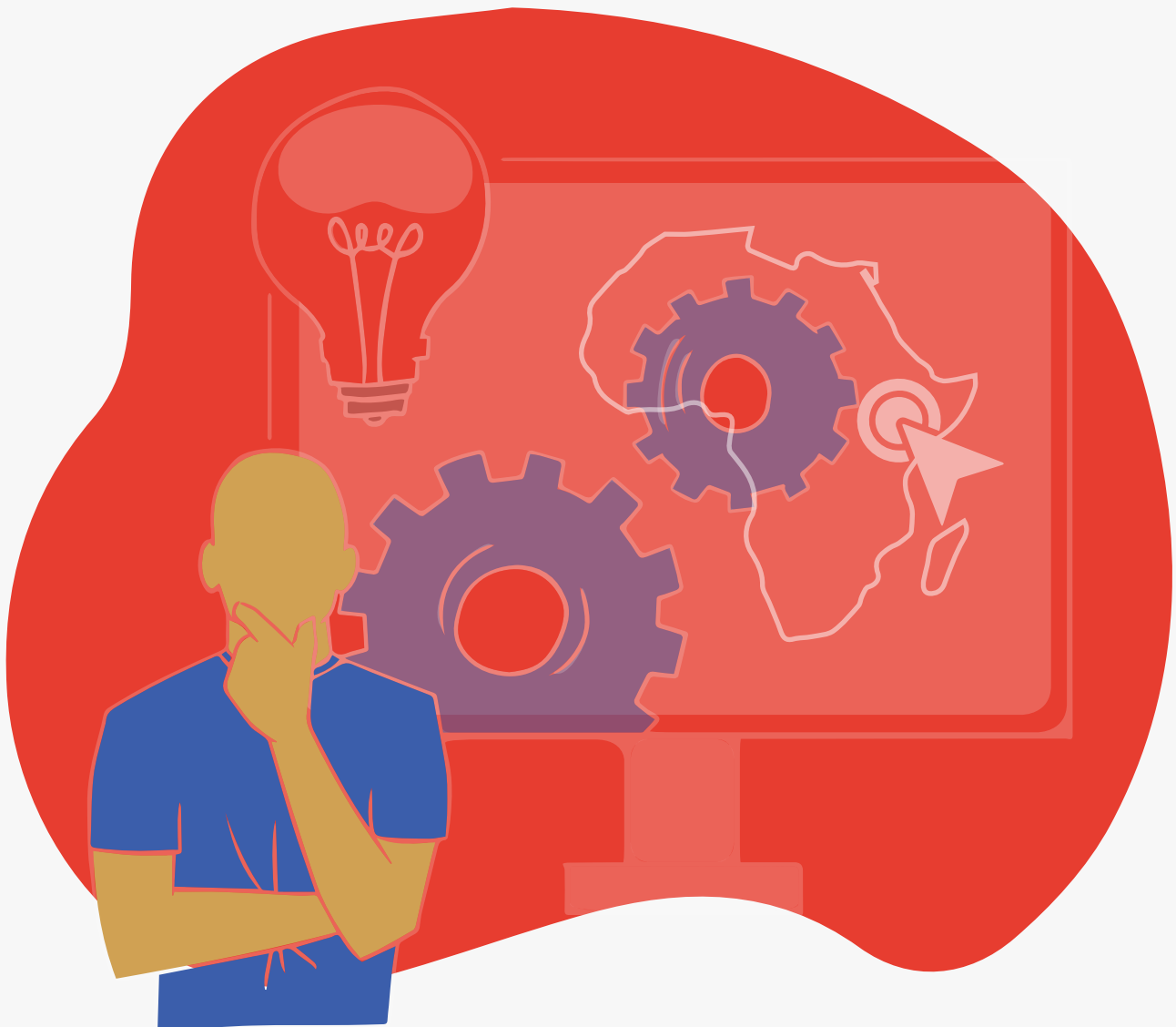


# The Applications, Challenges and Regulation of Automated Decision-Making (ADM) in Africa



**Strathmore University**

*Centre for Intellectual Property and  
Information Technology Law*

# ■ TABLE OF CONTENTS

<b>Acknowledgements</b>	<b>3</b>
<b>Executive Summary</b>	<b>4</b>
<b>1. Introduction</b>	<b>5</b>
<b>2. Purpose and Importance of the Study</b>	<b>5</b>
<b>3. Methodology of the Study</b>	<b>6</b>
<b>4. Limitations of the study</b>	<b>6</b>
<b>5. Mapping of ADM Applications in African Countries</b>	<b>7</b>
i. Financial Services	7
ii. Healthcare Services	7
iii. Agriculture	8
iv. Education	8
v. Public Administration	9
<b>6. Challenges Facing Automated Decision-Making Use in Africa</b>	<b>9</b>
i. Bias and discrimination	9
ii. Regulatory Vacuums	10
iii. Responsibility Gaps	10
iv. Gaps in Digital Skills, Data and Infrastructure	10
<b>7. Legal Provisions on Automated Decision-Making in African Countries</b>	<b>11</b>
<b>8. Analysis</b>	<b>13</b>
<b>9. Recommendations</b>	<b>14</b>
<b>10. Conclusion</b>	<b>15</b>

## ■ Acknowledgements

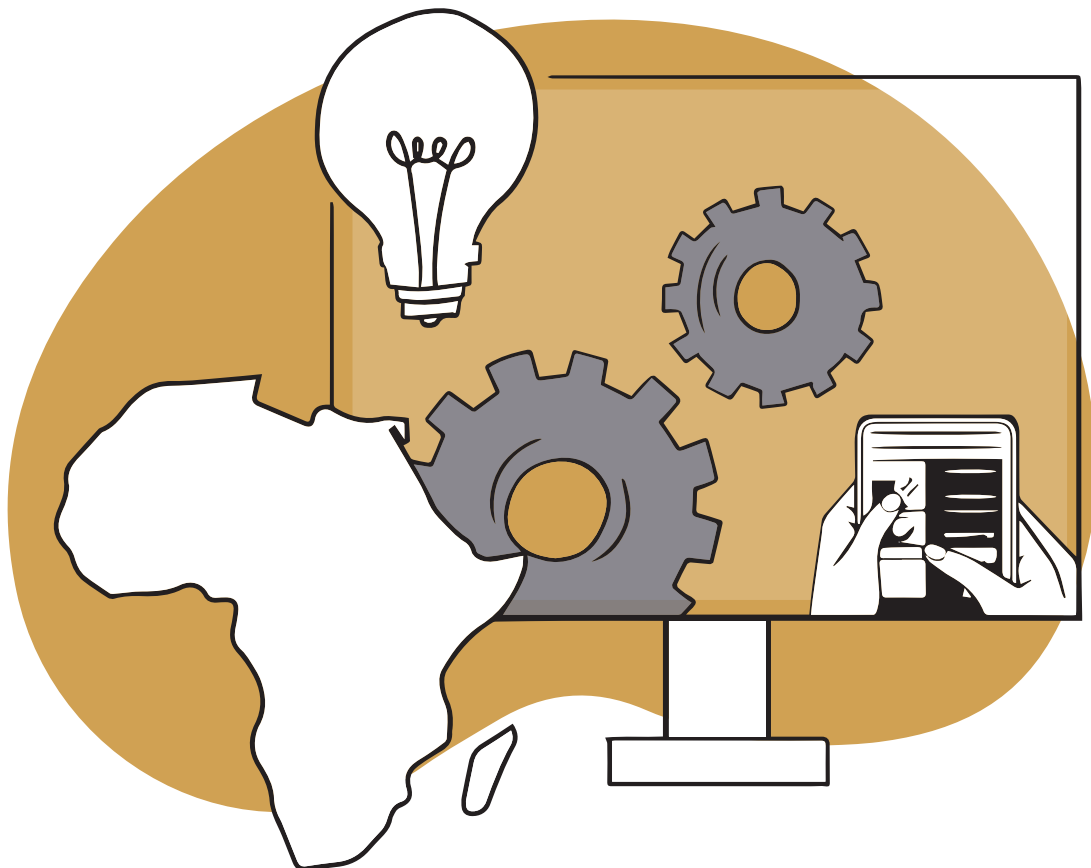
The preparation and publication of this report have been made possible through funding from Hewlett Foundation. We would like to thank the organisation for their continued support. CIPIT wishes to thank the team whose collaboration on this report made it possible. We particularly appreciate the efforts of the authors, Josephine Kaaniru and Lilian Olivia Orero, for their research and drafting, which shaped the content of the report. We also thank Dr. Melissa Omino, Nelly Chepngetich Rotich and Joshua Kitili for their editorial expertise, which significantly improved the quality and scope of the report. Lastly, we wish to thank the administrative team for their continued support throughout the process of developing this report, as well as Gloria Muthoka for designing the final version.

## ■ Executive Summary

The use of tools, procedures and computer systems to wholly or partially automate decision-making has been witnessed in Africa in finance, healthcare, agriculture, education and public governance. This process is known as Automated Decision Making (ADM) and is ubiquitous in the various industries on the continent to improve efficiency and decision-making. However, these systems often perpetuate existing biases and possible human rights breaches. The use of ADM in Africa also faces obstacles such as biased and unrepresentative datasets, accountability gaps, and a lack of adequate legislative safeguards against automated decision-making-related rights abuses.

Specific African use cases in the financial sector include Kenyan platforms such as Tala and Fuliza that use ADM for credit scoring and loan approvals, and Manila, a South African fraud detection and risk assessment tool. In the education sector, ADM provides personalised learning experiences through platforms such as Angaza Elimu, Daptio and M-shule. It is also seen in healthcare to improve healthcare outcomes through efficient diagnosis, monitoring, and specialising health services. ADM provides automated marketing and distribution avenues for farmers in agriculture through the Twiga Foods platform, which uses Google Cloud technologies to optimise effective food value chains. Public administration also benefits from ADM, which governments use to operationalise platforms such as Kenya's affordable housing project and automated school allocations in South Africa.

Several African countries have enacted data protection laws that emphasise the need for transparency and accountability in ADM systems, such as the South African Protection of Personal Information Act, the Ghana Data Protection Act, and the Kenya Data Protection Act, which provide the right not to be subjected to automated decision-making unless this process is necessary for the performance of a contract or legally mandated reasons. This report explores the applications, challenges, and legal and policy frameworks pertinent to ADM use in Africa.



## Introduction

Automated Decision Making (ADM) refers to using computations, tools, or procedures to replace, automate, support or enhance decisions, or implement policies.<sup>1</sup> In this report, Machine Learning (ML) and Artificial Intelligence (AI)-based ADM systems are considered a subcategory of ADM, since ADM comprises some automated systems that are not created using AI algorithms. ADM is revolutionising industries worldwide, and Africa is no exception, where it has a wide range of applications across various sectors, including finance, healthcare, education, agriculture and public administration.<sup>2</sup> These systems can improve efficiency and decision-making but raise concerns about bias, accountability, and human rights.<sup>3</sup> Therefore, it is vital to consider ADM systems' potential risks and benefits and develop appropriate safeguards to ensure they are used responsibly and ethically. This report explores the application, legal and policy frameworks, and challenges of ADM use in Africa.

## Purpose and Importance of the Study

Researching automated decision-making in Africa is crucial for addressing local challenges, informing policy and regulation, fostering innovation and capacity building, driving sustainable development and promoting ethical decision-making.<sup>4</sup> This research empowers African countries to harness the potential of ADM technologies while ensuring that they contribute to inclusive and equitable growth on the continent. In light of this, the current report considers the following issues:

- i. Addressing Contextual Challenges:* Research on automated decision-making in Africa allows for a deeper understanding of the unique challenges and opportunities that the continent faces. By examining the specific socio-economic, cultural, and technological contexts, researchers can identify solutions tailored to African needs. This research can help bridge the digital divide, promote inclusive development, and address disparities specific to the African context.
- ii. Informing Policy and Regulation:* Researching automated decision-making in Africa provides valuable insights for policymakers and regulatory bodies. It helps them understand the potential impact, risks, and benefits of ADM implementation in different sectors.<sup>5</sup> Research outcomes can inform the development of policies and regulations that promote ethical, transparent, and accountable use of ADM technologies, safeguarding individual rights, privacy, and societal interests.
- iii. Enhancing Local Innovation and Capacity Building:* Research on ADM in Africa encourages local innovation and capacity building. By exploring the challenges and opportunities specific to African countries, researchers can contribute to developing locally relevant solutions and technologies. This empowers African entrepreneurs, researchers, and developers to take an active role in shaping the future of ADM in the continent, leading to home-grown innovation and economic growth.
- iv. Promoting Ethical and Fair Decision-Making:* Research helps identify and mitigate the potential biases and discrimination arising from automated decision-making systems. It explores methods to ensure fairness, transparency, and accountability in ADM algorithms and models.<sup>6</sup> This research is crucial for promoting ethical decision-making that upholds human rights, reduces inequality, and ensures automated systems do not negatively impact vulnerable populations.

<sup>1</sup>Rashida Richardson, 'Defining and Demystifying Automated Decision Systems' (2022) 81 Maryland Law Review 785 <<https://digitalcommons.law.umaryland.edu/mlr/vol81/iss3/2>> accessed 21 June 2024.

<sup>2</sup>Joanna Redden, 'Governments' Use of Automated Decision-Making Systems Reflects Systemic Issues of Injustice and Inequality' (*The Conversation* 21 September 2022) <<https://theconversation.com/governments-use-of-automated-decision-making-systems-reflects-systemic-issues-of-injustice-and-inequality-185953>> Accessed 14 Jun 2023.

<sup>3</sup>*The impact of rapid technological change on sustainable development | UNCTAD.* (n.d.). Unctad.org. Available at <<https://unctad.org/webflyer/impact-rapid-technological-change-sustainable-development>> accessed 11 Jun 2023.

<sup>4</sup>Le Sueur A 'Robot Government: Automated Decision-making and its Implications for Parliament' in A Horne & A Le Sueur (eds) *Parliament Legislation and Accountability* (2016) 183-202, Oxford: Hart Publishing. <<https://deliverypdf.ssrn.com/delivery.php?ID=393024093024069080064010002093088065035087048051093061101004109064107066068002012009007006111015121111108089016114086006001016117014070089021011082103006075105084062077052121113100080004114094019116095024096091080113078118117001069012011097029009103&EXT=pdf&INDEX=TRUE>> Accessed 14 Jun 2023.

<sup>5</sup>Makoto Hong Cheng and Hui Choong Kuen, 'TOWARDS a DIGITAL GOVERNMENT Reflections on Automated Decision-Making and the Principles of Administrative Justice\*' (2019) <<https://journalonline.academyPublishing.org.sg/Journals/Singapore-Academy-of-Law-Journal/e-Archive/ct/eFirstSALPDFJournalView/mid/495/ArticleId/1453/Citation/JournalsOnlinePDF>> Accessed 14 Jun 2023.

<sup>6</sup>Makoto Hong Cheng and Hui Choong Kuen, 'TOWARDS a DIGITAL GOVERNMENT Reflections on Automated Decision-Making and the Principles of Administrative Justice\*' (2019)

- v. **Driving Sustainable Development:** ADM research in Africa contributes to sustainable development goals. By leveraging data and automation, ADM technologies can enhance resource allocation, optimise processes, and drive efficiency, improving livelihoods, economic growth, and environmental sustainability.<sup>7</sup> Research on ADM's impact on sustainable development helps ensure that these technologies are harnessed for positive and long-lasting outcomes.

## ■ Methodology of the Study

This study was conducted through desk research of existing works exploring the issue of automated decision-making technologies in Africa. It examined journal articles, reports, relevant websites, and blogs to gauge the extent of application of these technologies in finance, healthcare, agriculture, education and public governance and the challenges faced in the application of these technologies. The literature review also examined governing laws on ADM, with a comparative look at ADM provisions in Ghana, Kenya, Nigeria, and South Africa, while identifying the gaps in these regulatory measures.

## ■ Limitations of the study

Despite the limitations encountered in this study, researching automated decision-making remains essential for understanding, shaping, and guiding the responsible development and deployment of ADM technologies. By acknowledging and addressing the limitations identified below, the research aims to contribute to the advancement of knowledge on the ethical and responsible use of automated decision-making in various domains, ensuring fairness and remedies in case of rights breaches. The challenges faced include:

- i. **Data Availability and Quality:** In this research process, access to relevant and reliable data was limited, especially in the African context.<sup>8</sup> Mainly, information on specific applications of ADM in the public and private sectors was anecdotal and limited due to the failure of government institutions and private entities to publicise data on ADM systems in use.
- ii. **Algorithmic Transparency:** The lack of algorithmic transparency can be a significant limitation in ADM research. Many proprietary algorithms and models used in commercial systems and the public sector are not publicly disclosed,<sup>9</sup> making it challenging to fully understand and evaluate their inner workings and potential biases.
- iii. **Rapidly Evolving Technology:** ADM technologies and techniques are evolving rapidly, making it challenging for research findings to remain up to date over time.<sup>10</sup> The pace of technological advancements can render specific research findings less relevant or applicable as new methods and algorithms emerge.
- iv. **Contextual Specificity:** The context-specific nature of ADM research can limit generalisability. Findings from one region or sector may not directly apply to others due to variations in socio-economic factors, cultural norms, infrastructure, and regulatory frameworks.<sup>11</sup> Careful consideration is needed to ensure that research findings are appropriately contextualised.
- v. **Interdisciplinary Nature:** ADM research often requires multidisciplinary collaboration, combining expertise from computer science, social sciences, law, and ethics.<sup>12</sup> Navigating the multidisciplinary nature of the study required the researcher to integrate information from diverse fields such as computer science, social sciences, and ethics,

<sup>7</sup> Makoto Hong Cheng and Hui Choong Kuen, 'TOWARDS a DIGITAL GOVERNMENT Reflections on Automated Decision-Making and the Principles of Administrative Justice\*' (2019)

<sup>8</sup> Frank Pasquale, 'Restoring Transparency to Automated Authority Restoring Transparency to Automated Authority' (2011) 235 Journal on Telecommunications & High Technology Law <[https://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=2357&context=fac\\_pubs](https://digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=2357&context=fac_pubs)> accessed 15 November 2023.

<sup>9</sup> Katarina Foss-Solbrekk, 'Searchlights across the Black Box: Trade Secrecy versus Access to Information' (2023) 50 Computer Law & Security Review 105811 <<https://www.sciencedirect.com/science/article/pii/S0267364923000213#:~:text=Algorithms%20require%20scrutiny%2C%20which%20in,concealed%20under%20trade%20secret%20privileges.>> accessed 12 February 2024.

<sup>10</sup> Jesse Levinson and others, 'Towards Fully Autonomous Driving: Systems and Algorithms' (2011) <<https://cs.stanford.edu/people/teichman/papers/iv2011.pdf>> Accessed 14 Jun 2023

<sup>11</sup> Jesse Levinson and others, 'Towards Fully Autonomous Driving: Systems and Algorithms' (2011)

<sup>12</sup> Jesse Levinson and others, 'Towards Fully Autonomous Driving: Systems and Algorithms' (2011)

requiring an understanding of technical concepts, methodologies, and terminologies. The interdisciplinary nature of the research brings both opportunities and challenges, including the need for effective collaboration, communication, and integration of diverse perspectives.

## ■ Mapping of ADM Applications in African Countries

In recent years, the application of ADM systems has expanded across various sectors in African countries, such as education, finance, healthcare, and public administration. These sectors have increasingly leveraged automated decision-making to enhance efficiency, accuracy, and service delivery. This section will explore the specific use cases and benefits associated with ADM in these sectors in Africa.

### *i. Financial Services*

ADM is used in Africa's financial sector for credit scoring, loan approvals, fraud detection, and risk assessment. By analysing large amounts of data, algorithms assess creditworthiness and make lending decisions, especially in areas with limited access to traditional banking services.<sup>13</sup> In 2020, Kenya's Safaricom loaned Kenyan shillings 245 billion through their Fuliza lending product, an automated credit profiling system.<sup>14</sup> Tala is also a credit service that operates in Kenya, India, Mexico, and the Philippines, utilising automated decision-making to assess loan applications and determine creditworthiness.<sup>15</sup> In South Africa, First National Bank's Manila platform uses AI to flag fraud, money laundering, and tax evasion risks.<sup>16</sup> Analysts indicate that Manila is more effective and faster in analysing data and generating comprehensive reports based on a wide range of financial information.<sup>17</sup>

### *ii. Healthcare Services*

Machine Learning algorithms can potentially improve healthcare outcomes in Africa by aiding in diagnosis, patient monitoring, and optimising health services.<sup>18</sup> These autonomous systems can also contribute to customised treatment approaches and tracking.<sup>19</sup> Machine Learning algorithms such as XGBoost have been developed using data from East and Southern Africa to enable targeted checkups after identifying individuals at high risk of contracting HIV.<sup>20</sup> A diagnostic AI system has also been used to identify medical irregularities and accurately diagnose cervical cancer in Ethiopia.<sup>21</sup> To optimise services, researchers collected, organised, and stored large volumes of data from operational systems into a data warehouse to streamline health services in the Bejaia region of Algeria.<sup>22</sup> Data warehousing is a process of collecting, storing, and managing large amounts of data from different sources in one central place, making it easier to analyse and make informed decisions.<sup>23</sup> In this case, the researchers designed a system that could aid in selecting optimal health facility locations and specialities and in allocating healthcare staff and equipment.<sup>24</sup>

<sup>13</sup> Judy Kabubu, 'Artificial Intelligence (AI) in Kenya' (2021) <https://mman.co.ke/content/artificial-intelligence-ai-kenya> > Accessed 12 Jun 2023

<sup>14</sup> Frankline Mbogori Nkonge, 'Legal Challenges Facing Algorithmic Decision-Making in Kenya' (SSRN2021) <[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKewjz-tbln\\_qBAXVW2gIHHe9KDmUQFnoECAkQAQ&url=https%3A%2F%2Fpapers.ssrn.com%2Fsol3%2Fpapers.cfm%3Fabstract\\_id%3D3940381&usq=AOvVaw1UiqokoXtZgWCTBUV8YQIS&opi=89978449](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKewjz-tbln_qBAXVW2gIHHe9KDmUQFnoECAkQAQ&url=https%3A%2F%2Fpapers.ssrn.com%2Fsol3%2Fpapers.cfm%3Fabstract_id%3D3940381&usq=AOvVaw1UiqokoXtZgWCTBUV8YQIS&opi=89978449)> accessed 2023.

<sup>15</sup> 'Homepage - Tala' (Tala 2019) <<https://tala.co/>>.

<sup>16</sup> Mark Nasila, 'First National Bank Reimagine Risk Management Using AI' (CIO 2020) <<https://www.cio.com/article/193505/first-national-bank-reimagine-risk-management-using-ai.html>>.

<sup>17</sup> Mark Nasila, 'First National Bank Reimagine Risk Management Using AI' (CIO 2020)

<sup>18</sup> Judy Kabubu, 'Artificial Intelligence (AI) in Kenya' (2021)

<sup>19</sup> Mohd Javaid and others, 'Significance of Machine Learning in Healthcare: Features, Pillars and Applications' (2022) 3 International Journal of Intelligent Networks 58 <<https://reader.elsevier.com/reader/sd/pii/S2666603022000069?token=409AE7975A45F0563D03EF1447C5E0935C215AFE1D82AC41A512FD60F07A3EB83C034880D3E151E98026FF6D1A9A7D56&originRegion=eu-west-1&originCreation=20220712092151>>.

<sup>20</sup> Charles K Mutai and others, 'Use of Machine Learning Techniques to Identify HIV Predictors for Screening in Sub-Saharan Africa' (2021) 21 BMC Medical Research Methodology <<https://bmcmmedresmethodol.biomedcentral.com/articles/10.1186/s12874-021-01346-2>> accessed 14 Oct 2023

<sup>21</sup> Landry Signé, 'Strategies for Effective Health Care for Africa in the Fourth Industrial Revolution Bridging the Gap between the Promise and Delivery' (2021) <[https://www.brookings.edu/wp-content/uploads/2021/10/Strategies-for-effective-health-care-delivery-in-Africa\\_FINAL.pdf](https://www.brookings.edu/wp-content/uploads/2021/10/Strategies-for-effective-health-care-delivery-in-Africa_FINAL.pdf)>.

<sup>22</sup> Sebba Abderrazak and others, 'DW RHSB: A Framework for Optimal Allocation of Health Care Resources', *Proceedings of Engineering & Technology (PET)* (2016) <[http://ipco-co.com/PET\\_Journal/PETACECS2015/3.pdf](http://ipco-co.com/PET_Journal/PETACECS2015/3.pdf)>.

<sup>23</sup> Sebba Abderrazak and others, 'DW RHSB: A Framework for Optimal Allocation of Health Care Resources

<sup>24</sup> Sebba Abderrazak and others, 'DW RHSB: A Framework for Optimal Allocation of Health Care Resources

### iii. Agriculture

ADM in agriculture has significant potential to address African farmers' specific challenges, such as climate change, poor crop performance and poor soil conditions.<sup>25</sup> Algorithms generate personalised advice on optimal planting dates, crop selection, fertiliser usage, and pest management by analysing soil conditions, weather patterns, and crop performance data. ADM also provides farmers with automated marketing and distribution avenues, addressing existing market challenges. For instance, *Twiga Foods* uses Google Cloud technologies to manage an effective food value chain that directly links farmers with customers to deliver freshly picked local produce and improve food accessibility in Kenya.<sup>26</sup> The firm also uses AI and machine learning tools for efficient automated decision-making, such as product pricing and creating an efficient distribution and marketing system for farmers.<sup>27</sup>

In South Africa, researchers proposed a Bayesian network model to support decision-making on the viability of farming projects by determining their potential returns on investment.<sup>28</sup> This type of modelling tool is ideal in situations with scarce data and uncertainties, such as agriculture, as it includes expert analysis in the prediction mechanism.<sup>29</sup> The expert analysis was therefore useful in integrating socio-political and climatic conditions surrounding agricultural projects to make decisions.<sup>30</sup> Hello Tractor, which operates in Kenya, Nigeria and Uganda, is an innovative ADM application that aims to address challenges in the agriculture sector. They have deployed a platform that connects tractor owners with smallholder farmers who need tractor services.<sup>31</sup> The platform uses ADM algorithms to match farmers with available tractors based on location, availability, and specific agricultural needs.

### iv. Education

ADM systems can analyse student data, such as learning styles, strengths, and weaknesses, to generate customised learning pathways and improve student engagement and learning outcomes.<sup>32</sup> Angaza Elimu in Kenya uses artificial intelligence to provide customised learning experiences through its e-learning system.<sup>33</sup> M-shule, also founded in Kenya, uses AI and machine learning to assess progress and recommend content accordingly to learners across the country and Sub-Saharan Africa.<sup>34</sup> South African education platform Daptio provides personalised learning by understanding learners' needs and matching them with relevant content.<sup>35</sup> AI-based systems are also used in Education Management Information Systems (EMIS), such as the Kenyan-based iMlango system used to monitor attendance and provide personalised learning to pupils.<sup>36</sup>

<sup>25</sup>Sebaa Abderrazak and others, 'DW RHSB: A Framework for Optimal Allocation of Health Care Resources', *Proceedings of Engineering & Technology (PET)* (2016)

<sup>26</sup>Reena das Nair and Namhla Landani, *Making Agricultural Value Chains More Inclusive through Technology and Innovation* (UNU-WIDER 2020) <<https://www.econstor.eu/bitstream/10419/229262/1/wp2020-038.pdf>> accessed 15 Mar 2021.

<sup>27</sup>Twiga Foods Leverages Google Cloud Solutions to Streamline Food Supply Chain Operations | Food Business Africa Magazine' (*Food Business Africa* 14 October 2022) <<https://www.foodbusinessafrica.com/twiga-foods-leverages-google-cloud-solutions-to-streamline-food-supply-chain-operations/>> accessed 17 Oct 2023.

<sup>28</sup>Barbaros Yet and others, 'Evidence-Based Investment Selection: Prioritising Agricultural Development Investments under Climatic and Socio-Political Risk Using Bayesian Networks' (2020) 15 PLOS ONE <<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0234213>>.

<sup>29</sup>Barbaros Yet and others, 'Evidence-Based Investment Selection: Prioritising Agricultural Development Investments under Climatic and Socio-Political Risk Using Bayesian Networks'

<sup>30</sup>Barbaros Yet and others, 'Evidence-Based Investment Selection: Prioritising Agricultural Development Investments under Climatic and Socio-Political Risk Using Bayesian Networks' (2020)

<sup>31</sup>'Hello Tractor | Break Ground' (Hello Tractor) <<https://hellotractor.com/>>. Accessed 24 August 2023.

<sup>32</sup>Centre for Intellectual Property and Information Technology Law (CIPIT), 'How is AI Being Utilised in Africa: Mapping of AI Applications in Africa' (2021) <<https://cipit.strathmore.edu/artificial-intelligence/#1625830543653-9f9e3506-e2ba>> Accessed 12 Jun 2023.

<sup>33</sup>UNICEF, 'Angaza Elimu: Using AI for On-Demand Education | UNICEF Office of Innovation' (*www.unicef.org* July 2020) <<https://www.unicef.org/innovation/innovation-fund-angaza-elimu>>.

<sup>34</sup>'Mshule - Beyond School Walls: Inspiration from Disruption' <<https://resources.educationaboveall.org/sites/default/files/ngo/attachments/2020-08/07.%20M-Schule.pdf>> accessed 17 Oct 2023.

<sup>35</sup>UNESCO, 'Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development' (*Unesco.org* 2019) <<https://unesdoc.unesco.org/ark:/48223/pf0000366994>>.

<sup>36</sup>UNESCO, 'Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development' (2019)



## v. Public Administration

ADM is employed in Africa in public administration to enhance service delivery, optimise resource allocation, and improve governance. African governments use ADM to implement fundamental rights such as accessible and adequate housing. For instance, the Kenyan government uses an automated decision-making system to operationalise its affordable housing project through the online Boma Yangu portal.<sup>37</sup> The site, which is a component of the Credit and Risk Decision-Making (CRD) System, gathers device metadata, psychometric profile data, data from social networks and email, data from telecoms and utility service providers, and data from credit agencies to construct credit profiles on its own, which it uses to allocate users in the housing scheme.<sup>38</sup> In South Africa, the Department of Education in Gauteng relies on a fully automated decision-making system that considers proximity to schools and other factors to allocate students to schools efficiently.<sup>39</sup>

## ■ Challenges Facing Automated Decision-Making Use in Africa

This study identified various challenges faced in the application of ADM in the various industries on the continent, as discussed below. Some of the challenges, such as the gaps in digital skills, data and infrastructure, have been identified in prior research as a major crux in the adoption of various emerging technologies on the continent.<sup>40</sup> In the context of this research, this gap has a negative impact, particularly when high-risk data processing, such as facial recognition systems, are deployed in Africa by foreign companies aiming to use African data to improve their systems. A more favourable approach would be if African data, digital skills, and infrastructure were utilised to develop and enhance these systems locally, ensuring that the benefits and advancements remain within the continent and are aligned with the specific needs and ethical considerations of African societies. Notably, the most pressing challenges found include bias and discrimination, regulatory vacuums, responsibility gaps, and gaps in digital skills, data and infrastructure, as explored further below:

### i. Bias and discrimination

ADM applications can inherit biases and existing inequalities present in the data used to train them, leading to discriminatory outcomes.<sup>41</sup> This is because algorithms use data to release specific outcomes, which trigger actions that may not be ethically neutral.<sup>42</sup> This has been the case in South Africa, where black female entrepreneurs, considered too risky in loan eligibility decisions, are afraid that training AI models with these biased decisions will perpetuate discrimination against them due to biased historical financial and demographic data.<sup>43</sup> Bias is a major challenge facing the use of technologies that rely on 'big data', such as automated decision-making.<sup>44</sup> The concept of the old saying: 'garbage in, garbage out' applies in this new era of technological advancement, as systems' results depend on the quality of data they are trained on.<sup>45</sup>

<sup>37</sup>Alexander Beyleveld, 'Questions at the Interface between Automated Decision Making, Administrative Law and Socio-Economic Rights: The Example of Access to Affordable Housing in Kenya' (*AfricLaw* 18 March 2022) <<https://africlaw.com/2022/03/18/questions-at-the-interface-between-automated-decision-making-administrative-law-and-socio-economic-rights-the-example-of-access-to-affordable-housing-in-kenya/>> accessed 11 Jun 2023.

<sup>38</sup>Alexander Beyleveld, 'Questions at the Interface between Automated Decision Making, Administrative Law and Socio-Economic Rights: The Example of Access to Affordable Housing in Kenya' (*AfricLaw* 18 March 2022)

<sup>39</sup>Laura Chandler, 'A Legal Comparative Analysis of Automated Decision-Making and Reasonableness in Administrative Law' [2020] SSRN Electronic Journal.

<sup>40</sup>Haroon Borat and others, 'Digitalization and Digital Skills Gaps in Africa' (2023) <<https://www.brookings.edu/wp-content/uploads/2023/05/Bhorat-et.-al-May-2023-Digitalization-and-digital-skills-in-Africa-2.pdf>>.

<sup>41</sup>Council of Europe, 'Common Ethical Challenges in AI - Human Rights and Biomedicine - COE' (*Human Rights and Biomedicine*) <<https://www.coe.int/en/web/bioethics/common-ethical-challenges-in-ai>>.

<sup>42</sup>Council of Europe, 'Common Ethical Challenges in AI - Human Rights and Biomedicine'

<sup>43</sup>Nokuthula Olorunju, 'African Algorithmic Governance: Benefit of a Community-Based Approach' (*Research ICT Africa* 3 April 2022) <<https://researchictafrica.net/2022/04/03/african-algorithmic-governance-benefit-of-a-community-based-approach/#:~:text=There%20are%20also%20human%20rights>> accessed 16 Oct 2023.

<sup>44</sup>Natalia Norori and others, 'Addressing Bias in Big Data and AI for Health Care: A Call for Open Science' (2021) 2 Patterns 100347 <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8515002/#:~:text=A%20major%20challenge%20is%20that,to%20fatal%20outcomes%20and%20misdiagnoses.>>

<sup>45</sup>Monique F Kilkenny and Kerin M Robinson, 'Data Quality: "Garbage in – Garbage Out"' (2018) 47 Health Information Management Journal 103 <[https://www.researchgate.net/publication/324915855\\_Data\\_quality\\_Garbage\\_in\\_-\\_garbage\\_out](https://www.researchgate.net/publication/324915855_Data_quality_Garbage_in_-_garbage_out)>.

## ii. Regulatory Vacuums

Legal protections for ADM systems should include safeguards such as the right to be informed about the use of ADM, the right to contest decisions made by automated systems, and the right to data protection and privacy. Additionally, considering the high-risk nature of ADM, there should be requirements for conducting Data Protection Impact Assessments (DPIAs) to identify and mitigate risks to individuals' rights and freedoms.

Many African countries lack legal protections against rights violations arising from automated decision-making. For example, Chad, Cote d'Ivoire, Egypt, and Seychelles have no provisions for automated decision-making, while Uganda and Botswana provide it partially.<sup>46</sup> Countries such as Ghana lack the specific requirement for a DPIA in cases where data subjects' rights are in jeopardy.

Noteworthy, the use of automated systems to wholly or partially affect decision-making is a relatively new technological advancement, hence the lack of proper legal guidelines on the same. Unfortunately, in cases where users of automated decision-making systems face rights abuses such as privacy violations and bias, the dearth of proper legal protections leaves victims without legal remedies. Hence, these gaps in legal protections should be filled to provide an extra layer of protection for data subjects when using ADM systems.

Establishing these rights and legal protections is essential to ensure that individuals can trust and safely interact with automated systems. Without these measures, the risks of harm and injustice from ADM systems remain unaddressed.

## iii. Responsibility Gaps

Assigning liability for harmful or unfair outcomes is difficult when dealing with automated decision-making systems. Determining who is ultimately responsible for issues such as encoded bias is complex, as it may involve designers, operators, and users, highlighting the need for clear guidelines and regulations to address responsibility.<sup>47</sup> This complexity highlights the challenging nature of allocating responsibility, hence the urgent need for clear regulatory guidelines to effectively address the issue, by identifying each party's responsibility in case of rights breaches. For instance, the data protection law of Ghana identifies the principles of data security safeguards and accountability to guide the processing of individual data. Further, the Act empowers the Commission to compel a data controller to comply where a data subject brings a credible complaint of non-compliance.<sup>48</sup> However, these compliance orders only apply to data subjects and controllers.<sup>49</sup> As such, the accountability requirement does not extend to other parties, such as developers and users, exposing a responsibility gap.

The European Union's General Data Protection Regulation (GDPR) emphasises the principles of accountability and responsibility, stating that organisations are responsible for ensuring compliance with data protection rules, even when automated systems are involved.<sup>50</sup> Thus, it is clear that the multidisciplinary nature of ADM complicates the process of assigning responsibility in cases of rights breaches, which undermines accountability of perpetrators. This difficulty also leaves users of these systems and victims of rights abuses in a vulnerable position, exacerbating the injustices perpetrated by these technologies.

## iv. Gaps in Digital Skills, Data and Infrastructure

ADM applications require robust technical infrastructure, quality data, and skilled personnel. Unfortunately, digital skills literacy is a massive barrier to the general implementation of technology in Africa, where Sub-Saharan Africa has the lowest digital skills levels compared to the rest of the world,<sup>51</sup> with about 50% of the average global level of digital skills.<sup>52</sup>

<sup>46</sup>Data Protection Africa | by ALT Advisory' (*Data Protection Africa | ALT Advisory* 26 June 2023) <<https://dataprotection.africa/#map>> accessed 16 Oct 2023.

<sup>47</sup>Nicol Turner Lee, Paul Resnick and Genie Barton, 'Algorithmic Bias Detection and Mitigation: Best Practices and Policies to Reduce Consumer Harms' (Brookings Institute 22 May 2019) <<https://www.brookings.edu/articles/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/>>.

<sup>48</sup>Ghana Data Protection Act, section 41 (5)

<sup>49</sup>Ghana Data Protection Act, section 41 (6)

<sup>50</sup>Accountability | European Data Protection Supervisor' (edps.europa.eu) <[https://edps.europa.eu/data-protection/our-work/subjects/accountability\\_en](https://edps.europa.eu/data-protection/our-work/subjects/accountability_en)>.

<sup>51</sup>Kutoma Wakunuma and others, 'Responsible AI, SDGs, and AI Governance in Africa' (IEEE Xplore 1 May 2022) 1 <<https://ieeexplore.ieee.org/document/9845598>> accessed 21 Apr 2023.

<sup>52</sup>Payce Madden and David Kanos, 'Figures of the Week: Digital Skills and the Future of Work in Africa' (Brookings 2020) <<https://www.brookings.edu/articles/figures-of-the-week-digital-skills-and-the-future-of-work-in-africa/>>.

As a result, many machine learning models originating from powerful countries such as the United States and China take up the market share from African startups, gathering more data to optimise their models. In 2018, the Chinese company CloudWalk partnered with the Zimbabwean government to release a facial recognition system that would enable the government to enhance its surveillance and security capabilities.<sup>53</sup> Security responses based on decisions made using such a technology raise bias concerns.<sup>54</sup> Further, while CloudWalk received large amounts of photographic data from the government to optimise their models, the privacy rights of Zimbabweans were jeopardised.

In Africa, comprehensive and representative datasets are lacking, making it challenging to develop unbiased ADM tools.<sup>55</sup> Startups and individual developers cannot create or purchase datasets due to limited resources, further impeding the creation and deployment of ADM systems by Africans and for Africans. Therefore, Africa must address data accessibility challenges by building local data infrastructure and a proper policy framework for democratised data access.<sup>56</sup>

The foregoing challenges are addressed to some extent in the various regulatory frameworks discussed in the next section of this report, with a comparative examination of provisions from South Africa, Nigeria, Ghana and Kenya. However, various regulatory gaps exist, such as frameworks that fail to recognise ADM as a high-risk form of data processing, which would necessitate conducting data protection impact assessments.

## ■ Legal Provisions on Automated Decision-Making in African Countries

Existing legal provisions on automated decision-making on the continent emphasise the rights of data subjects in ADM by requiring transparency from data controllers and processors to enable data subjects to object to this form of processing where necessary. Data subjects are also granted the right to deny such automated processing after notification, the option to obtain data in machine-readable formats for easy transfer, and the ability to request a new decision not solely based on automated means. Further, the laws of Kenya, Nigeria and South Africa recognise automated decision-making as high-risk data processing; hence, they require data protection impact assessments. While each country's regulatory framework is unique, they share a common goal of safeguarding individuals' rights and offering remedies in case of breaches to promote responsible and ethical use of ADM systems.

The South African Protection of Personal Information Act (POPIA) states that a data subject cannot be subject to an automated decision with legal consequences through solely automated processing of personal information such as creditworthiness, location, health, personal preferences, or conduct.<sup>57</sup> The Act also requires data processors to provide data subjects with meaningful information about automated decision-making processes, enabling data subjects to contest decisions that they deem harmful.<sup>58</sup> Per the Regulations Relating to the Protection of Personal Information, information officers are tasked with conducting Personal Information Impact Assessments (PIIA) to describe the processing of personal information, its goal and extent, its necessity and proportionality, and identify any risks, mitigation strategies implemented.<sup>59</sup>

The Nigeria Data Protection Regulation (NDPR) of 2019 requires the controller to provide individuals with clear and understandable information about how their data will be used, including any automated decision-making processes and the consequences that the data processing might have on the data subject.<sup>60</sup> The Regulation also grants data subjects extensive rights to obtain data in a format that machines can easily read and enable inter-organisation transfer without obstacles from the previous data controller.<sup>61</sup> Nigeria's Data Protection Act also grants data subjects the right

<sup>53</sup>MISA, 'Digest: Facial Recognition Technology and Privacy Rights' (*Media Institute of Southern Africa Zimbabwe* 29 May 2018) <<https://zimbabwe.misa.org/2018/05/29/digest-facial-recognition-technology-privacy-rights/>> accessed 17 Oct 2023.

<sup>54</sup>Mark Rickerby, 'Supermarket Facial Recognition Failure: Why Automated Systems Must Put the Human Factor First' (*The Conversation* 22 April 2024) <<https://theconversation.com/supermarket-facial-recognition-failure-why-automated-systems-must-put-the-human-factor-first-228284#:~:text=Automated%20decisions%20and%20human%20actions>> accessed 10 July 2024.

<sup>55</sup>Qondi Moyo, 'AI Is Here to Stay! How Artificial Intelligence Can Contribute to Economic Growth in Africa - World | ReliefWeb' (*reliefweb.int* 23 June 2023) <<https://reliefweb.int/report/world/ai-here-stay-how-artificial-intelligence-can-contribute-economic-growth-africa>>.

<sup>56</sup>Qondi Moyo, 'AI Is Here to Stay! How Artificial Intelligence Can Contribute to Economic Growth in Africa

<sup>57</sup>Protection of Personal Information Act (POPIA), section 71 (1)

<sup>58</sup>POPIA, section 71

<sup>59</sup>POPIA (Regulations Relating to the Protection of Personal Information) 4(1)(b)

<sup>60</sup>The Nigeria Data Protection Regulation (NDPR), section 3.1(7)(l)

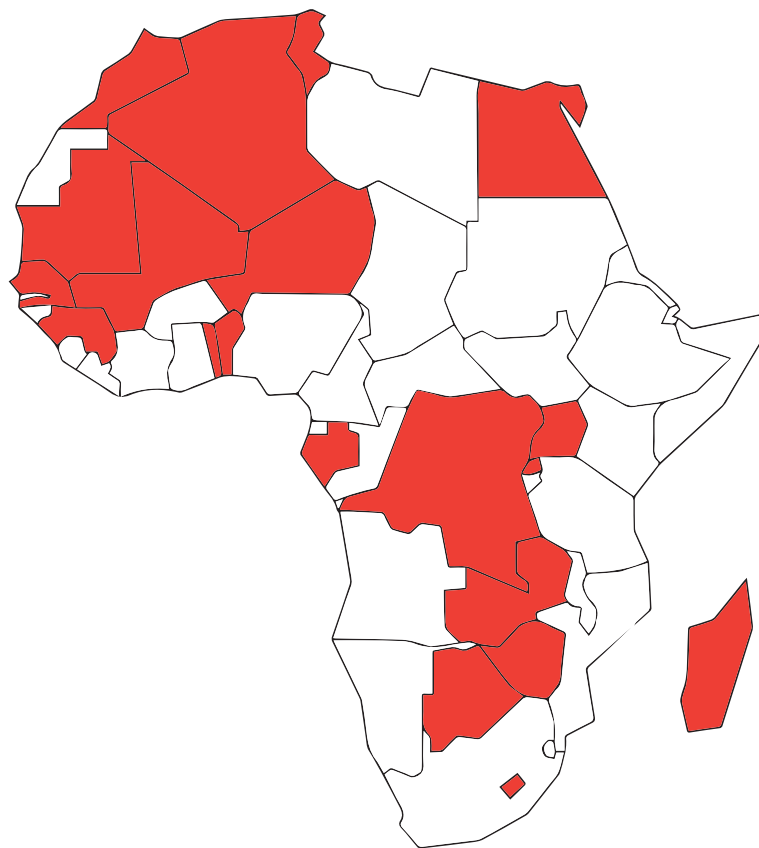
<sup>61</sup>NDPR, section 3.1(14)

not to be subjected to ADM<sup>62</sup> and directs data processors to conduct DPIAs where data subjects' rights are at high risk of violation.<sup>63</sup>

In Ghana, the Data Protection Act directs data subjects to, at any time, request information from the data controller concerning the processing of their data and for data controllers to ensure that any decision significantly affecting the data subject is not solely based on automated data processing.<sup>64</sup> Data controllers are also to notify subjects of any decision based solely on automated decision-making, enabling them to deny such processing after notification. As such, the law requires organisations to obtain consent to process personal data, ensuring fairness and transparency in ADM processes.

Section 35 of the Kenya Data Protection Act states clearly that every individual has the right not to be subjected to automated decision-making that has legal impact,<sup>65</sup> unless this process is necessary for a contract's performance or legally mandated reasons.<sup>66</sup> Data controllers and processors are also required to inform data subjects that they are making automated decisions based on their data, allowing data subjects to submit a request for a new decision that is not solely based on automated data processing.<sup>67</sup> The Data Protection General Regulations in Kenya call for a data protection impact assessment where data processing poses a high risk to the data subjects' rights and freedoms.<sup>68</sup> The Regulations identify ADM among activities considered to pose a high risk.

In addition to the foregoing laws, ADM provisions are also found in the laws of Algeria, Angola, Benin, Botswana, DRC, Egypt, Gabon, Guinea, Lesotho, Madagascar, Morocco, Niger, Mali, Mauritania, Rwanda, Senegal, Togo, Tunisia, Uganda, Zambia and Zimbabwe.<sup>69</sup> As part of this report, CIPIT in 2023 mapped and published ADM regulation and application in Africa.<sup>70</sup> The dashboard offers more insights into ADM provisions in these countries and would therefore not be discussed at length in this study.



<sup>62</sup>The Nigeria Data Protection Act 2023, section 37 (1)

<sup>63</sup>The Nigeria Data Protection Act 2023, section 28 (4)

<sup>64</sup>The Ghana Data Protection Act of 2012, section 41(2)

<sup>65</sup>The Kenya Data Protection Act of 2019, section 35 (1)

<sup>66</sup>The Kenya Data Protection Act of 2019, section 35 (2)

<sup>67</sup>The Kenya Data Protection Act of 2019, section 35 (3)

<sup>68</sup>Kenya - Data Protection Overview' (DataGuidance8 March 2023). <https://www.dataguidance.com/notes/kenya-data-protection-overview>

<sup>69</sup>Data Policy and Governance Centre - Centre for Intellectual Property and Information Technology Law' (CIPIT 22 October 2021) <<https://cipit.strathmore.edu/data-policy-and-governance-centre/#1698750527689-aa8b178b-0e0b>> accessed 10 July 2024.

<sup>70</sup>CIPIT 'Mapping of Automated Decision Making (ADM) in African Countries' available at <https://cipit.strathmore.edu/data-policy-and-governance-centre/#1698750527689-aa8b178b-0e0b>.

## ■ Analysis

From the foregoing, it is clear that ADM systems have emerged as powerful tools across various sectors in African countries, offering opportunities to streamline processes, enhance decision-making, and drive innovation. These systems, including ML and AI-based automated decision systems, have demonstrated the potential to revolutionise industries such as finance, healthcare, agriculture, education, and public administration by automating tasks and providing data-driven insights. For instance, government bodies often slowed down by bureaucratic decision-making paths, can benefit from automated systems that absorb data and produce results based on defined analysis methodologies. This would ensure that governance processes serve citizens at lower costs and at faster rates, improving citizen satisfaction. Thus, systems that assist or entirely conduct decision-making are vital to innovation, enabling African governments, businesses and users to enjoy improved efficiency and service delivery, ultimately contributing to economic growth and sustainable development.

However, the widespread adoption of ADM systems is not without its challenges. One key concern is the risk of bias and discrimination embedded in these technologies, as they can perpetuate existing inequalities and injustices in the data used to train them. The bias challenge is observed widely in using big data, where digitisation of decision-making is likely to digitise biases and discriminatory practices. Bias also arises due to the types, quality and amount of data used to train systems. For example, training an automated system for school placement without adequate data on people with disabilities is likely to lead to a situation where the system fails to consider the accessibility needs of students with disabilities. Moreover, financial decision-making systems trained to identify loan eligibility using data of only businessmen, are likely to declare businesswomen as ineligible for business loans. Therefore, the question of bias within decision-making systems is a key concern, which, if solved, would ensure efficient service provision for users.

The issue of responsibility gaps among designers and operators of ADM systems underscores the complexity of assigning accountability in the ADM ecosystem. The involvement of more than one party in developing and deploying these systems leaves users of these systems vulnerable to potential rights breaches without clear pointers to who is responsible for them. Hence, there is a need for designers, creators, and operators to adopt privacy by design and default practices and for comprehensive regulatory frameworks that hold every party responsible where necessary.

African countries are also facing digital skills, data, and infrastructure gaps as compared to other regions like China, Europe and the United States, which poses significant barriers to the effective implementation of ADM systems on the continent. Notably, the limited access to quality data and technical expertise, prevents the continent from fully enjoying the benefits of automated decision systems, pointing to the urgent need to invest in digital literacy and technological capabilities to bridge these gaps.

Regulatory and policy frameworks are pivotal in shaping responsible adoption of emerging technologies, including ADM. There is a notable gap in such regulatory provisions on ADM in African laws, raising concerns about bias and discrimination, as well as privacy and transparency in decision-making processes. Out of the 40 countries<sup>71</sup> with data protection legislation in Africa in 2024, about 36 countries have provisions on ADM in their data protection laws, including Algeria, Angola, Benin, Botswana, Burkina Faso, Cape Verde, Chad, DRC, Egypt, Eswatini, Gabon, Ghana, Guinea, Ivory Coast, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Niger, Nigeria, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Somalia, South Africa, Tanzania, Togo, Tunisia, Uganda, Zambia and Zimbabwe. In other countries, the lack of clear guidelines and safeguards on ADM leaves individuals vulnerable to potential harms without clear remedies, and without guidelines on the deployment of ADM systems.

---

<sup>71</sup>Africa Data Protection, *List of African countries with a dedicated data protection law* <<https://blog.africadataprotection.org/en/legislation/>> accessed 30 September 2024

## ■ Recommendations

### *i. Detection and Mitigation of Algorithmic Bias*

The successful use of ADM systems will rely on proactively removing biases by conducting bias impact assessments and audits, on both training data and the systems.<sup>72</sup> In doing so, designers and operators of ADM systems can ensure that AI and data-driven systems are adequately representative of the populations they impact and that they benefit Africans while upholding the principle of fairness.

### *ii. Develop reliable data infrastructure and quality datasets*

Reliable data infrastructure and datasets are essential for effectively deploying ADM systems. Governments and private sector stakeholders must invest in infrastructure development and promote rigorous data collection and classification to create reliable and representative datasets that can spur startups and individuals to develop robust ADM systems for African use.<sup>73</sup>

### *iii. Ethical and regulatory frameworks*

Ethical and regulatory frameworks to ensure responsible and ethical use of ADM systems are continually developed in African countries. These can be improved to explicitly address algorithmic bias, data protection, explainability, and accountability issues that arise in the use of ADM systems. By establishing clear guidelines and standards, African countries can create an environment that encourages adopting ADM while safeguarding individuals' rights and interests. Government policies on ADM must also require proof of safety and accuracy to minimise user harms, such as discrimination and breach of privacy rights. The African regulatory environment must also normalise the data protection impact assessments requirement for ADM systems that pose a risk to users to create stricter regulatory oversight over ADM.

The regulatory environment is only as functional as the ability of government bodies to enforce the laws. Hence, African governments must adequately resource enforcement bodies to enable them to flag, investigate, and issue guidance in case of rights breaches by ADM operators. For instance, a significant challenge facing the enforcement of existing laws on data protection and ADM is the lack of sufficient human and technical resources, which often renders proper enforcement impracticable. Therefore, increasing resources for these bodies to conduct more comprehensive audits, enforce regulations, and provide necessary legal guidance to data processors and controllers is essential.

### *iv. Sealing Responsibility Gaps*

To effectively address the challenge of determining responsibility for issues like encoded bias in algorithms, designers and operators of ADM must adopt a privacy-by-design and default approach. This involves integrating privacy considerations into algorithm design and operation to minimise the potential for breach of privacy of users. Sealing these gaps also requires clear regulatory guidelines on the accountability of parties, where designers and operators are held to a high standard of accountability by law. This approach would promote strict adherence to accountability and fairness in automated decision-making since all stakeholders would be held responsible for their role in preventing, detecting and mitigating rights breaches.

<sup>72</sup>Nicol Turner-Lee, Paul Resnick and Genie Barton, 'Algorithmic Bias Detection and Mitigation: Best Practices and Policies to Reduce Consumer Harms' (*Brookings* 22 May 2019) <<https://www.brookings.edu/articles/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms/>>.

<sup>73</sup>Abejide Ade-Ibijola and Chinedu Okonkwo, 'Artificial Intelligence in Africa: Emerging Challenges' [2023] *Social and Cultural Studies of Robots and AI* 101. <[https://link.springer.com/chapter/10.1007/978-3-031-08215-3\\_5](https://link.springer.com/chapter/10.1007/978-3-031-08215-3_5)> Accessed 24 Aug 2023.

## ■ Conclusion

Having explored various applications of Automated Decision-Making (ADM) across African sectors, it is evident that it plays a crucial role in improving efficiency and decision-making. While ADM has demonstrated significant benefits in finance, healthcare, agriculture, education, and government, it also raises concerns about perpetuating existing biases and potential human rights violations. The implementation of ADM systems must be carefully managed to address these issues.

Several African countries have enacted data protection laws to ensure transparency and accountability in ADM practices, including the South African Protection of Personal Information Act, the Ghana Data Protection Act, and the Kenya Data Protection Act. However, challenges remain, such as biased datasets, gaps in legal responsibility, and insufficient protections for individual rights. To address these challenges and promote ethical use of ADM, it is crucial to focus on mitigating algorithmic bias, investing in robust data infrastructure, and strengthening both ethical and regulatory frameworks.

This study was made possible by a grant provided by the William and Flora Hewlett Foundation. We thank the organization for their continued support.



© 2024 by Centre for Intellectual Property and Information Technology Law (CIPIT). This work is licensed under a Creative Commons Attribution – NonCommercial – ShareAlike 4.0 International License (CC BY NC SA 4.0). This license allows you to distribute, remix, adapt, and build upon this work for non – commercial purposes, as long as you credit CIPIT and distribute your creations under the same license: <https://creativecommons.org/licenses/by-nc-sa/4.0>