Artificial Intelligence. African Insight.

A Research Summary of the Ethical and Human Rights Implications of AI in Africa

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Introduction

Amidst the global race to develop guiding ethical principles and normative frameworks for the ethical use of artificial intelligence (AI), the availability of a comprehensive body of academic literature and research on AI within the African context has been limited. To address this, in 2020 the Human Sciences Research Council (HSRC) and Meta (formerly Facebook) announced a collaborative project and released a request for proposals (RFP) aimed at supporting interdisciplinary independent academic research throughout Africa in the field of AI, ethics and human rights.

A seven-person advisory board reviewed the proposals and, following a rigorous evaluation process, awarded eight research teams grants to conduct research. Awardees came from seven different African countries namely: Egypt, Ethiopia, Kenya, Nigeria, South Africa, Uganda and Zimbabwe. Local diversity was reflected in the research questions raised by the different projects. The variety of works these research teams have and will continue to produce can only stand the continent in good stead as Africa seeks to better understand the implications of AI and locally appropriate ways in which to leverage the technology for socio-economic development, while managing the risks and challenges of AI.

The eight projects fell into four broad themes, around which this report is structured.

1. The social impact and ethical challenges of AI in Africa;
2. AI and healthcare in Africa;
3. African approaches to AI ethics; and
4. Regulatory approaches to AI in Africa.

Collectively, the body of work produced to date represents one of the first comprehensive responses from the region in relation to complex questions regarding ethics, human rights and the social impact of AI, which have arisen from the growing reliance on AI systems in Africa by its governments, corporations and populations. Moreover, as AI becomes more entrenched within more sectors of African society, a distinctly African response that takes account of and elevates African contexts, experiences and value systems, is critical to mitigating potential harm to African communities. The profound impact of AI on Africa calls for this important interdisciplinary work to continue and to keep generating new knowledge and understanding around what AI means and the role it plays in relation to ethical value systems and the realisation of human rights in our African context. It is from this position that we adopt the report's title: *Artificial Intelligence. African Insight.*

This report aims to provide an overview of the salient points addressed and uncovered through research undertakings of each of the grant recipients. As a multi-country interdisciplinary research initiative, the perspectives and considerations range from assessments of digital lending practices in Kenya; to the adoption of rules by the Global North governing the deployment of autonomous weapons systems in Africa; to proposals of Africa-centric normative frameworks for human-centred AI design that consider respect, beneficence, non-maleficence, harmony, explicability and ethnic neutrality as alternatives to dominant themes of fairness, transparency and accountability.

Following a review of the work of research awardees, this report presents the key research priorities arising from this body of work in relation to AI, ethics and human rights in Africa, and offers some suggestions on further areas of research. A critical limitation of this work is that the research does not examine AI, ethics and human rights across the diverse geographic, linguistic and legal traditions of Africa, all of which impact policy making. Thus, support for more holistic research studies, should be a priority going forward to support greater regional knowledge-sharing, solidarity and cooperation in adopting African-centred AI and related policies.

Research Themes

The Social Impact and Ethical Challenges of AI in Africa

i. *Can Digital Credit in Kenya Be Made More Responsible?* (University of Nairobi, Kenya)

This research was a collaborative effort between the Institute for Development Studies, University of Nairobi, Institute for Advanced Studies, University College London and Lawyers Hub, Nairobi. The team investigated whether (and to what extent) AI may be reshaping access to and use of financial products and services in Kenya through automated risk assessments and leveraging non-traditional data by credit-lending institutions and banks. Mobile lending apps have increased in number and are hugely popular, with estimates of over 6 million Kenyans having borrowed at least one digital loan from the almost fifty mobile lending apps operational in Kenya.[1] Moreover, between 2016 and 2018, 86% of loans issued were digital and majority requested by males in urban areas.[2]

Such trends highlight the need to investigate the adequacy of transparency in automated lending decisions and the protection of app users and customers at each stage of the credit-lending process. For example, the team ask in their research: 'Do AI systems take automated credit decisions that consider the unique needs and vulnerabilities of unbanked populations, or do they lead borrowers to over-indebtedness?' and 'Can AI-driven banking address issues of defaults, over-indebtedness, high interest rates, short term nature of repayment terms and lack of transparency over data usage?'

The team's research highlights how digital lending has shifted the nature of lending in Kenya from mutual and informal obligations between family and friends, to more formalised obligations on borrowers towards lenders, where exploitation and power-imbalances between borrowers and lenders may arise, and where borrowers may be subjected to harsher penalties for non-payment of debt. Furthermore, alternative borrowing options may become limited, as despite the growing number of fintechs in Kenya, Safaricom practically holds a monopoly in the space.[3] Having sole control of the infrastructure that controls payment means repayments can be seized, leaving borrowers unable to access accounts or make payments through other avenues.[4] Moreover, as AI technology expands, the risks of having too many credit options and being able to borrow without a plan, purpose, or any traditional borrowing practice or history, may steer credit lending further away from being a helpful tool to accumulate assets, to something that is burdensome and limits access to other resources.

The research emphasises how personal data, as the building block of AI risk and creditworthiness assessment, must be utilised in a fair and transparent manner, and the need to adopt proper measures to protect user's data. AI has meant that data is not simply a binary tool to scan for red flags, but that can also study behaviour to ascertain credit worthiness. Digital credit uses automated assessments that examine a wide range of mobile data sources such as call logs, GPS, social network data and contact lists to inform credit risk assessments. However, contrary to popular perception that access to such data would enable highly sophisticated and personalised insights,

[1] Upadhyaya R, Weitzberg K & Bonyo L. "Summary Findings: Can Digital Credit in Kenya be made more responsible?" – from a presentation at AI and Ethics Human Rights Research Project for Africa Workshop, 30 September 2021.
[2] Ibid.
[3] Safaricom is the largest telecommunications provider in Kenya.
[4] Supra (note 1).

many mobile app algorithms are crude, non-individualised and are not in fact tailored to individual needs.

One individual interviewed as part of the research confirmed that the same people tend to receive loans, and that biases within the algorithms used in these apps tend to favour providing loans to men. The research thus recommends that policy makers, government institutions and industry stakeholders undertake intentional efforts to: include women and previously excluded groups through prioritising consumer protection, promote multi-agency collaboration, develop sector specific data/AI laws and policies, and address the (potentially harsh) treatment of individuals experiencing over-indebtedness.[5]

Digital credit can be limiting where behavioural analysis is shared with third parties who may use data for marketing and advertisement purposes, without considering the adverse consequences for marginalised groups. The team noted that in Kenya, regulation of this relationship between the collection of data and the effects of the tools such data is used to develop, has not been properly considered or addressed.[6]

The Kenya Data Protection Act[7] provides some protections for consumers, including: protections relating to automated data processing, data subject consent, accreditation requirements for data controllers and a consumer complaints processes. However, as a former policy maker stated: "The law is good [but] people are so poor [that] when you are given the option of clicking yes or no, people don't read terms and conditions."[8] Furthermore, there exists no overarching regulatory framework relating to lending, which means that anyone can provide lending services. Thus, short term lending, with characteristic quick profits and high default rates, is prevalent. Regulating digital lending requires a determination as to whether rules-based or outcomes-based approaches are preferable, and whether self-regulation or centralised regulation will create a sustainable lending environment.

The research concludes by emphasising that, overall, regulatory debates are moving in the right direction, provided several critical under-examined issues including high fees, consumer data protection, over-indebtedness and the inability of the unbanked to build independent financial histories, are addressed. Furthermore, the goal of financial inclusivity, specifically for women, should trump any advancements that will reinforce the financialisaton of the industry.[9]

ii. *Artificial Intelligence or Jobs: Which Way Forward For Africa?* (African Centre for Technology Studies, Kenya)

The African Centre for Technology Studies (ACTS) investigated dominant narratives on the role and impact of AI in Africa (on a country, company and worker level) and whether AI will contribute toward widening the gap between African countries and developed countries. The research explored issues ranging from the ability to leverage existing infrastructure and skills to take advantage of AI, to performance gaps induced by the use of AI and, most crucially, the potential of extensive job losses. Africa has a large unskilled working age population (15 to 64 year olds), which is expected to grow to over 1 billion people by 2030. Job loss fears are exacerbated by economies that consist of labour intensive and routine activities which have the highest potential for replacement by AI.[10] The aim of

[5] Ibid.
[6] Strathmore University CIPIT. "Privacy and Data Protection Practices of Digital Lending Apps in Kenya," (10 Feb 2021), p. 27. Available at https://cipit.strathmore.edu/privacy-and-data-protection-practices-of-digital-lending-apps-in-kenya-report/.
[7] Act 29 of 2019 (Kenyan Legislation).
[8] Supra (note 1).
[9] Ibid.
[10] Ongonga JO. "Innovation in the tea industry: The case of Kericho tea, Kenya." Global Journal of Management and Business Research, 13(1) (2013). Available at https://globaljournals.org.

ACTS's research was to generate evidence to test the validity of popular fears and perceptions around AI-driven job-loss on the continent. The research focused on four employment sectors within Kenya: healthcare, education, e-commerce and manufacturing.

Overall, the research demonstrated the need for policies and technical frameworks guiding the implementation of AI technologies in Kenya to support job creation and skills development. In particular, it found that the development of the technical capacity of the African workforce can be accomplished by addressing lack of data, infrastructure, investment in research and development, as well as skills and training. Furthermore, infrastructural improvement and internet penetration needs must also be addressed, particularly in relation to internet affordability, software and hardware costs, and power supply reliability.

Healthcare: The research identified the need to address uneven growth generated by the adoption of medical artificial intelligence (MAI) so as not to exacerbate the digital divide. Furthermore, the success of MAI includes its ability to contribute to information, research and service delivery that enables the sector to better serve a growing population with inadequate access to healthcare facilities or practitioners. However, MAI's predictive analysis, early detection and disease diagnostics abilities, must be measured against fairness, transparency and transitionary requirements. Other considerations include service delivery, as well as infrastructural, policy and legal challenges and the high cost of AI applications. The research highlighted the need for implementation of transitions to mitigate AI-induced job losses. In addition, funding and appropriate resources in the healthcare value chain, as well as collaborative decision making with stakeholders will serve to sensitise efforts to better integrate AI in the sector.[11]

Education: The research found that AI has improved the effectiveness of course content and collaborative and personalised learning, intelligent tutoring opportunities, smart content, teacher support, and efficiency in administrative processes. Furthermore, AI provides accessible and inclusive education, cost reduction (which can lead to poverty reduction) and shared prosperity through a reduced dropout rate in schools. Though job loss was seen as a real fear, there were other more pressing issues in the education sector including the cost of power, isolation and individualisation, technology addiction, the potential for AI systems to increase inequality among learners, and privacy and security concerns for children. A few AI success stories were revealed.[12] However, these existed only on a small scale. Overall, the research demonstrated that in education, the potential benefits of AI outweigh the potential risks.[13]

E-commerce: AI has become a cornerstone of the e-commerce sector, with investment in AI that automates decision-making and inventory management processes, as well as understands customer preferences and experiences. Job loss fears primarily relate to increased AI integration and automation of warehouse processes, as well as chat bots replacing customer service functions. However, the research found that retraining opportunities, capital investment in AI systems and hiring appropriately skilled personnel could offset potential job losses. Thus, while AI has changed the African e-commerce landscape with the potential for replacement of humans in the work force, job losses can be offset by other job creation opportunities and development of skillsets.[14]

[11] Ogada TPM, Ojenge W & Wanjau S. "Artificial Intelligence in Africa's health Sector – Impact on Jobs and the Sector's Development Gap" (forthcoming).
[12] In this regard, there are a number of success stories relating to AI in the education sector including those of M-Shule, Daptio, Eneza Education, SmartClass and Gradely.
[13] Ogada TPM, Ojenge W & Galia MA. "Artificial Intelligence or Jobs: Impact of Deployment of Artificial Intelligence in Education in Africa." (forthcoming).
[14] Ogada TPM, Ojenge W & Wanjau S. "Artificial Intelligence in Africa's Health Sector – Impact on Jobs and the Sector's Development Gap." (forthcoming).

Manufacturing: One of the most promising aspects of emergent technologies is AI's ability to automate, thus spurring marked increases in production efficiencies, processes, capabilities and ultimately cost reduction. Overall, the research (which assessed information from 15 African countries) found that while there are many opportunities for AI usage to increase efficiency, revenue, or save time, current fears around automation and high implementation costs may impact its adoption and usage. The research proffered measures to address these concerns including cost reduction, skills training and re-training, and all other underlying infrastructural issues.[15]

AI and Health Care in Africa

iii. *Artificial Intelligence in Healthcare in South Africa* (University of KwaZulu-Natal, South Africa)

The team from the School of Law, College of Law and Management Studies, University of KwaZulu-Natal conducted a comprehensive assessment of the socio-legal issues relating to AI in South Africa's (SA) healthcare sector. The main research question was whether SA's governance frameworks relating to AI in healthcare are aligned with international healthcare ethics principles and SA's constitutional commitments as set out in the Bill of Rights. The research explored the current governance landscape, human rights and ethical values applicable to AI in healthcare, and international developments in the governance of AI in healthcare. Three research papers addressing three different questions within this broad theme have been developed.

The first paper is titled 'How Artificial Intelligence Challenges Privacy, Autonomy, Bias, and Transparency and Whether Ethics Principles and Rights-Based Frameworks can Help in Addressing These Challenges'.[16] Here, AI and the role of ethics, law and rights as protection and transformation measures are considered. Findings included a need for risk assessment and mitigation measures to ensure that risks associated with ethical harms are managed as well as the application of a precautionary principle[17] in rolling out new AI technologies that present uncertainty and epistemic challenges to human rights.[18] Concerning privacy, the point is made that privacy losses (loss of privacy as a state of affairs) should not be conflated with privacy violations (violation of privacy as a legal or moral right).[19]

On data usage, a need for data trust,[20] and the consideration of altruistic data donation – particularly important for the health sector – were proposed, along with the setting of uniform standards to prevent the misuse of such personal data. The research also suggests countermeasures for AI-driven behaviour manipulation including the right not to be measured, analysed and coached. The research concluded that addressing bias and discrimination concerns required human-centric AI systems and a better understanding of human agency.

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[15] Ogada TPM, Ojenge W & Ayub MG. "Artificial Intelligence or Jobs: Which Way Forward For Africa? Case of Manufacturing Sector." (forthcoming).
[16] Townsend B. "How Artificial Intelligence Challenges Privacy, Autonomy, Bias, and Transparency and Whether Ethics Principles and Rights-Based Frameworks can Help in Addressing These Challenges." (forthcoming).
[17] This is intended to mean that, in the development of AI systems that are likely to present uncertainty and/or epistemic challenges to human rights, a higher degree of precaution may be necessitated. Thus, when the threat of harm of an AI technology is uncertain but likely, this would require, amongst other things, an assessment of the severity of the potential violation and the type of response necessary.
[18] Supra (note 16).
[19] Ibid.
[20] See: https://theodi.org/article/what-is-a-data-trust/.

In the second paper, titled, 'First Do No Harm: Legal Principles Regulating the Future of Artificial Intelligence in Health Care',[21] the regulatory framework in South Africa is examined to assess the extent to which current healthcare laws and policy align with international AI ethics principles and the values underpinning the South African Constitution. Four central legal issues were explored namely: the effective regulation of AI; the regulatory oversight mechanisms for registration of new AI health technologies; the ethics framework governing the use of AI by healthcare practitioners; and common law principles of liability for harm caused to a patient or user by AI technology.

The research highlighted the need for reform of regulatory oversight mechanisms and current ethical guidelines in the healthcare sector, the importance of guiding principles addressing civil liability for medical harm in an AI context, as well as (potentially) strict liability for AI operators and manufacturers of AI technologies. As SA has neither an overarching AI strategy nor laws governing AI or its usage, the importance of developing a 'home grown' human rights centred AI narrative in national policy and regulatory frameworks was emphasised. Lastly, the research demonstrated that present guidelines for health care practitioners should look at ways to encourage technological innovation, and that common law principles of fault-based liability for medical negligence may be insufficient to redress harms caused by AI technologies, and should be reviewed.

In the final paper on 'AI in Healthcare: Proposals for Policy Development in South Africa',[22] the argument that existing policy frameworks must be overhauled to encourage innovation is continued from the second paper. Five problematic areas requiring the adoption of a national policy framework are identified, namely: (i) outdated legislation; (ii) data and algorithmic bias; (iii) the negative impact of AI on the healthcare workforce; (iv) the imposition of the liability dilemma; and (v) lack of innovation and development of AI systems for healthcare in South Africa. Recommendations include: widening the ambit of the definition of a medical device to include general AI software in a healthcare setting; development of a new 'total product lifecycle' regulatory oversight mechanism; establishing an institution focused on ethical issues relating to AI, developing a national education and reskilling programme for the healthcare workforce; statutory intervention to address the imposition of liability for harm caused by AI; and establishing public sector institutions for patient electronic health records management, all to incentivise the development of AI for healthcare.

iv. *What Value is in the Code? Human Rights by Design in AI Governance* (University of Lagos, Nigeria)

This project had three objectives namely to: (i) understand human rights considerations in the design of AI-powered health-technology in Nigeria and Kenya; (ii) explore how these understandings affect or are likely to affect the operationalisation of human rights by design (HRsbD) in health-technology; and (iii) identify the policy approaches needed to implement HRsbD as a governance framework in Africa. Initial findings revealed that, though awareness of AI is on the rise, the use and deployment of AI in Kenya and Nigeria's healthcare sectors is relatively low. Tech hub managers and developers highlighted that though not yet fully active in the space, they were in the process of developing or deploying AI applications – a state of readiness to participate therefore exists. Two dominant themes of the research included: (i) low level of development and deployment of AI applications in the sector; and (ii) limited knowledge and awareness of human rights amongst the AI developer and designer community who have difficulties in explaining the concept of human rights and the link with AI solutions for healthcare.

[21] School of Law, College of Law and Management Studies, University of KwaZulu-Natal. "First Do No Harm: legal Principles Regulating the Future of Artificial Intelligence in Health Care" (forthcoming).
[22] Naidoo S, Bottomley D, Naidoo M & Thaldar DW. "AI in Healthcare: Proposals for Policy Development in South Africa." (forthcoming).

As part of the research process, a workshop was held to generate proposals for the implementation of HRsbD in AI by answering ethical questions relating to human rights challenges in health technologies, the identification and understanding of discriminatory risks in AI, privacy protection in the development of AI for healthcare and the development of human-centric AI in Africa. Key human rights risk factors outlined in the research included human rights violations resulting from the use of inadequate training data, particularly in relation to the stigmatisation and discrimination against individuals and communities. Furthermore, monitoring and surveillance, imbalances in power relations and hierarchies between data controllers/subjects, employers/employees and doctors/patients also play a role in violations.

HRsbD implementation measures set out in the research include: (i) technical measures that address anonymisation and abstraction, as well as federated learning techniques for machine learning algorithms; (ii) legal and regulatory review, development and simplification for better understanding of privacy and data protection rules by the designer community; (iii) ethical framework development including a data governance model for the healthcare sector and ethical guidelines on fair, transparent and explainable AI to avoid or minimise the risk of harm from AI systems; and (iv) capacity development, including through training of AI technical experts for understanding of AI ethics and integrating compulsory human rights courses into training of designers and developers.

The research found that these measures would aid the framing of AI challenges and solutions in human-centric terms, assist with understanding and compliance with HRsbD, as well as foster the development of responsible, inclusive and rights-respecting AI across Africa. Further research was recommended, to support the development of AI policy with an emphasis on ethics and liability rules, as well as expanding research into sectors such as finance and agriculture, to help understand the challenges of AI in Africa more generally.

African Approaches to AI Ethics

v. *Socio-Technical Considerations for the Design and Development of AI in Africa* (Addis Ababa Institute of Technology, Ethiopia)

The research team from the Addis Ababa Institute of Technology aimed to develop a deeper understanding of AI design, development and implementation and of the local cultural and social contexts shaping AI. Given the depiction of AI as capable of having a negative effect on deeply held social values, human dignity and wellbeing, the research sought to interrogate the potential ethical implications of AI in an African context, considering limited research on the subject matter. Given the potential of AI to disproportionately affect historically disadvantaged, marginalised and vulnerable groups, the study explored how culturally rooted ethical AI systems could be designed, developed and implemented in Africa.

The research gave recognition to the role AI is likely to play in shaping and impacting the global economy, culture and overall human activities, and at the same time, Africa's slow pace of innovation, and adoption of AI technologies, as well as localised AI ethics guidelines. The study also developed a contextualised African set of ethical principles comprising: respect for persons, beneficence, maleficence, harmony, explicability and ethnic neutrality.[23] It is hoped that since these principles fit well within the African socio-cultural context, grounding the design and development of AI technologies accordingly, may positively contribute to socio-economic development in Africa.

[23] Belay EG. "In Search of Context-Specific Ethical Principles and Values for AI in Africa." (forthcoming).

Another paper from the team examines how the advent of AI coupled with social media platform usage, has unleashed social justice challenges in the digital world, thus prompting the need for exploring social justice in the design and deployment of AI systems from an African perspective. With justice often being characteristic as determining what is fair, deserved and permitted, AI's algorithmic and data biases raise racial and gendered implications which can run contrary to these characteristics.[24]

In summary, researchers are convinced that AI has enormous potential to address some of Africa's chronic problems connected to efficiency and optimal use of resources. However, technical considerations for the design, development, adoption and use of AI-based systems in Africa identified through focus group discussions, key informant interviews and policy document review, reveal that issues that must be addressed, include, AI model adoption; AI biases; data availability, security and privacy; accuracy and quality of models; and the availability of AI resources.

This important study provides foundational input for policy formulation and AI capacity development endeavours, having recognised that AI is not necessarily ground-breaking *vis-à-vis* the technologies of the three prior industrial revolutions, but has merely substantiated production processes with more machine usage and less human intervention. What the research found has changed, is the accelerated speed and scope of transformation in a socio-economic context. To properly take advantage of this change in Africa, strategies need to be implemented to improve telecom infrastructure and to capture relevant data relating to African socio-economic activities. Moreover, a comprehensive AI policy and guideline is needed to regulate the development and adoption of AI systems as the technology matures, and unintended consequences are realised.

i. *Examining the Jus Ad Bellum – Jus In Bello Human Rights Law Dichotomy From an African Freedom Ethics Perspective: Towards a Comprehensive Response to Autonomous Weapon Systems* (Midlands State University, Zimbabwe)

This novel research by the Midlands State University investigated the extent to which autonomous weapon systems (AWS) can be fairly regulated by the laws of *jus ad bellum* and *jus in bello,* a field of international humanitarian law which is contentious within an African context. AWS are AI-powered robotic weapon systems that, once activated, can decide who to target, kill or harm without human intervention or control. As the research powerfully points out, people of colour and those from historically marginalised communities, are typically the targets of such technologies, or exploited in their creation.

Jus ad refers to the laws that govern the conditions under which one state may use force against the territory of another state. *Jus in bello* on the other hand, relates to the conduct of parties already engaged in a war or armed conflict and is intended to protect those not directly taking part in hostilities and regulates which weapons, means or methods of warfare are just and lawful.

The dangers AWS represents are obvious and present far reaching legal, ethical and security concerns. The research cautioned that from an African perspective, AWS is inconsistent with African values such as *ubuntu* and the African Union theme of silencing the guns.[25] While Western states have emphasised that the acceptability of AWS should be determined on the basis of *jus in bello* and, as the dominant framework being used to assess the legitimacy of AWS at present, the question becomes whether this approach is consistent or even relevant as an African benchmark?

[24] Belay EG. "Social Justice Considerations in Developing and Deploying AI in Africa." (forthcoming).
[25] See African Group of States Statement (April 2018). Available at https://reachingcriticalwill.org/images/documents/Disarmament-fora/ccw/2018/gge/statements/9April_African-Group.pdf.

No existing research explores the impact of AWS and *jus in bello* on historically marginalised groups, controversies surrounding ideas of global social justice and determining what amounts to 'acceptable use of force'. This research thus asks the question 'Will the use of AWS and similar technologies continue the exploitative trend of African people and other smaller nations?' Furthermore, the research explored how African values and standards have often been presented as ideas meant only to plug into existing global norms, which are not to be altered. This is so, even though the forums where *jus in bello* was conceived comprised imperial powers who were also determining how Africa was to be partitioned and subjugated.[26] Therefore, as a law seeking to humanise war, *jus in bello* also stems from a history of oppression and imperialism where military and Western needs trumped humane values and dehumanised non-western people. It is thus important that this history is not carried into AWS usage and deployment through the inadequacy of regulatory measures.

The research concludes that critical reflections of relevant African philosophies, ethics, traditions and values may shed different light on the acceptability of the use of AWS and other AI technologies, and require consideration as to whether the needs of African nations and other marginalised peoples have been adequately considered in developing global AI principles.

Regulatory Approaches to AI in Africa

ii. *The Cairo Charter: Urban AI in Africa for Social and Environmental Justice* (Smart and Future Cities Laboratory for Sustainable Urban Solutions (SFCL), Egypt)

A collaborative research effort between SFCL and the Urban AI Network[27] sought to develop a Charter that advances justice-driven AI in smart city planning and development in Cairo and beyond. Specific objectives included ascertaining how AI can play a role in enabling smart cities in Africa to be technologically equipped and ecologically sustainable, while also environmentally ethical and socially just. The Cairo Charter sets out guiding AI principles that can support smart city planners, regulators and innovators.

The Egyptian government plans to develop twenty smart, fourth-generation, cities in Egypt through the implementation of digitised infrastructure, services and planning. Research in the field has become especially urgent in Cairo, as it stands as one of the most polluted cities on the planet. The Charter is intended to serve as a framework for Urban AI[28] that advances ecological capacity and environmental and social justice as ways of ensuring equitable and ethical distribution of resources. Through workshops and 'designathons' that combined cross-sector expertise and knowledge, the team sourced principles, practices, protocols and policies for inclusion in the Charter. Furthermore, the workshops sought to identify: (i) what, where and why there are social and ecological challenges in Cairo; (ii) who the stakeholders working on Urban AI are and what tools they utilise; and (iii) what the potential use cases and problems of Urban AI might be. Key research objectives included assessing what Urban AI should (and should not) do, as well as what people want from the technology.

[26] Alexander A. "A Short History of International Humanitarian Law." *European Journal of International Law,* 111, (2015).
[27] A small global network of researchers that seek to map the implications of Urban AI advancements.
[28] Urban AI, in this context, serves as the crossroad between AI and the notion of Smart Cities – it comprises the sets of algorithms that learn from urban datasets and are used for solutions that are, or can be, deployed in a city. In particular, artificial neural network models, which rely on data extraction and validation, have developed as part of urban planning modelling approaches.

Outcomes of the research include building a network of AI experts, stakeholders and collaborators in Egypt and globally, on the problems and constraints of Urban AI, which include resistance by decision makers, lack of public awareness and a perception of AI as an exploratory tool. Furthermore, the research helped identify relevant players in the smart mobile space and the services utilised in Urban AI. Anticipated future challenges include inadequate digital skills, technical literacy, social preparedness, and infrastructure systems. Attention should also be paid to the impact AI may have on power cuts, unemployment rates, as well changes in traffic patterns and land usage. AI has many beneficial applications in smart cities including using its predictive capabilities to explore new development tracks, water and risk management, assisting with fire detection, enhancing security and being used in historic sites. What remains crucially important is to ensure there is equality in the opportunities of AI and that the services offered are inclusive.

As the Charter nears publication, research conclusions highlight that Cairo is unique in that it lacks core services and infrastructure in some parts but has intensive smart investment in others, an inequality which Urban AI could address. Moreover, Cairo's carbon dependent infrastructure continues to increase social inequity and a policy shift toward climate and social justice could help reorient the city by emphasising its connectivity, similarity and uniqueness. Thus, AI should focus on redistributive capacities, particularly in relation to data as Cairo needs a shared, open data pool that is not the exclusive tool of large companies or government. This will enable more actors to innovate more efficiently and strategically. Listed principles include the need for clarity, transparency, accessibility and public services – all with infrastructural standards that embrace culture, urban planning and technology.

iii. *Buying Ethical AI Solutions for Government: Why is Ethical Awareness in Public Procurement Important in the Deployment of Ethical AI Solutions in Uganda and Kenya?* (Uganda Management Institute, Uganda)

Governments represent the biggest market for AI solutions in Africa, taking into consideration public procurement spend as a percentage of GDP.[29] This raises questions about how decisions on buying these solutions for public use are made and what factors are considered. In particular, do AI procurement processes consider privacy and social concerns such as fairness, accountability, transparency as well as the ethics of AI usage and deployment? In contextualising the role of procurement processes, the research emphasised how officials involved in these decision-making processes have the power to protect millions of people who may have limited understanding of the potentially negative social impact of AI on their human rights, privacy and social ethos. As is clear in the project undertaken by ACTS in Kenya, AI may help address the most complex public challenges facing society today including in education, health, public infrastructure, agriculture and security, all of which require rigorous oversight from public officials procuring such solutions, as well as public transparency and accountability.

The research by the Uganda Management Institute involved a cross-country comparative analysis of AI ethics in Kenya and Uganda's public procurement systems and included a comprehensive survey of numerous public procurement actors involved in technology-based procurement, as well as a systematic evaluation of the procurement legislation and guidelines. This resulted in two publications that explored AI in supply chain management (SCM) and (the possibility of) human-centred AI for the public sector, with a focus on the gate keeping role of public procurement officials.

[29] Ghossein T, Islam AM & Saliola F. "Public Procurement and the Private Business Sector: Evidence from Firm-Level Data." *World Bank Policy Research Working Paper 8575* (2018).

In the former publication, it was found that, despite the exponential increase in computing power and availability of big data, the strategic adoption of AI within supply chain management is tentative. AI serves as an operational tool and is very much in a developmental stage, rather than a strategic one.[30] It was also found that explainable AI in SCM has significant potential but is currently limited by the capacities of firms to include humans in the AI decisions loop, with humans currently providing a monitoring, audit and validation input. Explainable AI therefore remains undeveloped and superficially addressed in literature and not well researched despite likely becoming a key enabler for digital SCM performance as AI systems become more complex.

The second publication[31] is an exploratory inquiry that gathers data amongst procurement practitioners in Uganda and Kenya (as both countries have similar procurement regimes). Findings from the study include that there is: (i) limited customisation in AI technologies; (ii) a lack of developed governance frameworks; (iii) little knowledge and distinction between AI procurement and other typical technology procurement processes.

Importantly, while procurement professionals recognise the significance of human-centred AI for the benefit and safety of the public, weak procurement legislation, as well as skills and knowledge gaps within the AI procurement teams limit the ability to facilitate a human-centred AI approach. A framework detailing how to embed human-centred AI principles into existing procurement processes was proposed by the researchers, with the aim of making procurement processes for AI and data base vendor solutions fairer, transparent and more accountable.

[30] Mugurusi G & Nagitta PO. "Towards Explainable Artificial Intelligence (XAI) in Supply Chain Management: A Typology and Research Agenda." *International Federation for Information Processing Advances in Information and Communication Technology*, volume 633 (2021).

[31] Nagitta PO, Mugurusi G, Obicci PA & Awuor E. "Human-centred Artificial Intelligence for the Public Sector: The Gate Keeping Role of the Public Procurement Professional." (forthcoming).

Further Research Areas, Priorities & Conclusion

Given the rich variety of research outputs, it is a challenging exercise to determine which of the many ideas discussed requires further attention and prioritisation. What is evident is that AI is a technology that will influence and reshape more obvious areas such as data usage and accessibility. However, it is also critical to understand and develop responses to less obvious areas such as environmental sustainability and harms caused by medical devices deploying AI.

Below are ten research areas identified as representing overarching priorities that merit more urgent attention by researchers, industry stakeholders, policy makers, government officials and those that AI technologies aim to serve, ordinary people.

- **African AI Ethics:** The development of ethical principles and guidelines governing the usage of AI technologies that are formulated based on African values and standards may generate responsible AI perspectives that extend beyond common understandings of fairness, transparency, and accountability, to address the specific AI-related challenges experienced on the Continent.
- **Historically Excluded and Marginalised Groups, and Women:** African histories of exploitation and colonisation, as well as marked levels of inequality, mean that a one-size-fits all approach to AI adoption is simply not possible. Particular attention should be paid to the way AI may exacerbate discrimination against historically excluded, marginalised and vulnerable groups, especially women. However, AI could also be a mechanism that can contribute to addressing such inequalities.
- **Liability:** The healthcare and AWS research highlighted that decision making processes are increasingly being outsourced to algorithmic processes. This raises questions as to who assumes liability when harms occur and whether existing laws adequately cater for or envisage the possibility of harms being caused by non-human agents.
- **Human Rights:** A substantial number of actual and potential human rights violations were identified in the research. Bias, discriminatory and exclusionary practices, as well as privacy and security concerns remain prevalent with increased adoption of AI. More research is needed to understand the wider human rights implications of AI in Africa beyond individual rights, such as the impact of AI on communal rights, including language, culture, the right to development and the right to a healthy environment.
- **Job Losses:** Job loss caused by AI-driven automation may very well be an inevitability, but also poses opportunities for those affected. As AI redefines the nature of industry and work, more research is needed to understand the wider impact of AI and automation on labour rights and access to the educational opportunities needed to adequately equip the workforce of the future.
- **Infrastructural Challenges:** One of the greatest barriers to the uptake of AI in Africa is infrastructural challenges. Findings from research teams showed that telecom infrastructure and reliable power supply are two significant limitations. Further research on the role of AI policies in facilitating infrastructure development and access to data, as core foundational elements of an equitable national AI ecosystem, is necessary.
- **Environmental Sustainability:** AI may come to play an important role in addressing environmental sustainability, by further emphasising the need for a policy shift toward climate and social justice. This is likely a microcosm of broader ecological and environmental harms and benefits that may arise from AI usage, and which require urgent attention from researchers and policymakers alike.
- **AI Governance and Data Governance Frameworks:** AI governance and legislative frameworks are still in an emergent stage in Africa. Thus, research on comprehensive ethical

and human rights-based frameworks that better assist stakeholders and decision makers in opting for responsible choices in the use and deployment of AI, will benefit all sectors. In addition, and to underlie AI strategies, comprehensive data governance frameworks regulating privacy rights and data protection, as well as responsible data sharing needed to build AI systems should also be expounded.

- **Skills and Knowledge gaps:** With a large unskilled working population that may be significantly affected by the automation processes afforded by AI, it is important that research addresses existing skills and knowledge gaps. While it is clear is that digital skills, digital literacy, technical training, and social preparedness is needed in the education system, from the grassroots to public officials, such efforts must also take into account the lived experiences of individuals, including women.

In conclusion, collectively, the body of research generated by the eight teams represented in this report, presents new and unique discourses, perspectives and perceptions of the ethical and human rights impact of AI in diverse African societies. This work has relevance not just on the continent, but globally, in understanding the differential impact, opportunities and challenges of AI. Much more research is needed to generate greater insights into the human rights and ethical implications of AI in different parts of the continent and on different sectors of society. Such research requires investment from African academic and research institutions, as well as research donors, to build capacity and provide access to opportunities for African researchers. Continued, collaborative efforts such as this one, will go far in strengthening Africa's voice in global debates and decision-making around AI.

Bibliography

- African Group of States Statement (April 2018). Available at https://reachingcriticalwill.org/images/documents/Disarmament-fora/ccw/2018/gge/statements/9April_African-Group.pdf.
- Alexander A. “A Short History of International Humanitarian Law.” *European Journal of International Law,* 111 (2015).
- Belay EG. “In Search of Context-Specific Ethical Principles and Values for AI in Africa.” (forthcoming).
- Belay EG. “Social Justice Considerations in Developing and Deploying AI in Africa.” (forthcoming).
- Strathmore University CIPIT. “Privacy and Data Protection Practices of Digital Lending Apps in Kenya,” (10 Feb 2021), p. 27. Available at https://cipit.strathmore.edu/privacy-and-data-protection-practices-of-digital-lending-apps-in-kenya-report/.
- Data Protection Act 29 of 2019 (Kenya).
- Ghossein T, Islam AM & Saliola F. “Public Procurement and the Private Business Sector: Evidence from Firm-Level Data.” *World Bank Policy Research Working Paper 8575* (2018).
- Mugurusi G & Nagitta PO. “Towards Explainable Artificial Intelligence (XAI) in Supply Chain Management: A Typology and Research Agenda.” *International Federation for Information Processing Advances in Information and Communication Technology*, volume 633 (2021).
- Nagitta PO, Mugurusi G, Obicci PA & Awuor E. “Human-centred Artificial Intelligence for the Public Sector: The Gate Keeping Role of the Public Procurement Professional.” (forthcoming).
- Naidoo S, Bottomley D, Naidoo M & Thaldar DW. “AI in Healthcare: Proposals for Policy Development in South Africa.” (forthcoming).
- Ogada TPM, Ojenge W & Wanjau S. “Artificial Intelligence in Africa’s health Sector – Impact on Jobs and the Sector’s Development Gap” (forthcoming).
- Ogada TPM, Ojenge W & Galia MA. “Artificial Intelligence or Jobs: Impact of Deployment of Artificial Intelligence in Education in Africa.” (forthcoming).
- Ogada TPM, Ojenge W & Wanjau S. “Artificial Intelligence in Africa’s Health Sector – Impact on Jobs and the Sector’s Development Gap.” (forthcoming).
- Ogada TPM, Ojenge W & Ayub MG. “Artificial Intelligence or Jobs: Which Way Forward For Africa? Case of Manufacturing Sector.” (forthcoming).
- Ongonga JO. “Innovation in the tea industry: The case of Kericho tea, Kenya.” Global Journal of Management and Business Research, 13(1), (2013). Available at https://globaljournals.org.
- Townsend B. “How Artificial Intelligence Challenges Privacy, Autonomy, Bias, and Transparency and Whether Ethics Principles and Rights-Based Frameworks can Help in Addressing These Challenges.” (forthcoming).
- Upadhyaya R, Weitzberg K & Bonyo L. “Summary Findings: Can Digital Credit in Kenya be made more responsible?” Presentation at HSRC/FB AI and Ethics Human Rights Research Project for Africa Workshop, 30 September 2021.
- School of Law, College of Law and Management Studies, University of KwaZulu-Natal. “First Do No Harm: Legal Principles Regulating the Future of Artificial Intelligence in Health Care” (forthcoming).