentially digital society can be traced back to the dawn of the new millennium, when it embarked on an ambitious project to introduce e-Government services (Lepik, & Kaaristo, 2020). The Estonian Government, (2020) reported that this initiative allowed citizens unprecedented online access to a wide array of government services. The impetus

for this transformation stemmed from the government's unwavering commitment to harnessing technology not just to enhance operational efficiency and transparency, but also to elevate the level of engagement between the state and its citizens.

When it comes to artificial intelligence and governance, Estonia has not been content to rest on its laurels. Over recent years, the Estonian government has redoubled its efforts to incorporate AI technologies as a cornerstone of its overarching digital transformation strategy to governance. The deployment of AI initiatives across a diverse spectrum of sectors, including but not limited to healthcare, transportation, and education, has been aimed squarely at refining service delivery and streamlining decision-making processes. In the healthcare sector, for instance, the integration of AI has been revolutionary, facilitating the optimization of patient care pathways and contributing to a more cost-effective healthcare system (Ministry of Economic Affairs and Communications, Republic of Estonia, 2020). Meanwhile, in the transportation sector, AI-driven innovations have significantly ameliorated traffic management systems and heightened safety measures (Estonia Ministry of Information Technology and Communications, 2020).

To navigate the complex ethical and legal landscape that accompanies the adoption of AI technologies, Estonia has proactively established a comprehensive legal and regulatory framework anchored by the principles of the European Union's General Data Protection Regulation (GDPR), this framework is meticulously designed to govern the processing of personal data while safeguarding individual privacy rights diligently (The Estonian Government, 2020). Beyond the foundational GDPR compliance, Estonia has taken proactive steps by enacting specific legislation and regulations tailored to the nuances of AI, such as the AI Strategy Act (The Data Protection Inspectorate, Estonia, 2021). This act delineates a set of guidelines that underscore the responsible development and deployment of AI technologies. Furthermore, the establishment of the Data Protection Inspectorate (DPI) exemplifies Estonia's commitment to ensuring adherence to data protection laws, extending to AI applications. The DPI plays a pivotal role, collaborating closely with a broad spectrum of entities, including businesses, research institutions, and government agencies, to certify that AI applications are developed and deployed in strict accordance with ethical standards, whilst rigorously respecting privacy rights (The Data Protection Inspectorate, Estonia, 2021). Additionally, the formation of a National AI Task Force signifies a strategic move by the Estonian government to furnish policymakers with expert advice on AI-related matters and to facilitate synergistic collaborations amongst key stakeholders within the AI ecosystem (The Estonian Government, 2020).

Beyond the legal and regulatory edifice, Estonia has been at the vanguard of developing ethical guidelines and principles to steer the responsible utilization of AI technologies. The AI Ethics Council, a brainchild of the Ministry of Economic Affairs and Communications, embodies Estonia's commitment to ethical AI. Tasked with the formulation of ethical guidelines for the development and deployment of AI, the council engages in extensive collaboration with industry stakeholders, academia, and civil society organizations (The Estonian Government, 2020). This collaborative ethos is geared towards cultivating ethical AI practices and ensuring that AI technologies are deployed in a manner that is not only transparent and accountable but also adheres to the highest ethical standards.

Also, central to Estonia's ethical AI framework are principles such as transparency, fairness, accountability, and privacy (The Estonian Government, 2020). These principles underscore the imperative of developing AI systems in a transparent fashion, ensuring that these systems are devoid of bias or discrimination, are accountable for their decisions, and uphold the sanctity of individual privacy rights. Estonia's steadfast adherence to these ethical principles is indicative of its overarching aim to engender trust in AI technologies and to champion responsible innovation within the AI ecosystem, thus reinforcing its position as a global leader in the domain of digital innovation and governance.

B. Impact of AI Governance in Estonia

Artificial intelligence (AI) governance has emerged as a pivotal element in sculpting the economic terrain of nations, playing a particularly instrumental role within the context of Estonia's public sector. The conscientious application of AI governance practices in Estonia has been identified as a linchpin in refining decision-making processes and amplifying the efficacy of service delivery (Medaglia et al. 2021). The deliberate integration of AI governance mechanisms by the government serves not only to streamline administrative functions but also to elevate the quality of public services, thereby fostering a more responsive and efficient government apparatus. At the organizational echelon, the delineation of AI governance frameworks has been acknowledged as a critical factor in assuring the responsible and efficacious employment of AI technologies. Mäntymäki et al. (2022) highlight the indispensable role AI technologies has played towards the attainment of economic enrichment in Estonia. The AI governance frameworks act as a compass, guiding organizations in navigating the multifaceted ethical, legal, and operational challenges posed by AI, ensuring that its deployment is aligned with broader organizational goals and ethical standards of the country.

Furthermore, the deployment of AI governance practices is celebrated in Estonia for its contribution to achieving strategic objectives and capitalizing on AI's potential for fostering sustainable development and economic progress. Papagiannidis et al. (2021) articulate how the judicious application of AI governance has served as a catalyst for sustainable economic advancement, underscoring the symbiotic relationship between AI governance and sustainable development. Estonia's strategic integration of AI governance practices across diverse sectors and within various organizational paradigms has positioned the nation at the forefront of AI-

driven innovation and economic development. The nation's methodical approach to understanding and addressing the challenges and opportunities presented by AI governance has equipped Estonia with the insights and tools necessary to navigate the complexities associated with the implementation of AI technologies. This strategic approach has yielded tangible benefits, enhancing operational efficiency, fostering innovation, and contributing to Estonia's economic growth and technological prowess (The Estonian Government, 2020).

In essence, Estonia's experience underscores the significance of robust AI governance in harnessing the transformative potential of artificial intelligence. By instituting comprehensive AI governance frameworks that encompass ethical, operational, and strategic dimensions, Estonia has demonstrated the feasibility of leveraging AI as a cornerstone for economic growth and technological advancement. This approach not only enhances decision-making and service delivery in the public sector but also empowers organizations to deploy AI technologies in a responsible and effective manner. Consequently, Estonia's journey offers a blueprint for how AI governance can be strategically employed to drive economic growth, underscore the importance of sustainable development, and propel technological innovation.

C. Current State of AI Governance in Nigeria

The discourse surrounding AI governance and its infrastructural framework within Nigeria has increasingly become a focal point, in light of the nation's concerted efforts towards the institutionalization of AI-centric initiatives. In a notable stride towards embedding AI into its developmental agenda, Nigeria has inaugurated the National Centre for Artificial Intelligence and Robotics (NCAIR), alongside establishing dedicated governmental entities aimed at fostering the research and systematic development of AI technologies (Effoduh, 2023). These pivotal steps have not only underscored Nigeria's commitment to harnessing AI but have also catapulted it to a position of leadership in AI innovation across Africa. Furthermore, the involvement of diverse stakeholders, spanning from private entities across critical sectors such as transportation, finance, and pharmaceuticals, underscores a collaborative ecosystem conducive to the evolution and deployment of AI systems within Nigeria (Effoduh, 2023).

The integration of AI technologies across various domains within Nigeria has showcased their transformative potential. In the healthcare sector, AI's application has been instrumental in elevating patient safety standards by significantly curtailing medical errors and furnishing customized solutions designed to navigate the myriad healthcare challenges prevalent in Nigeria (Akinpelu, 2023). The realm of auditing in Nigeria is also witnessing the burgeoning exploration of AI, with promising implications for the enhancement of audit quality and the refinement of financial statement analysis processes (Owonifari et al., 2023). The Central Bank of Nigeria has acknowledged AI's utility as a pivotal tool in augmenting decision-making processes within the banking sector, advocating for its extensive adoption as a means to elevate service delivery standards ("Artificial Intelligence as a Tool for Decision Making: A Perspective from the Central Bank of Nigeria", 2020).

Moreover, the incorporation of AI technologies transcends the confines of large-scale corporations, permeating into the operational dynamics of small and medium-scale enterprises (SMEs) as well. Scholarly investigations have illuminated the criticality of AI in bolstering the sustainability and expansion trajectories of SMEs in Nigeria, accentuating the indispensability of technology integration irrespective of business size (Ebuka, 2023). Additionally, the potential of AI in molding sustainable consumer behaviors and its pivotal role in reshaping financial services, including mobile banking, has been the subject of scholarly exploration within the Nigerian milieu (Cavus et al., 2021; Deji, 2023). This broad-based application and exploration of AI technologies across varying scales of enterprises and sectors signal a transformative phase in Nigeria's economic and social landscape, underpinning the nation's journey towards becoming a vanguard of AI innovation and governance in Africa.

Despite these advances, the AI governance in Nigeria is characterized by its piecemeal nature and the absence of a cohesive regulatory framework specifically dedicated to the oversight of AI technologies. While certain sector-specific regulations encompassing data protection and cybersecurity are in place, there lacks an overarching statute that explicitly addresses the governance of AI.

C. Challenges and Opportunities of AI Governance in Estonia and Nigeria

In the evolving world of artificial intelligence (AI) governance, Estonia and Nigeria present intriguing contrasts in terms of the challenges they encounter and the opportunities that lie before them. Estonia, renowned for its digital governance prowess, confronts the challenge of ensuring that its AI-powered systems operate within the bounds of transparency, accountability, and respect for privacy (World Economic Forum, 2020). As the integration of AI into various facets of society accelerates, so too does the potential for biased decision-making processes and the unethical utilization of data. In response to these challenges, Estonia has meticulously crafted a comprehensive legal and regulatory framework. This framework includes pivotal legislation such as the Data Protection Act, alongside strategic initiatives like the Governmental AI Strategy, designed to regulate the deployment of AI technologies and mitigate associated risks (The Data Protection Inspectorate, Estonia, 2021). Conversely, Nigeria faces a distinct set of challenges, primarily rooted in the absence of a robust regulatory infrastructure and the requisite capacity to govern AI technologies effectively. The country's current regulatory landscape is marked by a void in data protection laws and the lack of ethical guidelines, which amplifies concerns surrounding data privacy and the security of AI systems (Umar & Nwobilor, 2020). Additionally,

Nigeria grapples with limited domestic expertise in AI research and development, which constrains its ability to harness the full spectrum of benefits that AI has to offer. Despite these obstacles, Nigeria possesses inherent opportunities that could serve as catalysts for AI innovation due to the country's vast market size, demographic dynamism characterised by a youthful population, and an emergent tech ecosystem present fertile ground for propelling AI innovation and facilitating partnerships with global entities (Ebuka, A. 2023).

The divergent regulatory trajectories of Estonia and Nigeria in the realm of AI technologies reflect their distinct socio-economic environments. Estonia's government has championed a forward-thinking approach to AI governance, encapsulating a human-centric philosophy that underscores the paramountcy of ethics, transparency, and accountability in AI development. The Estonian Data Protection Inspectorate plays a crucial role in ensuring adherence to data protection laws, whilst the AI Taskforce offers sage advice to policymakers on the ethical development of AI, serving as a guiding light for responsible innovation (The Data Protection Inspectorate, Estonia, 2021).

In stark contrast, Nigeria's regulatory framework for AI remains in a nascent stage, characterized by fragmented legislation and a conspicuous absence of effective enforcement mechanisms. The lack of a specialized regulatory entity dedicated to AI oversight severely impairs Nigeria's capacity to navigate ethical dilemmas and manage the risks associated with the deployment of AI technologies. Notwithstanding these challenges, Nigeria stands at a crossroads with the potential to glean insights from Estonia's regulatory experiences through embarking on a path to establish a comprehensive and robust regulatory framework, Nigeria can cultivate an environment conducive to responsible AI innovation, ensuring that the development and deployment of AI technologies are aligned with ethical principles and societal well-being.

4. Lessons from Estonia's AI Governance for Nigeria

A. Lesson 1: Establishing a Comprehensive Legal and Regulatory Framework

Estonia's approach to AI governance, particularly through the establishment of a centralised body such as the Government Chief Information Officer (CIO) Council, offers valuable lessons for countries looking to navigate the complexities of AI integration into societal frameworks. The Government CIO Council in Estonia serves as a centralised body responsible for overseeing the country's digital transformation efforts, including the integration of AI technologies across various sectors. This council ensures that AI initiatives align with Estonia's broader strategic goals, emphasising ethical considerations, data protection, and public welfare. The council's role in facilitating communication and collaboration among government agencies, private sector entities, and academic institutions has been instrumental in creating a cohesive and effective AI governance ecosystem. The Government Chief Information Officer (CIO) Office also creates preliminary versions of laws in the relevant sectors; coordinate various activities related to 'State administrative information systems' (www.joinup.ec.europa). These activities include managing State IT budgets, developing IT legislation, overseeing IT projects and audits, implementing standardisation measures, managing IT procurement procedures, and facilitating international cooperation in the field of State information Systems (www.joinup.ec.europa).

Lessons for Nigeria: Institutional Framework and Coordination

Drawing lessons from Estonia, Nigeria could benefit significantly from establishing a centralised body dedicated to AI governance. Such a body could play a key role in several areas:

Strategic Alignment: By overseeing AI development, a centralised body in Nigeria could ensure that AI initiatives are in harmony with the nation's digital transformation goals. This includes aligning AI policies with economic, social, and ethical objectives, thus fostering a holistic approach to digital governance.

Policy Coherence and Implementation: A centralised coordination mechanism could address the current fragmentation in AI governance by providing clear and coherent policy directives. This would facilitate the seamless implementation of AI projects across different sectors, ensuring consistency with national priorities.

Stakeholder Collaboration: Just as Estonia's CIO Council promotes collaboration across various stakeholders, a similar entity in Nigeria could foster partnerships between government, industry, academia, and civil society. Such collaboration is vital for addressing the multifaceted challenges of AI governance, including ethical issues, data privacy, and skill development.

Innovation and Adaptability: A centralised body could also act as a catalyst for innovation, encouraging the exploration of new AI applications while ensuring they adhere to regulatory and ethical standards. This adaptability is crucial in the rapidly evolving field of AI, allowing governance structures to remain relevant and responsive to emerging technologies.

Public Trust and Transparency: Finally, centralizing AI governance can enhance public trust in AI technologies. By promoting transparency and accountability in AI development and deployment, such a body would play a critical role in addressing public concerns related to privacy, security, and ethical use of AI.

B. Lesson 2: Prioritizing Ethical AI Development

Estonia's commitment to ethical AI development is exemplified by its comprehensive guidelines and the establishment of the AI Ethics Council. This council serves as a beacon, guiding the country's AI initiatives towards responsible use and ensuring that they align with core societal values such as transparency, fairness,

and privacy; this structured approach to ethical AI underscores Estonia's recognition of the profound impact these technologies have on public trust and societal well-being (Lepik, & Kaaristo, 2020). In Estonia, ethical guidelines serve not only as a normative foundation for AI development but also as a means to foster public confidence in emerging technologies (European Commission, 2018). This emphasis on ethics enhances the societal acceptance of AI and promotes an environment where technology can flourish responsibly and inclusively.

Lessons for Nigeria: Integrating Ethical AI Development into Governance Models

Drawing from Estonia's example, Nigeria can take several steps to integrate ethical considerations into its AI governance framework, thus ensuring that AI technologies benefit all segments of society.

Establish an AI Ethics Council: Nigeria could establish a multidisciplinary council similar to Estonia's AI Ethics Council. This body would be tasked with developing ethical guidelines for AI, reviewing AI projects for ethical compliance, and facilitating a nationwide dialogue on the responsible use of AI.

Develop Comprehensive Ethical Guidelines: Inspired by Estonia, Nigeria can formulate a set of ethical guidelines that address key concerns such as data protection, bias in AI algorithms, and the transparency of AI decision-making processes. These guidelines should be developed in collaboration with stakeholders from various sectors, including technology, law, civil society, and academia, to ensure a broad consensus on ethical AI practices.

Promote Public Awareness and Engagement: To cultivate public trust in AI technologies, Nigeria should prioritize awareness campaigns and public engagement initiatives. These efforts could focus on educating the populace about the benefits and challenges of AI, as well as the ethical safeguards in place to protect their rights and interests.

Incentivize Ethical AI Research and Development: Nigeria could offer incentives for AI research and development projects that prioritize ethical considerations and societal benefit. This could include funding grants, tax incentives, and awards for innovations that demonstrate a strong commitment to ethical AI.

Foster International Collaboration: Finally, Nigeria can enhance its ethical AI development by engaging in international collaborations. Learning from global best practices and participating in international forums on AI ethics would provide valuable insights and resources for shaping Nigeria's approach to ethical AI governance.

C. Lesson 3: Fostering Public-Private Partnerships and Collaboration

Estonia's strides in AI governance and development are significantly bolstered by its strong emphasis on public-private partnerships and collaboration. The Estonian government, academia, and the private sector actively engage in a synergistic relationship, fostering an environment conducive to innovative AI solutions. This collaboration extends beyond mere dialogue, incorporating joint projects, shared research initiatives, and co-developed regulatory frameworks. The strategic alignment among these stakeholders has not only accelerated Estonia's AI advancements but also ensured that such developments are ethically aligned, socially beneficial, and economically viable (World Bank, 2021). The collaborative model adopted by Estonia underscores the recognition that the multifaceted challenges and opportunities presented by AI cannot be effectively addressed by any single sector acting in isolation.

Global Partnership on AI. (2021) highlighted the multi-stakeholder approach to AI innovation and regulation offers several benefits, as evidenced by Estonia's experience. Firstly, it facilitates the pooling of diverse expertise, resources, and perspectives, enhancing the quality and relevance of AI solutions. This diversity is crucial for tackling complex ethical and technical challenges inherent in AI development. Secondly, collaboration fosters a sense of shared responsibility among stakeholders, ensuring that AI technologies are developed and deployed in a manner that respects ethical norms and societal values. Thirdly, public-private partnerships can expedite the translation of research into practical applications, thereby driving technological innovation and economic growth. Lastly, engaging a broad spectrum of stakeholders in the AI governance process enhances transparency and public trust in AI technologies (Global Partnership on AI, 2021)

Strategies for Enhancing Collaboration in Nigeria

Drawing lessons from Estonia's model, Nigeria can implement several strategies to foster collaboration among stakeholders in the AI ecosystem:

Establish Multi-Stakeholder Platforms: Nigeria could create formal platforms or councils that bring together representatives from government, industry, academia, and civil society to discuss AI policies, projects, and ethical guidelines. These platforms can serve as a nexus for dialogue, coordination, and collaboration on AI initiatives.

Promote Joint AI Projects: Encouraging and facilitating joint AI research and development projects between universities, tech companies, and government agencies can harness collective expertise and resources. These projects can focus on addressing specific societal challenges, such as healthcare, education, and agricultural productivity.

Co-Develop AI Regulations: Involving a broad array of stakeholders in the regulatory process can ensure that AI laws and guidelines are both practical and comprehensive. This collaborative approach to regulation can help balance innovation with ethical considerations and societal needs.

Foster Innovation Ecosystems: Nigeria can invest in creating innovation hubs or clusters that bring together tech entrepreneurs, researchers, and policymakers. These ecosystems can serve as incubators for AI startups and facilitate the exchange of ideas and resources.

International Collaboration: By partnering with international organizations and foreign governments, Nigeria can gain access to global best practices, technological expertise, and funding opportunities. Such collaborations can also provide platforms for Nigerian AI initiatives to gain international visibility and credibility.

D. Lesson 4: Investing in Digital Infrastructure and Literacy

Estonia's digital world is a testament to the transformative power of comprehensive digital infrastructure and widespread digital literacy. Central to Estonia's digital governance is its e-governance services and the X-Road platform, a secure data exchange layer that facilitates seamless interaction between government databases, businesses, and citizens (The Data Protection Inspectorate, Estonia, 2021). This digital backbone not only streamlines service delivery but also serves as a fertile ground for AI development and deployment. The integration of AI into Estonia's digital infrastructure has further enhanced the efficiency of public services and introduced innovative solutions to complex problems, underscoring the symbiotic relationship between digital infrastructure and AI governance (Eurostat, 2020).

In Estonia, digital literacy is not merely an adjunct to the digital infrastructure; it is the bedrock upon which the digital society is built (The Estonia Government, 2020). Digital literacy programs ensure that citizens are equipped to engage with digital services effectively, fostering an environment where AI technologies can be developed and deployed responsibly. This widespread digital literacy has cultivated a society that is not only receptive to AI innovations but is also actively involved in shaping the digital landscape. (The Estonia Government, 2020). The Estonia Government, (2020) further explained that digital literacy extends beyond facilitating ease of access to digital services; but it also engenders a culture of innovation, critical engagement with technology, and informed discourse on AI governance.

Nigeria's Path to Enhanced Digital Infrastructure and Literacy

For Nigeria, the Estonian model provides a blueprint for harnessing the potential of AI through investments in digital infrastructure and literacy. The following strategies can be instrumental in achieving this goal:

Developing Robust Digital Infrastructure: Nigeria can initiate comprehensive projects to bolster its digital infrastructure, focusing on secure data exchange systems similar to Estonia's X-Road platform. This would facilitate the integration of AI technologies in public services and beyond, laying the foundation for an interconnected digital ecosystem.

Prioritizing Digital Literacy: Implementing nationwide digital literacy programs is essential for ensuring that all segments of the Nigerian population can benefit from AI and other digital innovations. These programs should focus on developing skills necessary for the digital age, including critical thinking, digital ethics, and cybersecurity awareness.

Leveraging Public-Private Partnerships: Collaborations between the government, private sector, and international partners can mobilize the resources and expertise necessary for significant investments in digital infrastructure and education. Such partnerships can also drive innovation and ensure that digital and AI technologies are aligned with Nigeria's developmental objectives.

Fostering an AI-Ready Workforce: By integrating AI and digital skills into the educational curriculum, Nigeria can prepare its workforce for the demands of the digital economy. This involves not only technical skills but also an understanding of the ethical and societal implications of AI.

Creating Inclusive Digital Platforms: Ensuring that digital infrastructure and literacy initiatives are inclusive and accessible to all Nigerians, including those in rural and underserved areas, is crucial for building a universally empowered digital society.

Conclusion

The exploration of Estonia's AI governance presents a compelling vision for Nigeria—an opportunity to advance its digital governance, align AI development with ethical standards, and catalyse economic growth. Estonia's integration of a centralised AI governance body and its unwavering commitment to ethical AI frameworks offer a beacon for Nigeria to follow. The importance of such frameworks cannot be overstated, as they provide the necessary oversight and public assurance to navigate the complex socio-technical landscape of AI. Moreover, Estonia's example illuminates the transformative potential of public-private partnerships and the foundational role of digital infrastructure and literacy in fostering an AI-ready society.

For Nigeria, adopting these lessons means transcending current limitations, mitigating risks, and nurturing trust amongst its citizenry towards AI technologies. The implementation of a centralised AI governance structure, akin to Estonia's model, could streamline policy coherence, foster innovation, and establish Nigeria as a frontrunner in AI governance within the African continent.

Therefore, this paper recommends that Nigeria commence by establishing a dedicated AI governance council, engage in the creation of comprehensive ethical guidelines, and cultivate robust public-private partnerships. Furthermore, Nigeria should champion initiatives to upgrade digital infrastructure and literacy to create an

inclusive, AI-empowered future. These steps are essential for Nigeria to leverage AI as a driver for sustainable development, equity, and prosperity.

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