

## Artificial Intelligence and Education Governance in Tanzania: Legal Gaps and Regulatory Challenges

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### **Abstract**

*This paper examines the adequacy of Tanzania's existing legal and policy frameworks in facilitating the adoption of Artificial Intelligence (AI) in the education sector and assesses the implications of persistent regulatory gaps for ethical, accountable, and rights-based AI deployment. Although AI presents significant opportunities to expand access to education, enhance learning quality, and support personalised teaching and assessment, its effective integration in Tanzania remains constrained by fragmented and outdated regulatory regimes. The study adopts a doctrinal legal research methodology, complemented by comparative analysis. It critically analyses key Tanzanian statutes and policy instruments relevant to AI governance in education, including the Personal Data Protection Act, 2022, the Cybercrimes Act, 2015, and the Tanzania National Guidelines for Artificial Intelligence in Education, 2025. These domestic frameworks are benchmarked against international and regional normative instruments, notably UNESCO's Guidance for Generative AI in Education and Research (2023), the Beijing Consensus on AI and Education (2019), and the African Union's Continental AI Strategy (2024), to assess regulatory coherence, alignment, and normative adequacy. The findings reveal significant legal and institutional shortcomings in Tanzania's AI governance framework for education. The existing legal gap exposes learners to data protection and accountability risks and threatens educational equity. The paper recommends enacting a comprehensive, binding legal framework for AI in education, strengthening institutional oversight, and aligning with international best practices to ensure ethical, inclusive, and rights-based AI adoption in Tanzania's education sector.*

**Keywords:** Artificial Intelligence (AI), Education, Tanzania, ICT, Sustainable Development

### **Introduction**

The rapid advancement of Information and Communication Technology (ICT), driven by innovations such as Artificial Intelligence (AI), machine learning, robotics, and 3D printing, continues to reshape key sectors globally. Among these technologies, AI has emerged as particularly transformative,

significantly influencing the education sector by enhancing teaching methodologies, enabling personalised learning, and improving administrative efficiency (Onesi-Ozigagun *et al.*, 2024). AI refers to computer systems capable of performing cognitive functions commonly associated with human intelligence, including learning, reasoning, and problem-solving (Fitria, 2021; UNESCO, 2021; Commonwealth of Learning, 2024).

Globally, the integration of AI into education has attracted increasing scholarly and policy attention due to its potential to improve learning outcomes and institutional effectiveness. In Tanzania, AI is progressively recognised as a catalyst for educational innovation, with the potential to expand access to education, enhance quality, and streamline administrative processes (Mambile & Mwogosi, 2024). Its adoption also aligns with national development priorities and international commitments, particularly the United Nations Sustainable Development Goals, which emphasise inclusive and equitable quality education. In recognition of this potential, the Government of Tanzania, through the Ministry of Education, Science, and Technology (MoEST), introduced the Tanzania National Guidelines for Artificial Intelligence in Education (2025). These guidelines provide policy direction for the ethical, inclusive, and responsible use of AI in educational institutions, with objectives that include improving pedagogy, supporting personalised learning, enhancing administrative efficiency, and safeguarding ethical principles such as data protection, equity, non-discrimination, and digital security (MoEST, 2025).

Despite this policy development, a critical problem persists: Tanzania lacks a comprehensive and enforceable legal framework to govern the deployment of AI in the education sector. The existing legal regime is fragmented and was not designed to address the complex ethical, legal, and accountability challenges posed by AI-driven technologies. Current data protection laws provide limited guidance on the collection, processing, and use of sensitive educational data by AI systems, while liability standards remain unclear in cases where algorithmic decision-making results in harm. Moreover, the absence of specialised regulatory or oversight institutions weakens enforcement and undermines adherence to ethical principles (Ally, 2024; Ally, 2025). These legal gaps are further compounded by structural challenges such as uneven digital infrastructure, limited technical capacity, and institutional unpreparedness, which collectively hinder effective and equitable AI adoption in education (Matto & Ponera, 2025).

This article contends that although Tanzania has taken important steps toward integrating artificial intelligence (AI) into education through policy guidelines, achieving a sustainable, ethical, and rights-based adoption of AI requires stronger legal and institutional frameworks. In light of this, the study aims to

achieve the following two specific objectives: (i) to assess the adequacy of existing legal and policy frameworks regulating the use of AI in Tanzania's education sector. (ii) To identify key legal, ethical, and institutional gaps within the current regulatory environment.

## **Literature Review**

### ***AI Integration in Education***

Artificial Intelligence (AI) is emerging as a transformative tool in secondary and higher learning education, poised to revolutionise both student learning and teaching methods. Its integration into essential educational functions is expanding, from automated grading systems to personalised learning platforms that employ machine learning algorithms to tailor educational experiences to individual student requirements (Mambile & Mwogosi, 2024). The integration of AI in education, as outlined by Saputra *et al.* (2023), offers significant opportunities to enhance personalised learning. AI-driven features, such as intelligent tutoring systems, provide real-time support and personalised feedback to students, adapting to individual learning needs. Additionally, AI-powered tools improve access to a wide range of learning resources, making education more flexible and tailored. For students, AI assists in personal learning by offering systems that adapt to their pace and learning style. It also provides scaffolding, which helps in overcoming learning difficulties. On the other hand, teachers benefit from AI's facial recognition systems and predictive analytics, which analyse student behaviour and emotions during lessons. This analysis helps educators identify students' needs, adjust their teaching approaches, and intervene early when students struggle, ultimately improving the learning process (Saputra *et al.*, 2023). This approach presents both opportunities and challenges, particularly in how it transforms traditional teaching methods.

AI tools, such as Edmentum's Exact Path, play a pivotal role in personalised learning by utilising adaptive testing to identify areas where students face challenges. Based on these assessments, the platform creates individualised learning paths to help learners improve. Tutors can leverage this tool to monitor student progress and adjust their instruction accordingly. Similarly, AI-powered test preparation tools assist educators in creating exams by utilising natural language processing (NLP) to analyse student performance data. These tools offer targeted practice exercises to enhance students' test-taking skills (Wang'ang'a, 2024).

Onesi-Ozigagun *et al.* (2024) highlight that AI-powered adaptive learning systems can personalise learning paths for students. These paths are tailored to accommodate individual learning styles, paces, and preferences, ensuring each student receives suitable levels of challenge and support. For instance, if a

student encounters difficulty with a specific concept, the system can offer additional practice exercises or resources to facilitate improvement. Nja *et al.* (2023), in their study titled "Adoption of Artificial Intelligence in Science Teaching: From the Vantage Point of the African Science Teachers," reveal that AI plays a diverse and imminent role in education. When AI is incorporated into the teaching and learning system, it creates opportunities for improvement in the educational sector, including teachers' teaching and students' learning outcomes. Students can learn in their own space and individually through personalised tutoring. Concepts that are ordinarily abstract can be presented in a form that will be understood by students, educators can identify learning disabilities, and students get feedback on their progress as they progress in the study.

In Kenya, the integration of AI in education has shown significant progress. One notable example is Angaza Elimu, an AI-driven eLearning platform funded by UNICEF. This platform provides students with personalised learning experiences, offering tailored study materials, assignments, and progress tracking. It enables tutors to assess students' capabilities and deliver customised learning resources to meet their individual needs. Another prominent AI application in Kenya's education sector is M-Shule, an SMS-based platform that delivers learning, assessment, and data tools to educational organisations. By utilising SMS technology, M-Shule makes education more accessible, especially in regions with limited internet connectivity (Akello, 2022). These examples illustrate how AI is transforming education by offering adaptive, personalised learning solutions that cater to students' specific needs, while also equipping educators with advanced tools for assessment and instruction.

In Tanzania, AI holds the potential to address persistent challenges, such as overcrowded classrooms, teacher shortages, and unequal access to quality education. One example of an AI-powered online learning platform that improves access to education in Tanzania is eLimu. The eLimu platform provides students in rural areas of Tanzania with access to interactive educational content, enabling them to engage with high-quality resources and interact with teachers and other students virtually (Lyimo, 2023, p. 97). The platform is designed to provide personalised learning experiences to students and incorporates a variety of multimedia resources, including videos, animations, and games, to make learning more engaging and interactive.

The University of Dar es Salaam in Tanzania has implemented an AI-based system called My Grades to automate grading (Lyimo, 2023, p.98). While the digital transformation promises extensive benefits in enriching educational experiences and fostering personalised learning, it also presents notable

challenges. These include concerns about academic integrity, particularly the potential misuse of AI tools, and the imperative to bridge the digital divide, which could otherwise exacerbate inequalities in access to quality education. Moreover, the integration of advanced technologies such as ChatGPT underscores the critical need for educators and students to cultivate robust digital literacy skills to navigate and leverage these tools effectively (Nguyen *et al.*, 2024). In essence, while ChatGPT and similar AI technologies hold immense promise in reshaping educational paradigms for the better, addressing these challenges is pivotal to realising their full potential in advancing inclusive and equitable digital education.

### ***Governing Theories***

The scholarly discussion on Artificial Intelligence and Education Governance in Tanzania: Legal Gaps and Regulatory Challenges is supported by several theoretical frameworks that provide analytical lenses and normative guidance for the responsible adoption, governance, and utilisation of AI technologies in the education sector. These theories collectively illuminate how regulatory systems may be designed to balance innovation with accountability, public interest, human rights protection, and social equity.

#### *Diffusion of Innovation Theory (Rogers)*

The Diffusion of Innovation Theory provides a systematic explanation of how new ideas, technologies, and practices emerge, spread, and become institutionalised within social systems over time, moving from initial introduction to widespread adoption (Bodén & Dahlstedt, 2023). When applied to Tanzania's education sector, the theory offers a robust analytical lens for examining the adoption of Artificial Intelligence (AI), particularly by highlighting the social, institutional, and regulatory conditions that shape acceptance, implementation, and long-term integration within educational institutions.

Central to Rogers' (2003) diffusion model are five attributes that influence adoption decisions: relative advantage, compatibility, complexity, trialability, and observability (Bodén & Dahlstedt, 2023). In the Tanzanian context, the perceived relative advantage of AI is increasingly evident in its capacity to enhance learning outcomes, automate administrative processes, and support data-driven decision-making in education. These benefits align closely with national development priorities, thereby strengthening AI's compatibility with existing policy objectives. Notably, strategic frameworks such as the Tanzania Digital Economy Strategic Framework (2024–2034) explicitly recognise AI as a catalyst for productivity, efficiency, and innovation across sectors, including education. Such policy alignment has contributed to AI's growing legitimacy and facilitated its gradual acceptance within the education system.

Despite these enabling factors, the diffusion process is significantly influenced by perceived complexity. In Tanzania, this complexity manifests through limited technical expertise among educators and administrators, uneven digital infrastructure, and persistent uncertainties regarding ethical and legal compliance. These challenges have constrained large-scale implementation, particularly in public institutions and rural settings. Nonetheless, the attribute of trialability has played a moderating role. Higher learning institutions, in particular, have been able to experiment with AI tools, especially generative platforms such as ChatGPT, on a limited and informal basis. This phased experimentation allows institutions to assess risks and benefits without immediate, system-wide commitment, thereby reducing resistance to innovation.

Observability has further reinforced the diffusion of AI within Tanzania's education sector. The increasing visibility of positive outcomes, including improved pedagogical approaches, personalised learning systems, and enhanced educational analytics, has strengthened institutional confidence and encouraged broader acceptance, particularly within universities (Rane *et al.*, 2024). These observable benefits have contributed to a shift in perceptions of AI from a speculative technology to a practical educational tool. In response to these developments, the Ministry of Education, Science, and Technology introduced the Tanzania National Guidelines for Artificial Intelligence in Education (2025), signalling a formal institutional acknowledgement of AI's growing role in education. The Guidelines seek to promote responsible adoption by addressing ethical considerations, including data protection, digital security, fairness, and accountability. This regulatory intervention enhances the legitimacy of AI adoption by aligning technological innovation with nationally endorsed norms and standards, thereby lowering some adoption barriers.

From a strategic perspective, AI adoption has become increasingly necessary for educational institutions seeking to remain competitive and responsive to evolving learning needs (Phillips, 2023). In Tanzania, AI-enabled applications such as personalised tutoring systems, adaptive learning platforms, learner progress tracking, and enhanced instructional design tools offer practical solutions to longstanding challenges, including large class sizes, disparities in learning outcomes, and constrained educational resources (Santos & Serpa, 2023). These applications underscore the functional relevance of AI and further strengthen its perceived relative advantage within the diffusion process.

Overall, from a diffusion of innovation standpoint, Tanzania's education sector can be characterised as being in a transitional phase, shifting from early-stage experimentation toward gradual institutional acceptance of AI technologies.

This transition is driven by government prioritisation of digital transformation, increasing awareness of AI's educational benefits, and the expansion of pilot initiatives within higher education and selected secondary schools. The visibility of early successes has further stimulated interest and experimentation among key stakeholders.

However, notwithstanding these positive developments, the pace and sustainability of AI diffusion remain constrained by structural and legal limitations. Persistent capacity gaps, infrastructural disparities between urban and rural areas, and unreliable connectivity continue to hinder equitable adoption (Soomro & Baig, 2024). More fundamentally, Tanzania's existing legal and regulatory framework does not yet provide comprehensive governance for AI in education. While instruments such as the National ICT Policy and the Education and Training Policy recognise the importance of digital technologies, they offer limited guidance on AI-specific concerns, including algorithmic accountability, ethical deployment, procurement standards, data governance, and liability for AI-driven decisions. The absence of detailed subsidiary legislation and dedicated regulatory oversight mechanisms generates legal uncertainty, which may deter institutional investment and inhibit responsible innovation (Soomro & Baig, 2024).

Thus, the Diffusion of Innovation Theory demonstrates that the sustainable integration of AI in Tanzania's education sector cannot be achieved solely through technological availability. It requires a coherent, enforceable legal and policy framework that provides regulatory clarity, safeguards fundamental rights, and aligns with existing education and data protection laws. Institutional readiness must therefore be strengthened through legally grounded capacity-building initiatives, clear standards for AI deployment, and effective coordination between education authorities and technology regulators. Without such systemic legal and institutional support, the diffusion of AI in Tanzanian education risks remaining fragmented, uneven, and ultimately unsustainable.

#### *Regulatory Governance Theory*

Regulatory Governance Theory examines how governments and regulatory institutions design and implement interventions to manage risks, protect the public interest, and establish standards of practice across different sectors. Rather than relying solely on rigid "command-and-control" regulation, the theory emphasises a broad mix of regulatory approaches, including rule-based enforcement, institutional dialogue, stakeholder participation, soft-law standards, and adaptive governance strategies (Mahrishi *et al.*, 2025). Central to this perspective is the recognition that effective regulation must balance oversight and accountability with the need to promote innovation, flexibility,

and social development. The theory therefore analyses not only the content of regulations but also how regulatory systems function in practice, highlighting the dynamic relationships among public authorities, private actors, and technological change.

In the context of Artificial Intelligence (AI) integration in education, Regulatory Governance Theory provides a useful framework for understanding the development of policies and institutional arrangements to ensure that AI technologies are introduced in ethical, fair, transparent, and safe ways. The primary objective of regulation is not to inhibit technological advancement but to guide AI adoption so that its benefits, such as personalised learning, intelligent tutoring systems, and efficient academic administration, are maximised while its risks are minimised (Mahrishi *et al.*, 2025). These risks include algorithmic discrimination, misuse of personal data, opaque decision-making processes, and threats to academic integrity.

García-López and Trujillo-Liñán (2025) identify three interrelated ethical challenges that underscore the need for robust regulation of generative AI in education. First, privacy and data protection concerns arise where sensitive personal information is collected, processed, or used to train AI systems without adequate legal safeguards or user consent. Weak oversight exposes students and educators to data misuse and security breaches. Second, algorithmic bias poses risks to educational equity, as AI systems trained on biased datasets may replicate or intensify existing social inequalities, leading to discriminatory outcomes in assessment, admissions, or learning support. Third, cognitive autonomy is increasingly at risk when excessive reliance on AI tools diminishes students' independent thinking, creativity, and capacity for self-directed learning.

#### *Human Rights-Based Approach*

The Human Rights-Based Approach (HRBA) constitutes a normative and operational framework that places internationally recognised human rights at the centre of policy design, implementation, monitoring, and evaluation. Its fundamental objective is to transform abstract legal standards into tangible social realities by integrating the principles of non-discrimination and equality, participation and inclusion, transparency, accountability, and empowerment into governance processes (Schmitz, 2012). Under HRBA, states and other institutional actors are recognised as duty-bearers obligated to respect, protect, and fulfil human rights, while individuals and communities are viewed as rights-holders entitled to claim and exercise these rights (Sonnonberg *et al.*, 2023).

In the context of technological governance, HRBA requires that the development, deployment, and regulation of innovations such as artificial intelligence (AI) align with established legal obligations, particularly those concerning the right to education, equality before the law, privacy, dignity, and freedom from discrimination (Lane, 2022).

Human rights are codified under multiple layers of international and domestic legal instruments, including the Universal Declaration of Human Rights (UDHR), binding human rights treaties such as the International Covenant on Economic, Social, and Cultural Rights (ICESCR), regional human rights charters, national constitutions, and sector-specific legislation. Article 26 of the UDHR and Article 13 of the ICESCR explicitly recognise education as a fundamental human right that must be accessible, available, acceptable, and adaptable to all persons without discrimination. HRBA therefore mandates that any technological intervention in education, including AI-driven platforms, digital assessment tools, and automated administrative systems, must promote, rather than undermine, the realisation of this right.

In the era of artificial intelligence, HRBA is particularly relevant because AI technologies present a dualistic impact on educational delivery. On the one hand, AI enhances access to learning resources, personalises pedagogical methods, streamlines administration, and supports students with diverse learning needs through assistive technologies (Ma'amor et al, 2024). On the other hand, AI risks perpetuating or deepening existing inequalities due to disparities in connectivity, digital literacy, infrastructure, and affordability. These inequalities disproportionately affect marginalised and vulnerable populations, including students with disabilities, learners in rural or low-income communities, linguistic minorities, and girls. The resulting digital divide threatens to convert technological progress into a new form of exclusion, thereby contradicting the HRBA principle of equality and non-discrimination (Ma'amor *et al.*, 2024).

### **Methodology**

This study adopts a qualitative research design, integrating doctrinal and comparative legal research methods to critically examine the legal and policy frameworks governing the adoption of Artificial Intelligence (AI) in the education sector. The doctrinal method facilitates a systematic analysis of Tanzanian statutes, judicial decisions, and policy instruments relevant to AI governance, enabling the identification of normative gaps, inconsistencies, and limitations within the existing legal regime. Complementarily, the comparative approach provides broader analytical perspectives by drawing insights from international and regional legal instruments, as well as selected foreign jurisdictions with advanced experience in AI regulation and educational innovation.

The selection of doctrinal and comparative methods is informed by the nature of legal research, which primarily involves desktop-based analysis aimed at interpreting laws, assessing their adequacy, and proposing reforms to address identified gaps. At the international and regional levels, the study examines key normative instruments, including UNESCO's Guidance for Generative AI in Education and Research, the OECD AI Principles, the European Union's Ethical Guidelines for Trustworthy AI, the Beijing Consensus on AI and Education (2019), and the African Union's Continental AI Strategy (2024). These instruments are analysed for their emphasis on core principles such as inclusivity, data protection, transparency, accountability, and human rights protection.

Comparative insights are further drawn from selected jurisdictions, namely China, the United States, and Finland. These countries were chosen for their demonstrated leadership in AI adoption in education and the relative maturity of their AI-related legislative and policy frameworks. The comparative analysis highlights practical regulatory approaches and institutional arrangements that may inform context-sensitive reforms in Tanzania.

At the national level, the study analyses relevant Tanzanian legislation, including the Cybercrimes Act, 2015 and the Personal Data Protection Act, 2022, alongside key policy instruments such as the Tanzania National Guidelines for Artificial Intelligence in Education, 2025, the National Digital Education Strategy (2024/25–2029/30), and the National ICT Policy, 2016. Legal analysis is conducted using established principles of statutory interpretation, including the mischief rule, the golden rule, and textual, purposive, and contextual interpretation. Both inductive and deductive reasoning are employed to assess legislative coherence, ethical implications, and regulatory adequacy. Through this integrated methodological approach, the study generates evidence-based recommendations to strengthen Tanzania's legal and institutional framework for AI in education. The findings contribute to the broader discourse on AI governance by offering practical insights for policymakers, legal practitioners, and educators seeking to align domestic legal frameworks with international standards while safeguarding human rights and educational equity.

### **Findings and Discussion**

This section critically evaluates the extent to which the study's specific objectives have been achieved. It commences with a systematic assessment of the adequacy of Tanzania's existing legal and policy frameworks governing the application of artificial intelligence (AI) in the education sector. The section subsequently identifies and analyses the principal legal, ethical, and institutional gaps within the prevailing regulatory framework, situating these shortcomings against relevant regional and international normative standards.

Building on this analysis, the discussion advances context-specific legal and policy reform proposals to promote the ethical, accountable, and rights-based integration of AI within Tanzania's education system.

***The adequacy of Tanzania's existing legal and policy frameworks governing the use of artificial intelligence (AI) in the education sector***

Tanzania's education system spans all levels of learning, from early childhood education to higher education, and is underpinned by a broad range of legal and policy instruments intended to promote access, quality, and equity. While these frameworks have historically provided a stable foundation for education governance, their capacity to address the integration of advanced digital technologies, particularly Artificial Intelligence (AI), remains limited. The existing regulatory environment is largely designed for conventional educational delivery and general ICT adoption, rather than the distinctive legal, ethical, and institutional implications posed by AI-driven educational systems. At present, the most explicit attempt to address AI in education is reflected in the Tanzania National Guidelines for AI in Education (2025). Although these guidelines signal an important policy acknowledgement of AI's transformative potential, they lack legal force and do not establish binding standards or enforcement mechanisms. Consequently, AI governance in education remains fragmented and institutionally weak. This regulatory insufficiency creates practical vulnerabilities, including inadequate protection of students' personal data, uncertainty regarding accountability and liability for AI-related harms, and heightened risks of biased, unethical, or discriminatory use of AI-enabled learning tools.

More broadly, Tanzania's policy landscape has traditionally focused on ICT integration rather than AI as a distinct technological paradigm. Existing instruments governing ICT adoption across education and other sectors, as observed by Manyengo (2021), provide a general digital foundation but fall short of addressing AI-specific risks and opportunities. Key among these is the National ICT Policy of 2003, revised in 2016, which played a pivotal role in expanding Tanzania's ICT sector and supporting the country's transition toward a knowledge-based society. Despite its contribution to digital growth and socio-economic development, the policy does not sufficiently anticipate or regulate emerging technologies such as AI, particularly within sensitive sectors like education.

Similarly, the Draft National ICT Policy of 2023, developed in alignment with the Digital Economy Strategic Framework (2023–2033), articulates an ambitious vision of positioning Tanzania as a digitally competitive economy prepared for the Fourth Industrial Revolution. The policy emphasises innovation, entrepreneurship, and the development of digital skills. However,

despite recognising rapid technological change, it fails to explicitly address AI as a distinct regulatory concern. This omission is significant, given AI's growing influence across education, healthcare, and governance, and raises questions about the policy's adequacy in guiding AI-driven educational transformation.

A critical assessment of these policy instruments reveals a persistent gap between the aspiration for digital transformation and the regulatory specificity required to manage AI technologies. AI is not merely an extension of conventional ICT; it represents a structural shift with profound implications for data governance, privacy, labour markets, ethics, and social equity. As highlighted by UNESCO (2025), harnessing AI's benefits requires dedicated regulatory frameworks that address algorithmic accountability, ethical deployment, transparency, and the broader socio-economic consequences of automation elements that are largely absent in Tanzania's current policy architecture.

Notwithstanding these gaps, there are emerging indications of increased governmental awareness regarding the need to modernise the education system. The development of the Digital Education Strategy for Tanzanian Schools, Colleges, and Universities demonstrates a growing commitment to digital transformation in education. This strategy aligns with the revised Education and Training Policy (2023) and the National ICT Policy (2024), and seeks to improve learning outcomes, enhance access, and ensure the relevance of education to national development priorities (Matto & Ponera, 2025). However, while the strategy facilitates ICT integration, it does not provide a comprehensive legal framework for governing AI-specific applications in education.

From a legislative perspective, the adequacy of existing education laws remains limited. The Education Act of 1978, which provides the overarching framework for the administration of education in Tanzania, predates the emergence of AI and contains no provisions addressing advanced digital technologies. This legislative silence leaves a regulatory vacuum regarding the use of AI in teaching, assessment, student monitoring, and administrative decision-making. Similarly, the Tanzania Universities Act of 2005 establishes the Tanzania Commission for Universities (TCU) as the regulatory authority for higher education institutions, but does not address AI-related governance challenges, such as algorithmic decision-making, academic integrity, or digital ethics in universities.

Although Tanzania has enacted several technology-related laws, including the Cybercrimes Act (2015), the Electronic and Postal Communications Act (2010), and the Personal Data Protection Act (2022), these instruments are not

tailored to the complexities of AI deployment in education. They provide general protections against cyber risks and data misuse, but do not adequately regulate AI-specific issues such as automated profiling, algorithmic bias, explainability, and accountability in educational contexts. This underscores the need for a dedicated, sector-specific regulatory framework governing AI in education, drawing on international best practices while remaining sensitive to Tanzania's socio-economic and institutional realities.

The enactment of the e-Government Act of 2019 further illustrates Tanzania's broader commitment to digital transformation within public institutions, including the education sector. Although not specifically focused on AI, the Act establishes the e-Government Authority with a mandate to coordinate, oversee, and enforce digital governance standards across public institutions. In the absence of comprehensive AI-specific legislation, this Act provides a potential institutional framework for developing interim AI governance mechanisms, particularly in data management, interoperability, and digital service delivery.

Ongoing education reforms aimed at strengthening digital skills, expanding e-learning platforms, and integrating mobile technologies into education delivery further demonstrate Tanzania's gradual transition toward a digital education ecosystem (Oreku, 2022). These reforms lay an important foundation for future AI adoption, particularly in addressing structural challenges such as teacher shortages, unequal resource distribution, and limited access to quality education. However, without corresponding legal and policy reforms, AI integration risks deepening inequalities and exposing learners to unregulated technological harms.

In this regard, the adequacy of Tanzania's existing legal and policy frameworks remains constrained. For AI to be effectively and sustainably integrated into the education sector, there is a pressing need for robust, coherent, and enforceable regulatory instruments. Such frameworks should prioritise data privacy, ethical use of AI, transparency, educator capacity-building, and equitable access to AI-driven educational tools, particularly for learners in marginalised and underserved communities (Azaroual, 2024). Addressing these gaps is essential not only for safeguarding rights but also for ensuring that AI contributes meaningfully to inclusive, high-quality education in Tanzania.

### ***Key Legal, Ethical, and Institutional Gaps Within the Current Regulatory Environment***

Notwithstanding the transformative potential of artificial intelligence (AI) in the education sector, Tanzania's current legal and regulatory framework falls

short in addressing the complexities of AI adoption. Existing policies and legal frameworks remain largely underdeveloped and fragmented, rendering them inadequate for governing AI-enabled educational practices. These shortcomings manifest in several critical areas, including the absence of comprehensive safeguards for data privacy and security, unclear protection of intellectual property rights, and uncertainty surrounding accountability and liability for AI-related harms. In addition, the regulatory framework fails to adequately address structural challenges such as the digital divide, which risks exacerbating existing educational inequalities, as well as ethical concerns relating to bias, discrimination, and fairness in AI-driven decision-making. Collectively, these legal, ethical, and institutional gaps undermine the effective, equitable, and rights-based integration of AI within Tanzania's education system.

*a) Data Privacy and Security*

The right to privacy is a fundamental human right, protected by various international human rights instruments. Key among these are the Universal Declaration of Human Rights (UDHR), the International Covenant on Civil and Political Rights (ICCPR), the UN Convention on the Rights of the Child (UNCRC), and the United Nations Convention on Migrant Workers (CMW) (CIPESA, 2018). At the national level, the Constitution of the United Republic of Tanzania also guarantees this right under Article 16(1), which explicitly upholds the individual's right to privacy.

In addition to these constitutional guarantees, Tanzania has implemented a range of subordinate laws to further protect privacy. The Cybercrime Act of 2015 prohibits computer-related crimes and establishes a framework for prosecuting them. To further bolster privacy protections, Tanzania enacted the Personal Data Protection Act in 2023. This comprehensive legislation establishes the legal principles governing the protection of personal data, including minimum requirements for its collection, processing, and management.

Despite these legal safeguards, the emergence and growing use of Artificial Intelligence (AI) across sectors, particularly education, introduce novel privacy challenges. AI's capacity to process vast amounts of personal data poses unique risks, as it often requires aggregating and analysing sensitive information. This leads to situations where personal data may be shared across extensive databases, potentially beyond the direct control of the individuals involved, raising concerns about consent, control, and data security. A critical challenge lies in the blurring of roles between AI systems as both data processors and data controllers. Traditional legal frameworks, designed for human operators or organisations, struggle to accommodate these dual roles.

This gap in legal definitions creates uncertainty regarding accountability for privacy violations, especially when autonomous systems are involved (Josh & Kharola, 2024).

Furthermore, most of the existing laws, such as the Cybercrime Act of 2015, have not fully adapted to the complexities introduced by AI. The provisions in Part II of the Cybercrime Act, which relate to offences and penalties, consistently use the term "person." This raises ambiguity about whether such provisions can be extended to cover autonomous agents, such as AI systems. While it is evident that AI technologies can facilitate or even perpetuate crimes, the current legal framework lacks clarity on how to attribute liability to autonomous systems, leaving a critical gap in enforcement and accountability mechanisms.

To address these challenges, it is essential to critically assess and update legal frameworks to account for AI's role in privacy violations. This may require new legislative approaches that explicitly define the legal status of AI systems and outline clear responsibilities for both human actors and autonomous technologies in data protection. Additionally, there is a pressing need for regulatory oversight and ethical guidelines that ensure AI operates within boundaries that respect fundamental privacy rights. Developing robust, AI-specific regulations would not only close existing gaps but also foster trust in the responsible use of AI in education and other sectors.

While Tanzania has made significant strides in privacy protection through its constitution and subordinate laws, the advent of AI demands a more nuanced and forward-looking approach (Moshi, 2024). Laws and regulations must evolve to adequately address the complexities of data privacy in an AI-driven world. Failure to do so risks undermining the very protections these legal frameworks were designed to safeguard.

#### *b) Intellectual Property (IP) Rights*

Artificial intelligence (AI) has revolutionised intellectual property (IP) by fundamentally altering how creations are conceived, managed, and utilised. This technological evolution presents both unprecedented opportunities and complex challenges for inventors, businesses, and policymakers (Ali & Kamraju, 2023, p. 1). As AI tools increasingly contribute to the creation of educational materials, questions surrounding ownership rights become increasingly contentious. The ambiguity over who rightfully owns content, whether it's the user, the developer, or the AI system itself, has the potential to hinder innovative uses of AI in education (Ali & Kamraju, 2023, pp. 24-25).

Furthermore, AI's ability to generate novel, non-obvious inventions raises significant legal and philosophical questions about inventorship. Current legal frameworks in many jurisdictions are ill-equipped to resolve disputes arising from AI-generated inventions. Central to this issue is whether AI systems can be considered inventors and, if so, who holds ownership rights: the AI itself, its developers, or other stakeholders (Ali & Kamraju, 2023, pp. 24-25).

In Tanzania, as a member state of both the African Regional Intellectual Property Organisation (ARIPO) and the World Intellectual Property Organisation (WIPO), intellectual property rights are constitutionally protected. However, the Copyright and Neighbouring Rights Act, Cap. 218 defines an author as a natural person, explicitly excluding non-human entities, such as AI, from holding copyright. This exclusion aligns with WIPO's definition of intellectual property as creations of the human mind protected under relevant IP laws (Ali & Kamraju, 2023, p. 25).

Internationally, rulings from entities like the European Patent Office (EPO) and the United States Patent and Trademark Office (USPTO) affirm that inventors must be human beings, not AI systems. While the USPTO has yet to fully address the issue of AI-generated inventions, legal scholars argue that existing frameworks inadequately address the complexities posed by AI, necessitating new legal paradigms to safeguard intellectual property rights in the age of AI (Ali & Kamraju, 2023, p. 25). The transformative impact of AI on intellectual property highlights the need for robust legal frameworks that can effectively accommodate and regulate AI-generated innovations, while providing clear and fair guidelines for determining ownership and rights. Tackling these challenges will be essential for promoting ongoing innovation and ensuring the ethical application of AI in education and other sectors.

### *c) Accountability and Liability*

Accountability and liability present significant legal challenges when dealing with AI systems in education. If an AI system malfunctions or provides incorrect information that negatively impacts a student's learning, determining who should be held accountable becomes a complex issue. Should it be the educational institution using the AI, the AI developer, or the individual user who relied on the information? The traditional concept of accountability revolves around four key elements: identifying responsible actors (who), determining to whom accountability is owed (to whom), establishing the timing of accountability (when), and deciding the methods for accountability (how). This framework inherently places human actors at the centre of responsibility. However, the increasing autonomy and decision-making capabilities of AI challenge this traditional notion, as AI systems shift from passive tools (objects) to active agents (subjects). This shift blurs the lines of

accountability between humans and machines (Staszkiwicz *et al.*, 2023). With AI systems now capable of making autonomous decisions, the uncertainty surrounding accountability for errors, biases, or misinformation in educational outcomes becomes more pronounced. Tanzanian law currently lacks clear provisions on who should bear responsibility when AI systems cause harm. Whether the liability should fall on developers, users, or educational institutions remains unresolved.

A real-world example is the use of non-generative AI by universities for tasks such as plagiarism detection. Many institutions rely on AI tools to identify academic misconduct and penalize students accordingly. While these tools are beneficial, they are not immune to errors or risks (Giuffrida, 2023). In cases where AI falsely flags a student for plagiarism, the question of liability becomes critical: should the university, the developer of the AI tool, or the student be held responsible for the consequences of incorrect AI outputs?

In his article "Artificial Intelligence and Legal Liability in Tanzania," Ally (2023) argues that while AI and robotics are advancing rapidly, legal frameworks surrounding liability, particularly the tort of negligence, are outdated and still rooted in human-centred definitions of responsibility. Currently, legal liability is imposed on entities with legal personality, such as individuals and corporations. The tort of negligence was developed specifically to address human conduct or the actions of entities recognised by law. However, this framework becomes inadequate when applied to AI, which, despite its increasing autonomy, lacks legal personhood.

A notable exception to this is Sophia, the AI robot created by Hanson Robotics, which was granted citizenship by Saudi Arabia in 2017. While this case is unique, it illustrates the growing legal and ethical complexities of AI autonomy. Ally (2023) points out that applying traditional liability doctrines to AI and robotics presents several legal challenges because these doctrines focus on human conduct, whereas AI operates based on algorithms and technical autonomy. The autonomy of AI, while sophisticated, remains purely technical and is not equivalent to human decision-making or legal responsibility. This raises a broader, critical issue for policymakers and legal scholars: as AI continues to evolve and assume more complex roles in society, including in education, there is an urgent need for legal reforms to address the specific challenges posed by AI's autonomy. Such reforms must ensure that accountability and liability are clearly defined to prevent legal ambiguities that could undermine trust in AI systems and limit their innovation potential.

While AI's transformative potential in education and other sectors is undeniable, its growing autonomy poses significant legal challenges regarding accountability and liability (Holzhausen, 2024). Current legal frameworks,

including those in Tanzania, are ill-equipped to handle the complexities introduced by AI. Without clear regulations and updated laws, issues such as negligence, misinformation, and bias in AI systems will continue to raise difficult questions about who should bear the responsibility. Addressing these gaps is crucial for fostering trust in AI and ensuring its ethical application in education and beyond.

*d) The Digital Divide*

The digital divide in education poses a significant barrier to equitable access to quality educational resources, disproportionately affecting students from low-income families, rural areas, and underserved communities. This gap exacerbates existing educational inequalities, making it more difficult to achieve the United Nations Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (Brian & Owin, 2024). Bridging this divide is critical not only for social justice but also for fostering a more inclusive global economy and workforce.

The rapid advancement of Artificial Intelligence (AI) promises transformative changes across societies, economies, and the world of work. While these developments offer immense opportunities for innovation, productivity, and growth, they also risk widening existing global and local disparities. High-income nations and affluent communities are disproportionately benefiting from AI advancements, while low- and middle-income countries, particularly in Africa, continue to lag in investment, adoption, and implementation of AI technologies (United Nations, 2024). This emerging "AI divide" mirrors the broader digital divide, amplifying inequities within and between countries, and even within different sectors of society, such as education.

In educational contexts, this divide manifests as a growing gap between students who have access to AI-driven tools and resources and those who do not. The privileged schools and communities are better positioned to harness the benefits of AI, leaving behind marginalised groups, particularly students from rural or low-income backgrounds who remain on the periphery of technological advancements. The unequal access to AI in education threatens to deepen existing socio-economic divides, entrenching systemic inequalities and creating a stratified educational landscape where opportunities for success are unequally distributed (United Nations, 2024).

Moreover, the rapid pace of AI development has outstripped the capacity for adequate governance, regulation, and ethical oversight. This has raised concerns about the ethical implications of AI technologies, particularly regarding data privacy, bias, and fairness. As AI becomes more integrated into

educational systems, questions of access and equity are paramount. There is growing apprehension about the potential for an AI-driven future where some groups, whether based on geography, income, or social class, are better equipped to benefit from technological advancements, while others are left behind (Bentley *et al.*, 2023). This "AI divide" can manifest on multiple levels, from the national and institutional levels to individual disparities based on socio-economic status. At a group-based level, the divide could exacerbate labour market inequalities.

The demand for jobs requiring advanced digital skills is expected to rise, while jobs that require lower-level digital skills may decrease. This shift will disproportionately impact those from lower socio-economic backgrounds, as they are less likely to have access to the necessary educational resources to develop these high-level skills. For individuals and communities already disadvantaged by limited access to technology, their ability to leverage AI's potential benefits will be significantly reduced, further entrenching socio-economic disparities (Bentley *et al.*, 2023).

In Tanzania, despite efforts to improve digital infrastructure, many rural and remote areas continue to lack the technological resources needed to implement AI-driven educational solutions. The digital divide in these regions exacerbates educational inequality, creating an urgent need for legal frameworks that address this gap and ensure equitable distribution of AI benefits across all student populations. Although governments, including Tanzania's, have been compelled by the United Nations to uphold the right to education, many of the existing laws are outdated and ill-equipped to address the specific challenges posed by AI and other emerging technologies (Ally, 2024). A stark example of the digital divide was revealed during the COVID-19 pandemic. As educational institutions globally transitioned to online learning to mitigate the risks of the virus, students who lacked access to digital devices and the internet were effectively excluded from education. In Tanzania and many other countries, this led to the marginalisation of students from rural or disadvantaged backgrounds, who were unable to participate in remote learning due to the lack of necessary technology (Ally, 2024). This experience underscores the critical importance of addressing the digital divide in education to ensure that future crises do not disproportionately affect vulnerable populations.

From a legal perspective, there are international and regional frameworks that recognise the right to education and the importance of digital rights. The African Declaration on Internet Rights and Freedoms, for instance, emphasises the protection of internet rights, which is critical for bridging the digital divide. In Tanzania, the right to education is enshrined under Article 11(2) of the

Constitution of the United Republic of Tanzania, 1977. However, this provision is broad and does not specifically address the challenges posed by AI and digital technologies. Moreover, it is not enforceable under the Basic Rights and Duties Enforcement Act (Act No. 33 of 1994), as it is not classified as a basic right.

To address the digital and AI divides, Tanzania and other countries must enact updated, enforceable laws that specifically address the intersection of education, AI, and digital equity. Legal frameworks should aim to ensure that all students, regardless of socio-economic background or geographic location, have access to the tools and resources necessary to succeed in an increasingly AI-driven world. In doing so, governments will not only advance educational equity but also foster the inclusive development of AI technologies that benefit society as a whole. Without such legal and policy interventions, the AI divide will continue to reinforce existing inequalities, limiting opportunities for those already at a disadvantage.

*e) Ethical Considerations and Discrimination*

AI algorithms, while revolutionary, are not immune to bias. In educational settings, the use of biased AI systems may exacerbate existing inequalities and undermine the goal of providing equitable education. Ensuring fairness and non-discrimination in AI systems is a significant challenge that the legal system must address. Bias in AI, particularly algorithmic bias, refers to the systematic and unjust discrimination against particular groups of individuals (Chadha, 2024). This problem has gained increasing attention as AI becomes more integrated into everyday life, and it is essential to explore how these biases occur and the potential harms they can cause.

Algorithmic bias is a broad term that encompasses various fairness issues in automated systems. Some biases arise from statistical or technical sources, while others emerge from the societal context in which AI operates. Researchers have defined bias as encompassing any unintended or potentially harmful properties of the data used to train AI, which could lead to unfavourable outcomes (Baker & Hawn, 2023). This is particularly relevant in education, where biased AI can create unequal opportunities for students, reinforcing social inequalities rather than addressing them.

A critical discussion of AI often centres on data privacy and security, but algorithmic bias is equally important, especially when AI is used in education. AI systems are highly dependent on the quality of data they are trained on. If this data is biased, whether due to historical inequalities, incomplete datasets, or skewed representation, the AI will reflect and sometimes amplify these biases. For instance, AI-driven tools for evaluating academic performance or predicting student success might favour students from certain demographics or

backgrounds, unintentionally disadvantaging others (Mambile & Mwagosi, 2024). Transparency and accountability in AI decision-making processes are critical to ensuring fair and equitable outcomes for all students. Educational institutions must navigate these challenges carefully to harness the benefits of AI while mitigating its risks. Without adequate transparency, it is difficult to identify and correct biased outcomes, which can result in long-term negative effects on marginalised student populations. This calls for a robust legal framework that mandates accountability and transparency for AI systems used in educational contexts.

Examples of algorithmic bias can be found across various industries, and the implications of such biases are often serious. In the U.S. criminal justice system, for instance, the COMPAS system, which predicts the likelihood of a defendant reoffending, was found to be biased against African-American defendants. According to a study by ProPublica, African-Americans were more likely to be labelled as high-risk, even when they had no prior convictions, compared to white defendants (Ferrara, 2023). This example highlights how algorithmic bias can have significant and harmful societal impacts. Similarly, facial recognition technology, widely used by law enforcement agencies, has demonstrated biases based on skin tone. A study by the National Institute of Standards and Technology (NIST) found that facial recognition systems were less accurate in identifying people with darker skin tones, leading to higher rates of false positives and potentially wrongful arrests or convictions (Ferrara, 2023). Although these examples are from industries outside of education, they illustrate the broad potential for AI to perpetuate harmful biases if not properly managed.

In the context of education, multiple studies have documented algorithmic bias impacting learners from various nationalities. These studies, primarily conducted by researchers based in the United States, investigated AI applications such as predicting academic achievement, automated essay scoring, and speech evaluation. The findings revealed biases affecting learners from countries such as China, Korea, India, Vietnam, the Philippines, and Costa Rica, as well as from regions where Arabic is the primary language (Baker & Hawn, 2023). These biases, rooted in cultural and linguistic differences, can create significant disadvantages for students from non-Western backgrounds.

To address bias in AI, it is crucial to develop AI systems that mitigate bias and promote equity. This involves several strategies, such as ensuring diverse and representative training data, enhancing algorithmic transparency, and conducting ongoing monitoring for bias and discrimination (Mambile & Mwagosi, 2024). AI developers and educational institutions must work

together to ensure that AI tools do not reinforce existing inequalities but instead foster more equitable learning environments. In addition to technical solutions, legal and policy frameworks must evolve to address the ethical and fairness concerns associated with AI in education. The responsibility for regulating AI's use in educational settings should not fall solely on institutions or developers. Governments must enact comprehensive legislation that ensures AI systems are developed, deployed, and monitored in ways that uphold fairness, transparency, and accountability. Without such legal protections, AI has the potential to exacerbate social inequalities, rather than serve as a tool for inclusive and equitable education.

## **Conclusions and Recommendations**

### ***Conclusions***

This study finds that artificial intelligence (AI) holds significant potential to transform Tanzania's education sector by enhancing the quality, efficiency, and inclusiveness of teaching, learning, and administrative processes. AI-enabled tools can support personalised instruction, improve assessment and feedback mechanisms, streamline administrative functions, and broaden access to educational resources, particularly in contexts characterised by large class sizes and limited teaching capacity. The analysis further demonstrates that AI can play a critical role in addressing learning gaps and supporting learners with special educational needs, thereby advancing broader educational reform objectives and contributing to a more equitable education system.

However, the study also reveals that the realisation of these benefits is contingent upon deliberate, coordinated, and rights-based legal, regulatory, and infrastructural interventions. Tanzania's current legal and policy frameworks are inadequate to address the unique challenges posed by AI in education. Key gaps include insufficient safeguards for data privacy and child protection, a lack of clarity regarding accountability and liability for AI-generated harms, weak regulation of intellectual property and ownership of AI-generated educational content, and the risk of exacerbating existing inequalities through digital exclusion. Without clear, enforceable, and comprehensive governance measures, AI adoption may inadvertently reinforce structural disadvantages rather than promote equitable access to quality education.

From a human rights perspective, the study reaffirms that education is a fundamental right that must be accessible, acceptable, adaptable, and of adequate quality for all learners. Effective AI governance must therefore be grounded in a Human Rights-Based Approach (HRBA), ensuring that technological innovation supports equality, inclusion, and non-discrimination. In Tanzania, persistent disparities between urban and rural schools, uneven

digital infrastructure, and limited digital literacy increase the risk that AI-driven educational initiatives will deepen existing inequities. Moreover, inadequate protection of personal data, especially that of children, creates vulnerabilities to surveillance, misuse, and broader violations of learners' rights.

Overall, the integration of AI into Tanzania's education sector requires more than the mere adoption of technology; it demands the establishment of a coherent, rights-centred legal and institutional framework. Aligning AI governance with constitutional principles, international human rights obligations, and national education and digital development goals is essential to ensure responsible, accountable, and sustainable innovation. Supported by robust legal safeguards, institutional accountability, and inclusive policy design, AI can meaningfully contribute to Tanzania's long-term vision for digital transformation, human capital development, and educational equity, while safeguarding fundamental rights and promoting a more inclusive and high-quality education system.

### ***Recommendations***

To bridge the identified challenges and ensure responsible integration of AI within Tanzania's education sector, the following policy and regulatory measures are recommended:

*a) Development of a National AI-in-Education Regulatory Framework*

The analysis demonstrates that Tanzania lacks a dedicated and enforceable legal framework governing the use of AI in education. As an immediate priority, Tanzania should develop a sector-specific AI-in-education regulatory framework to guide the design, procurement, deployment, and evaluation of AI technologies in learning institutions. This framework should be grounded in a Human Rights-Based Approach (HRBA) and impose clear legal obligations relating to transparency, algorithmic fairness, accountability, and non-discrimination.

*b) Strengthening Data Protection and Children's Privacy Safeguards*

The findings reveal that AI platforms increasingly collect sensitive learner data without adequate safeguards or institutional capacity for compliance. It is therefore imperative to prioritise the enforcement and contextualisation of data protection laws within the education sector. Regulatory standards should mandate informed consent, data minimisation, secure data storage, and parental oversight for children's data. In addition, schools and AI service providers should be legally required to conduct Data Protection Impact Assessments and Human Rights Impact Assessments prior to deploying AI tools.

- c) *Ensuring Algorithmic Transparency and Accountability*  
Public authorities should require AI systems used in education to be explainable and auditable. Mechanisms must be developed for learners, parents, and teachers to challenge automated decisions affecting assessments, admissions, or academic progression. Independent oversight bodies should be empowered to investigate discriminatory or unlawful AI practices.
- d) *Addressing the Digital Divide through Targeted Investments*  
The government should expand digital infrastructure, especially in rural and underserved communities, by improving school connectivity, providing affordable learning devices, and supporting community digital resource centres. Equity-focused funding schemes can help ensure that AI adoption does not privilege well-resourced institutions at the expense of disadvantaged learners.
- e) *Institutionalising Continuous Monitoring and Evaluation*  
The government should institutionalise regular monitoring and evaluation of AI's impact on educational quality, equity, privacy, and inclusion. Evidence-based regulatory review mechanisms will allow policymakers to respond proactively to emerging risks and technological changes, thereby reinforcing long-term sustainability.
- f) *Promoting Digital Literacy and Capacity Building*  
Teacher training programs should incorporate digital and AI literacy components to prepare educators to effectively and ethically integrate AI into teaching methods. Learners should also receive instruction on digital rights, online safety, and responsible technology use to enable informed participation in AI-driven education environments.
- g) *Protecting Intellectual Property and Educational Content Rights*  
Legal clarity is required regarding ownership of AI-generated educational materials, authorship rights, and fair use exceptions. Reforms should ensure that AI tools do not undermine teachers' intellectual contributions and that educational content remains accessible under open licensing models where appropriate.
- h) *Encouraging Stakeholder Participation and Public Engagement*  
AI policy development should involve broad consultations with teachers' unions, parent associations, disability advocacy groups, civil society organisations, technology experts, and students to ensure that governance frameworks reflect local needs and lived experiences. Such participatory governance aligns with HRBA standards and fosters public trust in emerging technologies.

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