

THE STATE OF AI IN AFRICA REPORT 2023

Prepared by the Centre for
Intellectual Property and
Information Technology Law
(CIPIT)



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EXECUTIVE SUMMARY

Africa is embracing Artificial Intelligence in ways unique to the continent and is by no means showing signs of slowing down. This executive summary provides a brief overview of the report on the State of AI in Africa prepared by the Centre for Intellectual Property and Information Technology Law (CIPIT). The report highlights the potential of AI technologies to transform various sectors in Africa, such as business operations, healthcare, education, legal and judicial services, and transportation. However, the report also identifies significant gaps in access to knowledge/information, data, education, training, and human resources necessary for AI development and adoption.

The report focuses on four key thematic areas: AI and Data, AI and Innovation, AI Use and Impact in Health, Agriculture, Legal and Creative Fields, and Responsible AI. It highlights the challenges faced in AI adoption in Africa, including ill-equipped policy frameworks, ethics, skills, and capacity, and a need for a structured data ecosystem. The absence of robust policy frameworks leaves AI deployment largely unregulated, and ethical concerns such as accountability, data bias, transparency, and socio-economic implications arise.

The involvement of external entities like IBM, Google, and Microsoft in promoting AI adoption in Africa is acknowledged. However, the report emphasizes the increasing role of grassroots startups by Africans in deploying ethical AI and developing local talent. It suggests a multistakeholder approach involving public bodies, civil society organizations, developers, researchers, and local communities to address the challenges in AI skills development.

The report highlights the importance of AI in various sectors, such as agriculture, healthcare, education, and the creative industry. Examples of the binding nature of AI include educational chatbots like Botter and financial management applications such as Jumo in South Africa and Mipango App in Tanzania. However, there is a need for comprehensive AI policies and frameworks to ensure responsible innovation, address ethical

concerns, and promote equitable access to AI benefits for all communities. African governments should establish privacy policies to protect data subjects from the adverse effects of data breaches in AI utilization and define clear guidelines on surveillance limits.

Africa should approach AI strategically, focusing on its unique challenges and solutions rather than simply replicating techniques from the Global North. Collaboration and investment from the public and private sectors are crucial to establish the necessary infrastructure and promote capacity building in digital skills. Building a diverse skill set, including non-computer-related disciplines, can provide valuable insights for AI systems in various industries. It emphasizes the need for a deeper and more accessible data pool to enable effective problem-solving using AI solutions. The ethical implications of AI, including privacy concerns and surveillance practices, are also discussed, focusing on the need for data protection measures and responsible AI frameworks. To promote the sustainable adoption of AI in Africa, the report suggests prioritizing data governance, capacity building, and the development of local data sets. It calls for the involvement of African innovators, policymakers, and academics in AI conversations to ensure solutions align with African needs and priorities. Establishing comprehensive AI policies and frameworks, developing a responsible AI ecosystem, and creating a conducive environment for startups are highlighted as crucial steps for AI advancement in Africa.

The report recognizes the efforts made by some African countries in developing AI national strategies and policies, as well as the contributions of organizations like the African Commission on Human and People Rights (ACHPR) in shaping AI policy. However, it emphasizes the need for more comprehensive policies and frameworks to address ethical concerns, promote responsible innovation, and ensure equitable access to AI benefits.

The CIPIT report highlights the growing AI ecosystem in Africa and the potential for AI to drive positive change across sectors. It underscores the importance of addressing the existing gaps and challenges, such as access to data, skills, and policy frameworks, to unlock the full potential of AI in Africa. By prioritizing responsible AI practices, investing in research and knowledge transfer, and fostering local innovation, Africa can harness the benefits of AI while safeguarding privacy, promoting inclusivity, and respecting African norms and ethics.

1. Introduction

Artificial Intelligence (AI) technologies have enormous potential to aid the growth of African economies and alter the social and cultural fabric of the continent. AI technology has the potential to alter business operations and performance, enhance productivity, and improve health care, education, legal and judicial services, and transportation in Africa.¹ AI also has the potential to solve the continent's most challenging problems and to reduce existing inequalities. For example, South African computer scientist Raesetje Sefala is building algorithms that will flag poverty hotspots - developing datasets she hopes will help target aid, new housing or clinics.²

Developing a well-coordinated and strategic approach to leveraging AI requires consideration of the challenges that may hinder the development and adoption of AI on the continent. The potential benefits and risks of AI technology are not equally distributed across regions of the world. In Africa, there are significant gaps in terms of access to knowledge, data, education, training, and human resources required for the development and adoption of AI technologies, primarily due to the digital divide.³ In considering the existing gaps and ⁴acknowledging the strides made to address them, we examine the state of AI in Africa in four key thematic areas, namely;

- AI and Data: Privacy Surveillance Concerns and Mitigation Measures
- AI and Innovation: Infrastructure Capacity and Data
- Practical use of AI: AI Use and Impact in Health, Agriculture, Legal and Creative Fields in Africa.
- Responsible AI: Policies and Legal Frameworks

1.1 State of AI in Africa 2023

Artificial intelligence (AI) technologies will profoundly impact all areas of life that require human intellect and interaction in African countries. Businesses and institutions may employ AI, in particular, to personalise tasks, optimise processes, encourage innovations, and empower and supplement staff operations.⁵ Africa is already leveraging AI; for example, Togo is utilising AI systems to distribute social funds, Zambia to counter disinformation and misinformation during the electioneering periods, and Kenya is harnessing machine learning in agriculture and education.

Unfortunately, harmful AI use has also been observed, for example, in Libya through

1 D. O. Eke et al. (eds.), *Responsible AI in Africa, Social and Cultural Studies of Robots and AI*, <https://doi.org/10.1007/978-3-031-08215-3_1> accessed 5 May 2023

2 Harrisberg, Kim. *The African software developers using AI to fight inequality*. Reuters. February 16, 2022. <https://www.reuters.com/legal/government/african-software-developers-using-ai-fight-inequality-2022-02-16/>

3 'UNESCO Launches the findings of the Artificial Intelligence Needs Assessment Survey in Africa.' (UNESCO, 5 May 2023) <<https://www.unesco.org/en/articles/unesco-launches-findings-artificial-intelligence-needs-assessment-survey-africa>>

4

5 Abejide Ade-Ibijola and Chinedu Okonkwo, 'Artificial Intelligence in Africa: Emerging Challenges', *Responsible AI in Africa* (Palgrave Macmillan 2023) <https://link.springer.com/chapter/10.1007/978-3-031-08215-3_5>.

the deployment of autonomous weapon systems and in Zimbabwe through facial recognition surveillance systems.⁶ It is also good to note that with a few exceptions, such as South Africa, Nigeria, Ethiopia, Kenya, Zimbabwe, Togo, Libya, and Ghana, AI applications have not yet been widely adopted throughout Africa, with most African nations lacking the necessary elements required for technology adoption in the form of infrastructure, data ecosystems, STEM education, and governance systems.⁷

To increase the sustainable adoption of AI in Africa, it is necessary to create positive ecosystems among stakeholders, such as policymakers, research institutions, businesses, startups, and government agencies, to ensure the sustainability of the emerging technology.⁸ Notably, AI adoption in Africa has encountered various challenges that stakeholders must take into account to enable a conducive environment for sustainable use, including; ill-equipped policy frameworks, ethics, skills and capacity, and lack of a structured data ecosystem.

1.2 Policy Framework Challenges

There is a scarcity of pertinent policies that prioritise AI development and its application in Africa while addressing potential social repercussions. African countries such as Mauritius, Egypt, Zambia, Tunisia, and Botswana, have created National AI Programs, and others such as South Africa, Nigeria, Ghana, and Kenya have approved Data Privacy Legislation that may be used to govern AI technology.

However, all the policy frameworks are in their infancy, leaving AI deployment largely unregulated.⁹ Strategy on AI deployment techniques is required in African nations, similar to those in first-world nations such as China, the United States, and the European Union.¹⁰ Further, as pointed out in the Conference on the State of AI in Africa (COSAA), policy implementation is critical, and accountability is required to ensure that policies are properly implemented.

1.3 Ethical Challenges

Ethics in this context refers to guidelines for the best conduct during the development and use of novel technologies. While AI has great potential, it also presents significant ethical challenges for governments, developers, and users. These include accountability, data bias, transparency, and socio-economic concerns such as social inequality.¹¹ For example, AI has been shown to reproduce socio-economic disparity when utilising

6 Tara Davis and others, 'AI Governance in Africa an Overview of Regulation and Policy Work on Artificial Intelligence in Africa ALT Advisory' (2022) <<http://ai.altadvisory.africa/>>.

7 *ibid*

8 Abejide Ade-Ibijola and Chinedu Okonkwo (n3)

9 *ibid*

10 *ibid*

11 Tara Davis et al. (n4)

biased data.¹² Additionally, some complicated algorithms are used to create AI systems, jeopardising explainability, trust, and transparency. The practice of carrying out surveillance using AI is also a major ethical issue affecting African data subjects. Hence, these ethical concerns must be addressed by cementing the rights of data subjects and creating ethical AI frameworks to promote accountability among developers and across governments.

1.4 Lack of a Structured Data Ecosystem

AI projects depend on the quality and quantity of data used to train the AI systems. As such, in the event that the data does not accurately reflect the demographic characteristics of the intended population, an AI will frequently fail to serve its intended purpose. For example, a Chatbot needs thorough and accurate data to provide users with the right answers; if the user requests information not in the data bank, the system will not function.¹³

According to the United Nations Economic Commission for Africa (UNECA), African data ecosystems are gradually emerging and in their early phases, with the private sector driving early development stages.¹⁴ Due to this, African users are more likely to import algorithms developed and trained abroad using data that might not recognise the African population. This dissonance between data and users propagates inequality and other socio-economic challenges. Thus, a deeper, richer, and more easily available data pool is required to enable researchers, academics, developers, and users to utilise AI solutions for effective problem-solving.

1.5 Responsible AI Frameworks

Ethical AI, also known as Responsible AI, refers to the practice of translating ethical principles and rules to artificial intelligence (AI) systems to ensure that deployed systems behave ethically.¹⁵ It is characterised by principles such as accountability, transparency, privacy, explicability, and bias evaluation. The widespread adoption of AI systems in Africa calls for the deployment of Responsible AI to prevent negative impacts on individuals as a result of AI bias and data breaches. Unfortunately, Africa mainly consumes AI products developed in developed nations, such that most AI systems deployed on the continent have been developed and trained using data, values, and social considerations from foreign countries.¹⁶ This necessitates the adoption of an African limb of Responsible AI to address Africa's unique challenges regarding AI systems. Further, Africa has many unique value systems, which calls for the development

12 *Ibid*

13 *Abejide Ade-Ibijola and Chinedu Okonkwo (n6)*

14 *Ibid*

15 *Damian Okaibedi Eke, Kutoma Wakunuma and Simisola Akintoye, Responsible AI in Africa (Palgrave Macmillan 2023) <https://link.springer.com/chapter/10.1007/978-3-031-08215-3_1>.*

16 *Ibid*

of an ethical AI framework that takes note of African cultural values to ensure that Africans apply the appropriate solutions to existing challenges.¹⁷ Unfortunately, Africa's dependency on richer countries for AI systems begets the continent's dependence on the ethical AI frameworks developed by the same richer nations.¹⁸ As a result, only some African nations have developed ethical AI frameworks, leading to the continued adoption of highly unregulated AI systems in many African countries.

One major challenge to implementing Responsible AI frameworks in Africa is the quality and quantity of data available.¹⁹ Africa has diverse populations with different languages, cultures, and socio-economic backgrounds. Developing ethical AI systems that account for this diversity and minimise biases is crucial to prevent breaches of principles such as accountability and transparency.²⁰ Unfortunately, datasets are limited in many African countries, which could lead to the development of incomplete, biased, or inaccurate AI models that do not cater to this diversity. Additionally, there is a lack of adequate digital literacy and resources in Africa, leading to a digital divide. As a result, outside entities such as IBM, Google, and Microsoft have led the charge to promote AI adoption, which often means that foreigners are in charge of major projects in Africa.²¹ Fortunately, recent growth in grassroots startups by Africans is bound to increase the African talent in charge of deploying ethical AI facilitated by individuals who understand African cultural values and principles.²² It is also necessary to bridge the digital divide by providing affordable and reliable internet connectivity, promoting AI education and training, and ensuring the equitable distribution of the benefits of AI systems. Finally, a multistakeholder approach involving public bodies, civil society organisations, developers, researchers, and local communities can solve the challenge of AI skills since it would foster collaboration and skill-sharing.²³ Public bodies must also cater to skill gaps by developing in-house expertise on AI systems, ethical AI approaches, and best practices to ensure that there are regulatory frameworks and standards for ethical AI that solve problems in society.²⁴ This collaboration would ensure that AI technologies are developed, deployed, and used responsibly, respecting African cultural values and general principles of ethical AI.

1.6 Mapping of AI in Africa

AI development is occurring in Africa. The highest rate of activity in the development

17 *Ibid*

18 *Chinasa T Okolo, Kehinde Aruleba and George Obaido, 'Responsible AI in Africa—Challenges and Opportunities' in Kutoma Wakunuma, Damian Okaibedi Eke and Simisola Akintoye (eds), Responsible AI in Africa: Challenges and Opportunities (Palgrave Macmillan 2023).*

19 *Ibid*

20 *Ibid*

21 *Ibid*

22 *Ibid*

23 *Bernd Carsten Stahl and others, 'Organisational Responses to the Ethical Issues of Artificial Intelligence' [2021] AI & SOCIETY.*

24 *Ibid*

of AI-enabled tools is found in the agriculture, health, fintech, and education sectors. Africa has more than 2,400 AI organisations operating across various industries, including health, wellness, fitness, farming, law, training, and insurance. A sample of the many AI applications currently available in Africa can be found in [an interactive dashboard on “AI Applications”](#) developed by the Center of Intellectual Property and Information Technology Law (CIPIT).

2. Part 1: AI and Data Privacy and Surveillance Concerns and Mitigation Measures

Artificial intelligence needs data to be operational. However, there is a possibility that the data collected may be misused or utilised outside of its initial intended purposes. An example of this is data utilised in AI-enabled surveillance. As a consequence of this, the Concept of Surveillance and Data Privacy in AI is of paramount concern and discussion among certain groups of AI stakeholders. Surveillance involves the observation, recording, and categorization of information about people, processes, and institutions.²⁵ Privacy has also been associated with surveillance and sometimes it is seen as ‘its antidote if not its antonym.’²⁶ Surveillance activities are data-dependent and therefore, their outcomes are the product of data gathering, analysis, and use.²⁷ An illustration of surveillance is the Covid-19 global surveillance, whose aim was to ‘monitor the extension of the pandemic across countries, the severity of disease and risk factors and also the impact of control measures.’²⁸

Concerns around AI surveillance have played out in the South African judiciary. In the case of *amaBhungane Centre for Investigative Journalism NPC and Another v Minister of Justice and Correctional Services and Others*²⁹, the South African High Court found that ‘the need of journalists and their sources for confidential communications required special protections against surveillance abuses.’³⁰ In cases where communication surveillance is essential, it should be conducted according to the law and in a proportionate manner to ensure no infringement of other rights and freedoms as is enshrined in the Constitution.³¹

25 Christian Fuchs, *How can Surveillance be Defined? Remarks on Theoretical Foundations of Surveillance Studies* (1 October 2010) <<http://sns3.uti.at/wp-content/uploads/2010/10/The-Internet-Surveillance-Research-Parer-Series-1-Christian-Fuchs-How-Surveillance-Can-Be-Defined.pdf>> accessed 6 May 2023

26 David Lyon, ‘Surveillance’ (2022) 11 (4) *Internet Policy Review* 2-19

27 *ibid*

28 Maya Allan and others, *The World Health Organisation Covid-19 surveillance database* <<https://equity-healthj.biomedcentral.com/articles/10.1186/s12939-022-01767-5>> accessed 11 April 2023

29 Case No. 25978/2017

30 *Media Defence* (n 16)

31 Justice Alfred Mavedzenge, ‘The right to privacy v National Security in Africa: Towards a Legislative Framework which Guarantees Proportionality in Communications Surveillance’ (2020) 12 (3) *African Journal of Legal Studies* 360-390

Some African countries, e.g., Zimbabwe, Eswatini, Angola, and Mozambique, have used national security justifications to deploy surveillance technologies to control and discipline non-law-abiding citizens.³² The challenge with mass surveillance is it creates a climate of fear, and citizens are presumed to be guilty unless proven innocent. This eventually alters the ‘power balance between a state and its citizens.’³³ In Nigeria, 2.2 billion Naira was allocated in the 2018 budget for “Social Media Mining Suite”, in addition to ordering the military to watch for anti-government content online.³⁴

Biometric surveillance refers to the use of technologies that analyse the personal characteristics of an individual, and it is often used in law enforcement and security contexts. For instance, in Tanzania, a biometric border screening with facial recognition was installed at the Kilimanjaro and Julius Nyerere International Airports in 2018.³⁵ In the same year, Uganda’s president commissioned a CCTV surveillance centre with facial recognition covering Metropolitan Kampala. Facial recognition software has continuously developed and is now able to account for changes in ‘lighting, facial hair, and ageing.’³⁶ The accuracy, however, depends on the clarity of the photos and databases and the images being captured and searched.³⁷

Computing has been recognized as playing a crucial role when it comes to surveillance. This has resulted in a number of categories that describe the interconnection of computing and surveillance, such as ‘the new surveillance, dataveillance, the electronic panopticon, electronic surveillance or digital surveillance.’³⁸ Gary T. Marx has defined new surveillance as ‘the use of technical means to extract or create personal data.’³⁹ Dataveillance, on the other hand, has been described as the ‘systematic monitoring of people’s actions or communications through the application of information technology.’⁴⁰ Online or internet surveillance is the ‘monitoring of computer activity or of the data which is being transferred over networks and the internet.’⁴¹ Manuel Castells considers internet surveillance as a technology of control.⁴² A key feature of surveillance is the gathering of some form of data connected to individuals.⁴³ Some forms of online surveillance are illegal, while others are legal and may be performed by governments,

32 Allen Munoriyarwa and Admire Mare, *Digital Surveillance in South Africa* (Pulgrave Macmillan 2022)

33 Daniel Anyemedu, *Digital Surveillance in violation of Human Right and data Justice* <https://www.researchgate.net/publication/351917794_DIGITAL_SURVEILLANCE_IN_VIOLATION_OF_HUMAN_RIGHT_AND_DATA_JUSTICE> accessed 12 April 2023

34 *ibid*

35 CIPESA, *The rise of biometric surveillance* <https://cipesa.org/wp-content/files/reports/State_of_Internet_Freedom_in_Africa_2022.pdf> accessed 5 May 2023

36 Mark G. Milone, *Biometric Surveillance: Searching for Identity* <<https://www.jstor.org/stable/40688067>> accessed 5 May 2023

37 *ibid*

38 Christian Fuchs and others, *Internet and Surveillance* (Routledge 2012)

39 *ibid*

40 *ibid*

41 Esoteric, *What are the different types of surveillance?* <<https://www.esotericltd.com/2020/09/11/what-are-the-different-types-of-surveillance/>> accessed 8 May 2023

42 Fuchs (n 16)

43 Gary T Marx, *Surveillance Studies* <https://web.mit.edu/gtmarx/www/surv_studies.pdf> accessed 8 May 2023

ISPs (Internet Service Providers), and Internet services.⁴⁴ Online surveillance enables companies like Facebook and Google to sell targeted advertisements based on a user's interests and personal information.⁴⁵

Some of the ways in which online surveillance can be carried out include:

- **ISP tracking** - An ISP can monitor a user's online activity, and they do this by recording information about the websites one visits, the links that a user clicks, and also the data that a user sends that are not secured by HTTPS. They may sell the data to advertisers or even work with intelligence agencies to monitor a user's activities.⁴⁶
- **Social media tracking** - People share a lot of information on social media, and through this, advertisers can formulate advertisements based on people's behaviours, interests, or even locations and then target them.⁴⁷

The utilisation of social media for surveillance purposes has been used by private, mercenary-style surveillance groups to target 50,000 people in over 100 countries through the use of Facebook and Instagram.⁴⁸

Privacy, on the other hand, just like surveillance, is multidimensional and the major forms of privacy are informational, aesthetic, decisional, and proprietary privacy.⁴⁹ Privacy has been defined as the 'right to be let alone, or freedom from interference or intrusion.'⁵⁰The right to privacy has been enshrined in the 1948 Universal Declaration of Human Rights, and it provides that '*No one shall be subjected to arbitrary or unlawful interference with his privacy, home or correspondence, nor to unlawful attacks on his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.*'⁵¹ Thomas Emerson viewed privacy as a zone in which the individual can 'think his own thoughts, have his own secrets, live his own life and reveal only what he wants to the outside world.'⁵² In this case, informational privacy is the most significant, and it involves rules and conditions around personal information.⁵³ Information privacy has also been defined as the 'right to have some control over how your personal information is collected and used.'⁵⁴

Privacy consists of two elements, namely; 'the state of being alone and not being

44 Joe Robinson, *Internet Surveillance and how to keep your activity private* (23 March 2023) <<https://www.privacyaffairs.com/internet-surveillance/>> accessed 8 May 2023

45 *ibid*

46 *ibid*

47 *ibid*

48 Patrick Howell O'Neill, *Facebook Says 50,000 users were targeted by cyber mercenary firms in 2021* (16 December 2021) <<https://www.technologyreview.com/2021/12/16/1042652/facebook-says-50000-users-were-targeted-by-cyber-mercenary-firms-in-2021/>> accessed 8 May 2023

49 Marx (n 21)

50 *iapp*, *What does privacy mean?* <<https://iapp.org/about/what-is-privacy/>> accessed 6 May 2023

51 Article 12

52 Ira S. Rubinstein, *Voter Privacy in the Age of Big Data* <<https://wlr.law.wisc.edu/wp-content/uploads/sites/1263/2015/02/1-Rubinstein-Final-Online.pdf>> accessed 8 May 2023

53 Marx (n 21)

54 *iapp*, *What does privacy mean?* <<https://iapp.org/about/what-is-privacy/>> accessed 8 May 2023

watched or interrupted by other people.⁵⁵ Online privacy entails the protection of personal data. Personal data is any information that relates to an identifiable living individual. Online surveillance can be a threat to privacy, especially when personal data is obtained without an individual's consent or authorization.⁵⁶

The African Declaration on Internet Rights and Freedoms (AfDec) provides that 'unlawful surveillance, monitoring, and interception of users' online communications by state or non-state actors fundamentally undermine the security and trustworthiness of the internet.⁵⁷ The document also states that the collection, interception, and retention of communications data amounts to an interference with the right to privacy and freedom of expression. The article also mentions indiscriminate surveillance, and according to it, it constitutes a violation of the right to privacy, freedom of expression, and other human rights.

2.1 Data Breach

Data breaches are increasingly concerning with rapid datafication on the continent. A data breach is the 'intentional or inadvertent exposure of confidential information to unauthorised parties.'⁵⁸ If a data breach occurs, it poses a risk to an individual's rights and freedoms.⁵⁹ It has also been described as any security incident whereby unauthorised parties access sensitive data or confidential information including personal data or corporate data.⁶⁰ Personal data breach has also been defined in the General Data Protection Regulation (GDPR) as a 'breach of security leading to the accidental or unlawful destruction, loss, alteration, unauthorised disclosure of or access to, personal data transmitted, stored or otherwise processed.'⁶¹

Some of the causes of data breaches include:

- Innocent mistakes for example where an individual emails confidential information to the wrong person.⁶²
- Malicious insiders - This may be caused by disgruntled people for instance laid-off employees ⁶³
- Hackers - Malicious outsiders may intentionally commit cybercrimes to steal

55 *Bitdefender, What is Online Privacy? And Why is it important?* < <https://www.bitdefender.com/cyberpedia/what-is-online-privacy/> > accessed 8 May 2023

56 *Chika Ebere Odoemelam, 'Adapting to Surveillance and Privacy Issues in the Era of Technological and Social Networking' (2015) 5(6) International Journal of Social Science and Humanity 572-577*

57 *Principle 9*

58 *Long Cheng, Fang Liu and Danfeng (Daphne) Yao, Enterprise data breach: causes, challenges, prevention, and future directions* <https://www.researchgate.net/publication/318152978_Enterprise_data_breach_causes_challenges_prevention_and_future_directions_Enterprise_data_breach> accessed 5 May 2023

59 *European Commission, What is a data breach and what do we have to do in case of a data breach?* <https://commission.europa.eu/law/law-topic/data-protection/reform/rules-business-and-organisations/obligations/what-data-breach-and-what-do-we-have-to-do-in-case-of-a-data-breach_en> accessed 8 May 2023

60 *IBM, What is a data breach?* <<https://www.ibm.com/topics/data-breach>> accessed 5 May 2023

61 *Article 4(12)*

62 *IBM (n 63)*

63 *ibid*

data.⁶⁴

The common patterns involved in the commission of external breaches are:

1. **Research** - In this case, a hacker identifies a target and then looks for a weakness that can be exploited in the target's computer system. The hackers may also purchase stolen information that will grant them access to the target's network.⁶⁵
2. **Attack** - Once the target has been identified, the hacker may engage in social engineering with the intention of exploiting vulnerabilities in the target system using stolen log-in credentials.⁶⁶
3. **Compromise data** - Once the hacker locates the data, they take action by destroying the data or 'locking it up with ransomware and demanding payment.'⁶⁷

Some of the methods of carrying out data breaches include stolen credentials, social engineering, ransomware, human error, and also physical security failures.⁶⁸

There are various examples of data breaches in Africa:

1. Postbank South Africa⁶⁹ - Postbank, South Africa's Post Office Bank, had to replace about 12 million bank cards at a cost of \$58 million after insiders compromised the personal data of account holders by copying a master key. The bank detected about 25,000 fraudulent transactions in the system months after the breach that occurred in 2018. About 8 million and 10 million cardholders were affected, and a total of \$3.2 million from their accounts was stolen by the hackers who could have also exfiltrated the personal information of an additional 1 million customers.
2. Experian South Africa Data Breach⁷⁰ - In August 2020, Experian South Africa, a credit reporting company, suffered a data breach that impacted 24 million South Africans and 793,749 business entities. The breach involved a fraudster posing as a client and requesting access to Experian's services. The fraudster was able to extract personal and business information, such as names, ID numbers, and bank account details.

These breaches illustrate the real-world consequences of cyber-attacks, which can range from financial loss to reputational damage to public safety risks. They also highlight the need for better data protection measures, both at the organisational and individual levels.

64 *ibid*

65 *ibid*

66 *ibid*

67 *ibid*

68 *ibid*

69 CIO 'African data breaches: A look at the evolving threat landscape,' <https://www.cio.com/article/201509/top-african-data-breaches-the-threat-landscape-changes.html>

70 *ibid*

2.2 Mitigation Measures

2.2.1 Privacy Policies and Consent

A privacy policy is a ‘legal statement explaining how a company collects, handles, processes and respects its customers’ personal data on a website or app.’⁷¹ Privacy policies use clear language to enable data subjects to understand the kind of personal data that is collected and how that data will be used.⁷² The Nigeria Data Protection Regulation 2019 for instance, requires that privacy policies be simple and conspicuous.⁷³ It is also important to note that in Africa there are 33 (61%) countries with data protection and privacy legislation,⁷⁴ 6 (11%) countries with draft legislation,¹⁰ 10 (19%) countries with no legislation, and 5 (9%) countries with no data.⁷⁵ Privacy policies are fundamental for any digital medium like a website, web applications, mobile applications, and desktop applications.⁷⁶

Alternative terms of privacy policies include:

- Privacy statement
- Privacy page
- Privacy notice
- Privacy information

Privacy policies are important for compliance with privacy legislation. For instance, the California Online Privacy Protection Act requires companies collecting personally identifiable information to have a privacy policy.⁷⁷ In order to comply, companies must indicate the following in the privacy policies:

- The kind of information that will be gathered
- Information that could be shared
- The policy’s effective date

Privacy policies are also important because they compel businesses to act transparently, they give consumers control over their personal information, and they also help build trust between consumers and website owners since both parties know what is expected of them.⁷⁸ Some websites or apps provide in their privacy policy that a data subject

71 ContractsCounsel, Privacy Policy <<https://www.contracts-counsel.com/t/us/privacy-policy>> accessed 5 May 2023

72 *ibid*

73 Section 2.5

74 Lexology, ‘Recent developments in African data protection laws - Outlook for 2023’ <https://www.lexology.com/library/detail.aspx?g=baef72ee-10bd-4eb9-a614-a990c236bb45> accessed 16 May 2023.

75 UNCTAD, ‘Data Protection and Privacy Legislation Worldwide’ <https://unctad.org/page/data-protection-and-privacy-legislation-worldwide> accessed 16 May 2023.

76 ContractsCounsel (n 74)

77 Segment, Data Privacy Policy: What It is & Why you need one <<https://segment.com/resources/data-privacy/why-your-company-needs-a-data-privacy-policy/>> accessed 5 May 2023

78 Jennifer Laird, What is a privacy policy? (1 July 2022) <<https://www.privacypolicies.com/blog/what-is-privacy-policy/#:~:text=A%20Privacy%20Policy%20is%20a%20document%20which%20outlines%20how%20your,Whether%20you%20collect%20personal%20information>> accessed 6 May 2023

who uses the medium is taken to have consented to the collection and use of their personal data.

The GDPR defines consent as ‘any freely given, specific, informed and unambiguous indication of the data subject’s wishes by which he or she by a statement or by a clear affirmative action signifies agreement to the processing of personal data relating to him or her.’⁷⁹ In simple terms, consent is an individual’s way of giving permission for the use or disclosure of his or her personal information.⁸⁰

Consent may also be affirmative or implied. Affirmative or explicit consent is where an individual “signifies” his or her agreement with a data controller by some active communication between parties.⁸¹ Implied consent on the other hand occurs where the consent may be inferred from the action or inaction of an individual.⁸²

The subject of consent aligns with data breach mitigation in the sense that personal information should be lawfully obtained through consent for a specific purpose (purpose limitation), and not be used for unauthorised surveillance or profiling by governments or third parties or used for unconnected purposes without consent.⁸³ This helps to avoid cases of data breaches where information from data subjects was collected without their consent and the same data is used to perpetrate cybercrimes.

3. Part 2: Artificial Intelligence and Innovation: Infrastructure, Capacity, and Data

Africa is seeing an increasing number of local actors involved in AI knowledge creation, capacity building, and innovation processes. This is due to enhanced computational capacity, accompanied by an increase in funding for AI as part of an increase in funding for start-ups more generally.⁸⁴

A myriad of challenges faces the development and adoption of AI technologies in Africa. These issues include a lack of a structured data ecosystem, insufficient infrastructure and digital divide, lack of enough capacity building on AI, and limited venues for innovation skills acquisition.⁸⁵ There is a skill gap present in regard to the utilisation of

79 Article 4 (11)

80 *iapp*, Consent <<https://iapp.org/resources/article/consent-2/>> accessed 6 May 2023

81 *ibid*

82 *ibid*

83 ID4D, ‘Data protection and privacy laws’ <https://id4d.worldbank.org/guide/data-protection-and-privacy-laws> accessed 16 May 2023.

84 Verhulst, Stefaan. (2019). *Data Collaboratives as an enabling infrastructure for AI for Good*. Medium. ⁷⁵ <https://medium.com/data-stewards-network/data-collaboratives-as-an-enabling-infrastructure-for-ai-for-good-99aeb1192c10> > Accessed on 4th May 2023.

85 Ade-Ibijola, A., Okonkwo, C. *Artificial Intelligence in Africa: Emerging Challenges*. In: Eke, D.O., Wakunuma, K., Akintoye, S. (eds) *Responsible AI in Africa. Social and Cultural Studies of Robots and AI*. (2023) Palgrave Macmillan, Cham. <https://doi.org/10.1007/978-3-031-08215-3_5> Accessed on 4th May 2023

AI. Computing capacity and skill force capacity are becoming increasingly important as technology advances.⁸⁶ Africa is rich in data but the data has not been aggregated. There is difficulty in finding ethical training within the AI and innovation field.⁸⁷

3.1 Infrastructure

One of the critical components of economic growth and development is an investment in infrastructure and innovation.⁸⁸ AI has come to the fore due to exponential growth in computing capacity, the development of more sophisticated algorithms, and increasing datafication.⁸⁹ These advances depend on infrastructure availability as well as human and institutional capacity.

Poor internet connectivity hinders the consistent use of mobile apps and consumer adoption of AI-based services. The high cost of mobile internet data or home-based broadband connections also limits the market size and uptake of services.⁹⁰ Most businesses do not have solid platforms for AI technologies that include potential for future scaling, building on open-data architectures, digitising operations, and fostering an agile culture.⁹¹ Despite an increase in mobile technology, which has given rise to new data-driven business models, smartphone penetration is still relatively low. In 2018, only 45% of Sub- Saharan Africans had mobile phones, and many devices were older models unable to support high-tech apps.⁹² This is coupled with a lack of access to sufficient computing.⁹³

At the heart of the issue, however, is that African organisations do not have sufficient infrastructure, resources, and data-management protocols in place to operationalize the creation of adequate data sets. In less digitised environments, comparatively less data is available.

86 *ibid*

87 Mhlanga D. *Artificial Intelligence in Industry 4.0, and Its Impact on Poverty, Innovation, Infrastructure Development, and the Sustainable Development Goals: Lessons from Emerging Economies?* *Sustainability*. 2021; 13(11):5788. <https://doi.org/10.3390/su13115788> >Accessed on 6th May 2023.

88 Strusani, D.; Hougbonon, G.V. *The Role of Artificial Intelligence in Supporting Development in Emerging Markets*. (2019.) Available online: www.ifc.org/thoughtleadership > Accessed on 5th May 2023.

89 UNESCO. *Artificial Intelligence needs assessment in Africa*. <https://en.unesco.org/news/unescolaunch-es-findings-artificial-intelligence-needs-assessment-survey-africa>

90 *ibid*

91 African Union Panel on Emerging Technologies. <https://www.nepad.org/programme/african-union-high-level-panel-emerging-technologies-apat>

92 Besaw, C., FilitZ, J. *AI & Global Governance. AI in Africa is a Double-Edged Sword*. (2019) United 60 Nations University – Centre for Policy Research. <https://cpr.unu.edu/ai-in-africa-is-a-double-edgedsword.html>

93 *ibid*

3.2 Capacity

Capacity building encompasses learning both practical and theoretical skills that are necessary for the innovation of AI technologies in Africa.⁹⁴ In the era of technological advancement, an important element is the acquisition of technical skills. Information technology and business leaders in Africa agree that stakeholders' knowledge base on AI and Innovation must be improved in order to enjoy the benefits of AI technologies fully.⁹⁵ This means that national education systems and frameworks must be restructured to include digital literacy and training. Remote learning and intelligent tutoring systems with the help of AI may be used to provide quality education.⁹⁶ However, most AI students in Africa cannot benefit from these tools due to a lack of access to internet connectivity and technological infrastructure.

Additionally, universities must have a fundamental role in developing critical research that can inform policy and the public about Artificial Intelligence and Innovation.⁹⁷ The next generation of AI practitioners ought to be taught by higher education institutions about the design of AI technologies and the societal implications of AI and innovation associated with the Fourth Industrial Revolution.⁹⁸ Research and knowledge production can guide on how to better understand AI and innovation. Keen focus should be placed on African scholars in promoting African experiences, expertise, and values in global debates and discussions around AI. It is crucial to have input from African innovators, policymakers, and academics in AI conversations to ensure that research solutions are aligned with African needs and priorities. Unfortunately, there is limited personnel and a lack of funding for African universities regarding their capacity to implement AI and innovation research projects. This has, in part, inhibited African scholars from participating in global platforms to share their experience with AI and innovation. The continent should accelerate research-led and knowledge transfer strategies at the university level and ensure the inclusion of ethical and responsible use of AI subjects in computer science, information systems, machine learning, engineering, and AI-related courses. Moreover, governments should prioritise data governance to ensure that the collected data is within the standards usable in machine learning.

AI Handbooks and Practitioners' Guides can be used to equip policymakers with the foundational knowledge and capabilities to handle AI-related policy issues.⁹⁹ An

94 *ibid*

95 Mzmkandaba, S., *Gartner lifts the lid on barriers to AI adoption*. (2019) iTweb. <https://www.itweb.co.za/content/mQwkoM6KJZbq3r9A> > Accessed on 7th May 2023.

96 bu-Alsaad, H.A., *Agent applications in e-learning systems and current development and challenges of adaptive e-learning systems*, in: *2019 11th International Conference on Electronics, Computers and Artificial Intelligence (ECAI)*, IEEE. pp. 1-6.

97 *ibid*

98 Eve Ruwoko, *Africa needs data set infrastructure to benefit from AI*, (2022) <https://www.universityworld-news.com/post.php?story=20220412075232969> > Accessed on 5th May 2023.

99 *Ibid.*

AI for policy-makers curriculum, as well as articles, reports, and case studies, can be incorporated into such handbooks, thereby making it relevant for any kind of technology policy course in academia, government, civil society, and even the private sector. Beyond capacity-building for policymakers, there is a call by academia to build capacity within learning institutions by training and creating more opportunities for Masters and PhD students in AI and innovation fields.¹⁰⁰

3.3 Data

AI researchers need to generate local data sets across different sectors, such as health, agriculture, and water resources, that could be useful in developing AI technologies. The more data is collected, the more accurate the predictive models and the more effective AI and innovation would be in achieving the intended outcomes.¹⁰¹ The data sets in Africa for machine learning and AI are largely inadequate, and data sets developed outside Africa do not carry the same patterns or signatures contextual to Africa. Therefore, they may not provide accurate models.¹⁰² As a result, it is recommended that Africa develops a contextual data collection infrastructure.¹⁰³

Like computing infrastructure, data is also foundational to AI innovation and adoption. AI research and development advances more quickly in areas with complementary datasets.¹⁰⁴ Across all sectors, the number of Machine Learning systems directly corresponds to companies with high volumes of well-managed data and strong foundational infrastructure, and where AI takes its place alongside their other top digital priorities.¹⁰⁵ African organisations do not have sufficient infrastructure, resources, and data-management protocols in place to operationalize the creation of adequate data sets. In less digitised environments, comparatively less data is available.¹⁰⁶

100 Ajadi, S., *Can AI help tackle the most pressing challenges in developing countries?* GSM Association. (2020) <https://www.gsma.com/mobilefordevelopment/region/africa/can-ai-help-tackle-the-most-pressing-challenges-in-developing-countries/> Accessed on 7th May 2023

101 *ibid*

102 Effoduh, J.O., *7 ways that African states are legitimizing artificial intelligence.* (2020) Openair.Africa. <https://openair.africa/7waysthatafricanstatesarelegitimizingartificialintelligence/>

103 *ibid*

104 *ibid*

105 *ibid*

106 *ibid*

4. Part 3: Practical AI: AI Use and Impact in the Health, Agriculture, Legal, and Creative Fields in Africa

The “potential enhancement” that Artificial Intelligence (AI) can provide to African healthcare is undeniably substantial.¹⁰⁷ The development of AI in health would play an ‘enabler role,’ where AI assists with reorganising the archaic health systems by providing a shift from “reactivity to proactivity”.¹⁰⁸ However to successfully implement AI there is need for a sustainable ecosystem that must be established to ensure equity and access to healthcare.¹⁰⁹ AI technologies are held to expedite the “development of affordable, better quality and accessible” healthcare while “overcoming the local resource-constrained environment.”¹¹⁰ Looking towards examples, South Africa has applications centred around predictive patterns within the healthcare industry. Examples of this include the use of machine learning to develop a predictive tool that assists with assessing the duration of health employees and their potential stay within the public sector.¹¹¹ Kenya houses various e-health start-ups that utilise AI technologies. Examples include; Ilara Health which offers accurate and affordable diagnostics to communities in rural areas through a small AI-powered diagnostic device,¹¹² and *askNivi*, a free sexual and reproductive health chatbox that bridges the information gap that exists between the young population and health providers.¹¹³ In Ghana, we have minoHealth AI labs that are primarily focused on the automation of radiology by the application of deep learning and an algorithm known as convolutional neural network.¹¹⁴ Within the Northern region, Egypt has developed mhealth apps that utilise AI for nursing triage and tele-nursing services.¹¹⁵ Despite the growing presence of AI within healthcare, there is a need to appreciate that for there to be effective implementation of these sustainable AI innovations, a strong data culture has to be upheld to ensure that stakeholders within the ecosystem value and safeguard data.¹¹⁶ In addition, local solutions should

107 Global Gateway Series : Artificial Intelligence (AI) and the future of healthcare <<https://europa.eu/capacity4dev/articles/global-gateway-series-artificial-intelligence-ai-and-future-healthcare#FN1>> last accessed 16th May 2023

108 Laghmari S, Artificial Intelligence, a key tool to improve the African Health System <<https://infomineo.com/artificial-intelligence-a-key-tool-to-improve-the-african-health-system/>> last accessed 16th May 2023

109 *ibid*

110 Alami, H., Rivard, L., Lehoux, P. et al. Artificial intelligence in healthcare: laying the Foundation for Responsible, sustainable, and inclusive innovation in low- and middle-income countries [2020] *Global Health* Vol 16:52, 2

111 Moyo S, Doan, T.N., Yun, J.A. et al, Application of machine learning models in predicting length of stay among healthcare workers in underserved communities in South Africa [2018] *Hum Resour Health* 16, 68

112 Ilara Health <<https://www.ilarahealth.com/>> last accessed 16th May 2023

113 Green EP, Whitcomb A, Kahumbura C, Rosen JG, Goyal S, Achieng D, Bellows B, “What is the best method of family planning for me?”: a text mining analysis of messages between users and agents of a digital health service in Kenya [2019] *Gates Open Res* 3:1475

114 Minohealth <<https://www.minohealth.ai/>> last accessed 16th May 2023

115 Egyptian ehealth startup , 7Keema to expand across Africa via quasi franchising model <<https://disrupt-af-rica.com/2019/07/15/egyptian-e-health-startup-7keema-to-expand-across-africa-via-quasi-franchising-model/>> last accessed 16th May 2023

116 Akogo D, Five ways AI can democratise African healthcare <<https://www.ft.com/content/8649e35f-29d2-4da0-a1cd-7eece48b7152>> last accessed 16th May 2023

take centre stage when developing AI technologies, as the solutions should aim to promote self-reliance that would assist with cultivating a local ecosystem.¹¹⁷

AI is held to have substantial potential to advance agriculture within Africa. AI technologies have assisted farmers across the globe to “increase yield with less input, improve output quality,” and allow for more efficient go-to-market strategies.¹¹⁸ The technologies assist with limiting the use of fertilisers, pesticides, and irrigation.¹¹⁹ This generally improves the well-being of humans and the environment. There are ‘75 million AI devices that have been utilised by farmers and by 2050 it is estimated that the average farm will collect 4.1 million data points per day.’¹²⁰ Specifically in Africa, AI promotes ‘resilience’ amongst the “inevitable agricultural threats” of the climate crisis.¹²¹ AI technologies cut across various agricultural functions such as crop yield, irrigation, soil content sensing, crop monitoring, crop establishment, and weeding. AI applications within the continent include; Nuru, a Kenyan beta-stage AI tool that identifies and diagnoses crop diseases.¹²² The application has been successful amongst smallholder farmers, as 28,000 Kenyan cassava farmers have benefited from the tool.¹²³ In addition, Kenya’s AI-based agritech Apollo Agriculture, utilises AI to estimate the solvency of farmers as well as machine learning to assist in formulating better decisions concerning the loans that can be granted to specific farmers.¹²⁴

Recently, we have seen greater use of technology within our legal ecosystems for products, services, and ease of business. Despite being shielded by regulations and traditions, the legal field has not withstood the “sweeping influence of the digital revolution.”¹²⁵ This has led to the disruption of “carefully erected protections that have sheltered the legal profession.”¹²⁶ Protections here include foundations of the monopoly over the practice of law.¹²⁷ Therefore, for the legal industry to survive the rise of technology, legal practitioners will need to adapt to a new practice of law that stretches the traditional role of lawyers as “guardians of fairness, impartiality and accountability” to more of “an innovative role” within the new technological world order.¹²⁸ This innovative role is one that goes beyond the “knowledge of substantive

117 *ibid*

118 *An overview of AI technologies in African Agriculture* <<https://www.kdhi.ag/single-post/an-over-view-of-ai-technologies-in-african-agriculture>> last accessed 16th May 2023

119 *ibid*

120 *ibid*

121 *ibid*

122 *Nuru AI expansion : supporting farmers to diagnose crop diseases* <<https://blog.plantwise.org/2020/03/13/nuru-ai-expansion-supporting-farmers-to-diagnose-crop-diseases/>> last accessed 16th May 2023

123 *An overview of AI technologies in African Agriculture* (n107)

124 *Kenya AI based Agritech , Apollo Agriculture* <<https://www.wearetech.africa/en/fils-uk/solutions/kenya-ai-based-agritech-apollo-agriculture-helps-farmers-maximize-profits>> last accessed 16th May 2023

125 *Ademola A, Artificial Intelligence and the Future of Law Practice in Africa* [2018] <<http://dx.doi.org/10.2139/ssrn.3301937>> last accessed 11th May 2023

126 *Simon M, Lindsay F. A, Loly S & Comparato P, Lola v. Skadden and the Automation of the Legal Profession* [2018] 20 *Yale J.L & Tech*,234

127 *ibid*..257

128 *Lola v. Skadden, Arps, Slate, Meagher & Flom, No. 14-3845 (2d Cir. 2015)*

law” to a “duty of technological competence”.¹²⁹

Bearing this, we look towards the state of legal technology in Africa. The legal tech industry makes up an estimated 3% of the legal market share.¹³⁰ 40% of legal start-ups offer online legal services; 26% legal practice management; 5% legal documentation; 15% e-discovery, and 10% offer lawyers marketplace platforms.¹³¹ There is clear evidence of an increased demand for technology-driven legal services and products within Africa’s legal industry. Legal tech continues to embrace advanced technologies such as AI and blockchain across the continent. Evidence of this includes legal tech Kenya with their AI chat box (Artemis Legal AI),¹³² Andersen Law, a leading law and tax firm in Egypt that utilises AI to increase the efficiency and effectiveness of its lawyers and tax specialists,¹³³ and TIMI in Nigeria, a chat box that acts as a consultant for legal practitioners.¹³⁴

The creative landscape is currently experiencing a “democratised” shift, where AI is held to lift the barrier of entry that would normally be used to deter many talented individuals from following their creative talents and passions.¹³⁵ Creative industries were long believed to be “exclusive clubs.” However, with the advent of AI, there has been increased participation of individuals in the creative fields, with AI offering essential support in artistic visions.¹³⁶ An example of how AI is utilised is in image generation. Here we have AI models generating new images derived from text descriptions or samples.¹³⁷ This would assist designers in discovering novel ideas. Key illustrations of this include recent work by Malik Afegbua, who generated images of older people to exhibit at a fashion show.¹³⁸ AI may also be utilised for music composition. In this case, AI composes music in different styles. Artists can utilise these AI -Composed pieces to create new compositions and gather ideas for melodies and rhythms.¹³⁹ There is support for AI in music on the continent, as it would assist with African states scaling

129 American Bar Association, *Model Rules of Professional Conduct Rule 1:1, eighth comment to rule 1:1 Competence* <https://www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/rule_1.1_competence/comment_on_rule_1.1/> last accessed 11th May 2022

130 *ibid*

131 *ibid*

132 *Legal tech Kenya, Artemis Legal AI* <<https://www.legaltechkenya.com/artemis>> last accessed 11th May 2023

133 *Egypt: Pioneers In Integrating Artificial Intelligence to Enhance The Efficiency of Lawyers and Tax Professionals* [2023] <<https://www.mondaq.com/new-technology/1297704/pioneers-in-integrating-artificial-intelligence-to-enhance-the-efficiency-of-lawyers-and-tax-professionals>> last accessed 11th May 2023.

134 *TIMI AI Companion for every young lawyer* <<https://legalnaija.com/timi-ai-companion-for-every-young-lawyer/02900951941647681314/>> last accessed 11th May 2023

135 *How AI is Changing the Future of Creative Enterprise* <<https://www.forbes.com/sites/forbestechcouncil/2023/03/27/how-ai-is-changing-the-future-of-creative-enterprise/?sh=7f56fd125e61>> last accessed 11th May 2023

136 *ibid*

137 *How can creatives use AI in their work* <<https://admi.ac.ke/how-can-creatives-use-ai-in-their-work/>> last accessed 11th May 2023

138 *The Nigerian AI artist reimagining a stylish old age* <<https://www.bbc.com/news/world-africa-64260739>> last accessed 11th May 2023

139 *How can creatives use AI in their work (n118)*

their markets beyond the continent.¹⁴⁰

5. Part 4: Responsible AI: Policies, laws, and Frameworks

A growing and thriving AI ecosystem is developing in Africa; local tech spaces, as well as internationally driven technology hubs and centres, have been established by big tech companies such as Twitter, Google, Facebook, Alibaba Group, Huawei, Amazon, and Microsoft, who have significantly increased the development and deployment of AI systems in Africa. These technology spaces and hubs are focused on using AI to meet local challenges. Ethical, legal, and socio-cultural implications must be considered to ensure that Africa and Africans fully leverage and benefit from AI. Responsible AI principles must be considered in the development and deployment of AI systems to minimise harm and ensure transparency and accountability.¹⁴¹

Responsible AI is the process of defining policies and establishing accountability to guide the creation and deployment of AI systems.¹⁴² Rapid advancements in AI have opened up new opportunities for productivity, economic development, and advancements in various sectors. While current and future AI applications have the potential to advance responsible AI, they can also pose risks to human rights.¹⁴³ Responsible AI requires governance. It is in this context that we look at the existing landscape of policies, laws, and regulations in the AI ecosystem with the aim of understanding the extent to which the African AI ecosystem is responding to the application of responsible AI. These regulations though necessary, are not to be created in a manner that stifles the momentum of AI research and development. These regulations must strike a balance between creating an enabling environment for innovation and regulating development processes and the resultant technology. The lack of regulation has the potential to lead to the propagation of AI systems that can not only halt progress in AI development and research, but that can potentially lead to destruction and global decline.¹⁴⁴

The AI governance landscape in Africa is advancing to catch up with the adoption and implementation of AI in the continent. This is characterised by emerging policy responses, with the continent observing an increase in data protection legislation as well as the development of National AI strategies. Egypt, Mauritius, and Rwanda are the first African countries to develop National AI strategies. 35 countries have implemented data

140 *What will happen now that AI can sing like your favourite Nigerian Musician*, <<https://techcabal.com/2023/04/22/what-will-happen-now-that-ai-can-sing-like-your-favourite-nigerian-musician-through-voice-cloning/>> last accessed 11th May 2023

141 D. O. Eke et al. (eds.), *Responsible AI in Africa, Social and Cultural Studies of Robots and AI*, <https://doi.org/10.1007/978-3-031-08215-3_1> accessed 2 May 2023

142 *Reasons why your Organization needs Responsible AI (IBM)* <<https://www.ibm.com/blog/3-key-reasons-why-your-organization-needs-responsible-ai/>> accessed 3 May 2023

143 *Artificial Intelligence and Responsible Business Conduct (OECD)* <<https://mneguidelines.oecd.org/RBC-and-artificial-intelligence.pdf>> accessed 3 May 2023

144 N. Joshi, 'Why Governments Need to Regulate AI.' (Allerin, May 2019) <<https://www.allerin.com/blog/why-governments-need-to-regulate-ai>>

protection laws. Tunisia, Ghana, Zambia, and Kenya have also taken steps toward the development of AI national strategies and policies. Most recently, Nigeria instituted the first Africa National Center for AI and Robotics to promote research and development on emerging technologies and their practical application in areas of Nigerian national interest. Nigeria's National Information Technology Development Agency (NITDA) is set to roll out the National Policy on Artificial Intelligence, having completed the first draft. The policy is intended to guide the development and deployment of AI in Nigeria, taking into consideration potential risks such as bias, privacy violation, as well as job displacement.¹⁴⁵

National AI strategies help to identify areas of leveraging AI as well as areas of regulation. Egypt and Mauritius have the most comprehensive national AI strategies. Egypt's national AI strategies cover the adoption, implementation, and use of AI in government, national development, human capacity building, and involvement in international activities that are AI related. The national AI strategy will guide the development of skills, technology, ecosystem, infrastructure, and governance mechanisms to ensure its sustainability and competitiveness, with this commitment, the AI strategy equally proposes to promote a human-centric AI approach where people's well-being is a priority and facilitate multi-stakeholder dialogue on the deployment of responsible AI for the benefit of society and to inform related policy discussions.¹⁴⁶

Much like Egypt, Mauritius takes a similar approach in its National AI strategy, which focuses on leveraging AI in manufacturing, health, biotechnology, maritime, transportation, business processes, and citizen and government services. The regulatory approach is guided by accountability, ethics, and inclusion in building public trust and creating a robust AI ecosystem.¹⁴⁷

As a regional block, in 2019, the AU ministries in charge of ICT established a working group tasked with developing a capacity-building framework and establishing an AI think tank. In 2022, the AU executive council requested the AU Commission to pursue the development of an AI continental strategy. Within the same year, the AU high-level Panel on Emerging Technologies emphasised the need for a continental AI strategy noting that the AI strategy would enable African countries to enhance policy-making and implementation and improve stakeholder engagement on AI challenges and opportunities.¹⁴⁸

145 N.Isaac, 'FG Finalises Policy On AI, Commends Volunteers For Contributions.' (Science Nigeria March 8 2023) <<https://sciencenigeria.com/fg-finalises-policy-on-ai-commends-volunteers-for-contributions/#:~:text=The%20policy%20aims%20to%20guide,as%20well%20as%20job%20displacement.>> accessed 9 May 2023

146 Egypt National AI Strategy (Ministry of Communications and Information Technology, July 2021) <https://mcit.gov.eg/Upcont/Documents/Publications_672021000_Egypt-National-AI-Strategy-English.pdf> accessed 5 May 2023

147 Mauritius Artificial Intelligence Strategy (2018) <<https://treasury.govmu.org/Documents/Strategies/Mauritius%20AI%20Strategy.pdf>>

148 Artificial intelligence in Africa: Continental Policies and Initiatives (DIPLO, November 2022) <<https://www.>

The African Commission on Human and People Rights (ACHPR) has equally contributed to the development of AI policy in Africa, focusing on the intersection between AI and Human rights. In the 2019 ACHPR Declaration of Principles on Freedom of Expression and Access to Information in Africa, the commission called on states to ensure the use and application of AI Algorithms and other related technologies align with human rights law and standards, ensuring that freedom of expression, access to information and other human rights are not stifled.¹⁴⁹

Core to ACHPR's contribution to AI policy is the adoption of resolution 473, which specifically focuses on AI and Human rights. The resolution focused on a number of key themes, i.e., opportunities and challenges brought about by AI, the place of autonomous systems, data protection, and the underlying principles of fairness, transparency, and accountability in the development and use of AI. The resolution urges governments to work towards a comprehensive legal and ethical governance framework for AI technologies, robotics, and other new emerging technologies. Further, it stressed the need for the AU and regional bodies to develop a regional regulatory framework that ensures the technologies respond to the needs of the people of the continent. In addition to the resolution, the commission committed to undertake the study in order to further develop guidelines and norms that address issues relating to AI technologies and their impact on human rights in Africa in consideration of African norms, ethics, values, and communication ethos in framing global AI governance frameworks.¹⁵⁰

Internationally, the 193 UNESCO member states adopted the recommendations on Ethics on Artificial Intelligence, creating universal standards founded on the unprecedented challenges brought about by the development and use of AI. Some of the challenges are the increase in gender and ethics bias, significant threats to privacy, dignity, and agency, and the danger of mass surveillance. These recommendations set the first global normative framework on AI while giving member states the responsibility to apply the recommendations at their respective national levels.¹⁵¹ The values embodied in the recommendations include;

- Respect and promotion of human rights and fundamental freedoms and human dignity
- Recognition, promotion, and protection of the environment and flourishing ecosystems
- Diversity and inclusivity
- Taking an enabling and participatory approach to living in a peaceful, just, and interconnected society.

diplomacy.edu/resource/report-stronger-digital-voices-from-africa/ai-africa-continental-policies/> accessed 8 May 2023

149 *ibid*

150 *ibid*

151 '193 Countries Adopt First-ever Global Agreement on the Ethics of Artificial Intelligence.' (UN News, 25 November 2021) <<https://news.un.org/en/story/2021/11/1106612>>

The ethical principles identified in the recommendations are grounded in their application throughout the lifecycle of the AI system. The principles include ¹⁵²

- Proportionality and do no harm
- Safety and Security
- Fairness and non-discrimination
- Sustainability
- The right to privacy and data protection
- Human oversight and determination
- Transparency and explainability
- Responsibility and accountability
- Awareness and literacy
- Multistakeholder and adaptive governance and collaboration.

46 African member states out of the 193 that adopted the recommendations, consequently, committed to applying the recommendations, values, and principles highlighted with respect to AI policy formulation at national levels. Notably, the recommendations are reflective of adopting a human-centric and human rights-based approach aligned with responsible AI ensuring that AI technologies benefit humanity.

The applicability of responsible AI norms and principles within the African context requires the adoption of a contextualised approach in consideration of broad moral African principles. Local and indigenous factors must be considered in applying responsible AI principles and integrating the same into policy development procedures. Inclusivity of communities and consideration of inequalities that are likely to arise with the adoption and use of AI, i.e., social, cultural, and economic biases, must be viewed within the scope of responsible AI with an understanding of how responsible AI can eliminate the biases and inequalities at the development stages and how responsible AI can mitigate biases and inequalities.

Additionally, responsible AI extends to responsible data systems. Data governance structures must therefore consider elements of responsible AI, particularly in the development stages of AI systems, along with robust safety and accountability governance structures. Consequently, mechanisms must also be put in place to monitor accountability and compliance in relation to ethical and responsible AI. The lack of comprehensive frameworks in Africa does not limit the continued development and use of AI in Africa. This does not also hinder the regulation of AI through other laws i.e., foundational laws such as data protection regulations which in part govern different aspects of AI such as personal data and automated decision-making.

Although AI policy and regulation is still at the foundational and inception level in Africa, AI applications and systems are still being adopted, implemented, and used as

¹⁵² Recommendation on the Ethics of Artificial Intelligence. (UNESCO, 2021) <<https://unesdoc.unesco.org/ark:/48223/pf0000377897>>

highlighted above in the mapping on AI utilizations. Policy has long struggled to catch up with technology. The argument that regulation will stifle the evolution of technology is often brought up in discussions surrounding AI regulation.

The US and the EU respectively are in the process of implementing the AI Bill of Rights and the EU AI Act. At the core of these legislative frameworks is the need for the creation of policies that allow for the responsible use of AI technologies. Africa is yet to arrive at this level of AI regulation, it cannot, however be dismissed that there are steps that are being taken to ensure that the development of such legislation not only embodies the principles of responsible and ethical AI but also reflect the diversity in social, cultural and economic norms that influence the African AI ecosystem.

6. Key Observations and Findings

- AI adoption in Africa is mainly observed in industries such as finance, healthcare, agriculture, and education, with notable examples including education chatbots like Botter and financial management applications such as the South African Jumo and MipangoApp in Tanzania.
- There is a need for more comprehensive AI policies and frameworks to promote responsible innovation, address ethical concerns, and ensure equitable access to AI benefits across all communities.
- African governments need to put in place privacy policies that safeguard data subjects against the adverse effects of data breaches in the utilisation of AI tools and products.
- There is a need for clear policies and guidelines on limits of surveillance in AI.
- Africa needs to think strategically about what AI and innovation means for the continent and encourage capacity building, and provide adequate infrastructure and data collection avenues. For this move to be successful, then it must stop copying and pasting techniques from the Global North and focus on its unique challenges and solutions in AI and innovation fields.
- To fully realise the potential of AI and innovation in Africa, countries may need to work together to establish the necessary infrastructure. However, significant investment and support from both the public and private sectors may be required. There is a need for capacity building in relation to relevant digital skills. For example, community learning can be an effective way of advancing digital skills. It is imperative to note the importance of building a diverse skill set, linguistic students play a key role in creating algorithms that are utilised in data sets. Non-computer-related disciplines can also contribute to AI in the industry by providing valuable insights and perspectives that can be used to inform AI systems.
- Governments also need to support the development of a responsible AI ecosystem in the following ways:

- i. being willing to adopt AI, and being able to adapt and innovate to do so;
 - ii. promoting a good supply of AI tools from the technology sector; and
 - iii. ensuring these tools are built and trained on high-quality and representative data, and building the appropriate infrastructure to be delivered to and used by citizens.¹⁵³
- National policies and regulatory frameworks need to ensure that emerging technologies benefit humanity.
 - Responsible AI principles must ensure that fairness, transparency, and accountability are integrated as the underlying principles in the development, adoption, implementation, and use in consideration of human-centred AI.
 - There is a need for African developers to develop ‘African AI’ that would be tailored to the contextual needs of the continent.
 - African states should look towards creating a conducive environment for the start-ups to thrive.

7. Conclusion

There is clear evidence as to how AI can push for progress and development of the continent. This is evident with the role AI has played within the four thematic areas. Assessing the AI and Data Privacy and Surveillance area, there is a consensus that, without safeguards and mitigation strategies, there is a high risk for privacy violation. However, AI is double-edged, as it can be utilised to reduce the risks of data breaches whilst upholding the right to privacy. Within AI and innovation, there is emphasis on tapping into our own talent pools within the continent. Focus should be on African expertise, where there should be investment in research-led and knowledge-transfer strategies. Practical Applications of AI has provided us with insights as to how there are local initiatives in place that assist with developing AI solutions. The insights also demonstrate that despite the fact that AI is still at its nascent stages, there are positive signs that showcase we are in the right direction as to how AI is being developed and utilised within the continent. Contextualised regulation has been emphasised within the formulation of policies, laws, and frameworks, as African norms, ethics, and values should be integrated into the policy formulated for the promotion of responsible AI.

153 *Recommendations adopted from Oxford Insights and the International Development Research 94 Centre. (2020). Government Artificial Intelligence Readiness Index 2020. [https:// www.oxfordinsights.com/government-ai-readiness-index-2020](https://www.oxfordinsights.com/government-ai-readiness-index-2020) > Accessed on 4th May 2023.*

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