Africa Digital Governance and Law Review (ADGLR)

AI and Indigenous Cultural Sovereignty: Legal Protection against Algorithmic Extraction of Community Knowledge in Lesotho

[1] **Sophia Thabane***
Sociology and Social Work, Faculty of the Social Sciences, National University of Lesotho, Roma, Email: sophiathabane@gmail.com
[2] **Benjamin Okorie Ajah**
Sociology and Social Work, Faculty of the Social Sciences, National University of Lesotho, Roma, Email: ajahokoriebenjamin@gmail.com
[3] **Malefane Justice Matele**
Department of Sociology and Social Work, National University of Lesotho, Email: mmatele2@gmail.com

(*) Corresponding author, email: ajahokriebenjamin@gmail.com

Article history: |Submitted: 22nd March 2026 | Revised: 20th May 2026 | Accepted: 27th June 2026 |

ABSTRACT

Artificial Intelligence (AI) has revolutionised the creation, preservation and dissemination of knowledge, creating unique possibilities in terms of cultural documentation and creativity. However, the use of AI increasingly depends on massive data extraction efforts that include indigenous community knowledge without their free, prior and informed consent, hence undermining the cultural sovereignty of the indigenous community. In Lesotho, where the Basotho ethnic group has rich customary knowledge related to traditional medicine, folklore, oral tradition, agriculture and cultural expressions, the lack of a legal framework for the regulation of algorithmic extraction places communities at risk of cultural misappropriation and digital exploitation. This study assesses the adequacy of the legal protection of indigenous community knowledge from algorithmic extraction by artificial intelligence in Lesotho. By using doctrinal legal research, this study evaluates relevant constitutional provisions, intellectual property laws, customary law, international human rights instruments and scholarly literature on the subject matter. The findings of this study reveal that the current legal framework inadequately acknowledges the existence of collective property and digital rights over indigenous community knowledge.

Keywords: AI, Indigenous, Culture, Algorithmic, Community Knowledge, Lesotho

1. INTRODUCTION

One of the most revolutionary technologies of the twenty-first century is artificial intelligence, which has changed the ways of collecting, processing, storing, and

commercializing information[1]. Machine learning models require large datasets such as linguistic data, cultural stories, traditional medicinal knowledge, folklore, music, and other indigenous practices. In the case of Lesotho, the indigenous knowledge of Basotho people is an important cultural resource passed down from generation to generation through oral means, tradition, customs, and communities[2]. Basotho indigenous knowledge has a significant role in the conservation of biodiversity, traditional medicine, agriculture, conflict resolution, and cultural identity. According to UNESCO, the systems of indigenous knowledge are essential for achieving sustainability and cultural diversity[3]. However, the growing presence of AI in digital knowledge systems can lead to the unauthorised digitisation and commercialization of indigenous knowledge. Consequently, the theoretical connection between AI and Basotho indigenous knowledge should be analysed not only in terms of innovation but also in terms of law, ethics, culture, and human rights[4].

The development of artificial intelligence models entails algorithmic extraction, which is the automated process of collecting, processing, classifying and reusing vast amounts of data[5]. As indigenous knowledge captured in online archives, scholarly papers, audio-visuals, ethnographic data and digital culture is increasingly being included in the datasets used in AI without any consultation from the indigenous communities[6]WIPO notes that there are collective, intergenerational, and culturally specific characteristics that differentiate indigenous traditional knowledge from conventional intellectual property. The algorithmic extraction is known for disregarding the traditional ownership systems, thereby leading to commercialization without authorization[7]. For instance, indigenous traditional medicine, indigenous agricultural methods, oral literature, indigenous initiation rituals and ecological knowledge, among others, can be used in artificial intelligence models without any credit to the originating communities. The use of communities' intellectual property for profit purposes denies the communities the opportunity to engage in decision-

[1] Samuel Kakraba, Edmund Fosu Agyemang, and Sudesh K. Srivastav, "Cognitive Sovereignty and Decolonial Public Health: Reclaiming Epistemic Authority in the Global AI Era," *Frontiers in Public Health* 14 (2026): 1785170.

[2] Belay Sitotaw Goshu and Muhammad Ridwan, "Ubuntu, Algorithms, and Ancestral Epistemologies: A Systematic Review of AI–Indigenous Knowledge Integration in African Societies," *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal* 9, no. 2 (2026): 81–100.

[3] Cry Kuranga and Tlou M. Masenya, "Decolonizing Digital Technologies for Indigenous Knowledge Systems," in *2025 Conference on Information Communications Technology and Society (ICTAS)* (2025): 1–6.

[4] Nankyer Sarah Joseph and Amir Sa'ad, "Ethical AI in African Contexts: Data Sovereignty and Indigenous Knowledge Systems," *AUN International Conference* 3, no. 1 (2025).

[5] Elolo Emmanuel Agbenonwossi, "Decolonizing Artificial Intelligence Ethics: Ubuntu as a Philosophical Paradigm for AI Governance in Africa" (University of Malta, 2026).
Toussaint Nothias, "An Intellectual History of Digital Colonialism," *Journal of Communication* 75, no. 5 (2025): 385–397.

[6] Susan Brokensha, Eduan Kotzé, and Burgert A. Senekal, *AI in and for Africa: A Humanistic Perspective* (CRC Press, 2023).

[7] Golden Lwando Mwinsa, Benjamin Ferguson, and Frances Griffiths, "Data-Driven HIV Humanitarianism, Data Colonialism, and Data Ethics: A Sub-Saharan African (SSA) Perspective," *Law, Technology and Humans* (2026).

making about their knowledge[8]. This new emerging problem indicates the necessity of legislation to regulate the activities of AI developers.

The rapid growth of generative AI technology has raised serious apprehensions about algorithmic extraction, especially given that sophisticated language and imagery AI models can replicate, reconfigure, and commercialize indigenous cultural expressions on an unprecedented scale[9]. UNESCO reports and the United Nations Permanent Forum on Indigenous Issues have pointed out the possibility that AI technology could continue the historical trend of cultural appropriation, where indigenous knowledge is divorced from the original context of social, spiritual, and customary practice[10]. Documentation projects in Lesotho aimed at documenting Basotho culture could end up facilitating the access of AI technology developers who are beyond the scope of national control to the same cultural expression. Current AI technology does not make any distinction between freely available data and restricted cultural data that requires community consent. As a result, indigenous cultural practices, languages, symbols, and indigenous ecological knowledge could end up being incorporated into commercially produced AI products without any legal redress[11]. Moreover, the lack of any mechanism of AI governance means that indigenous communities have no chance to monitor data usage, question any unauthorized extraction, or enter any form of beneficial agreement.

The Republic of Lesotho has a well-defined system of laws covering constitutional law, statutory law, customary law, and international law; however, none of these laws offers comprehensive rules regulating the use of AI to extract the knowledge held by the indigenous communities of the country[12]. Even though the Constitution of the Kingdom of Lesotho protects the cultural rights of the Basotho people and recognises the customary system of laws, the current intellectual property law is still largely designed to protect the personal interests of individuals. Similarly, copyright, patents, and trade secret laws fall short when protecting the oral traditional knowledge and expressions of the communities from misuse by algorithms[13]. While the Convention on Biological Diversity, UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage and the discussions at the World Intellectual Property Organization on Traditional Knowledge offer some helpful guidelines, they have not yet been converted into effective legal regulations at a national level. Therefore, the Basotho people become vulnerable to the use of their cultural knowledge by way of

[8] Grace Ataguba et al., "Artificial Intelligence in Africa: Prospects, Challenges and Opportunities Based on Social Media Discourse," in *Proceedings of the 5th Biennial African Human Computer Interaction Conference* (2025), 165–185.

[9] Cry Kuranga and Tlou Maggie Masenya, "Convergence of Indigenous Knowledge Systems and Artificial Intelligence: Forging Pathways Between Indigenous Wisdom and Technological Innovation," in *Ethics, Justice, and Governance in the Age of AI and Digital Societies* (2026), 293–322.

[10] Mark Nasila, *Mastering Sovereign Artificial Intelligence: Owning and Shaping the Future in the Age of AI* (Jonathan Ball Publishers, 2025).

[11] Ibid

[12] Ibid

[13] Teboho J. Lebakeng and Andreas Velthuizen, *African Intelligence, Diplomacy and National Security: Statecraft Tools for Navigating an Insecure World* (Taylor & Francis, 2026).

digitisation, algorithm training [14], copying and dissemination without the communities' free, prior, and informed consent or benefit-sharing arrangements.

This study's uniqueness is that it takes into consideration the governance of AI, cultural sovereignty of the indigenous people, customary laws, and the digital protection of indigenous peoples' laws in the context of Lesotho. Prior literature on indigenous knowledge mainly focuses on biodiversity conservation, intellectual property, and cultural heritage, and little has been done concerning the legal effects of algorithmic harvesting through AI[15]. The uniqueness of this research is that it contributes to contemporary legal discussion by analyzing the challenges presented to collective ownership[16], customary governance, and digital sovereignty of Basotho indigenous knowledge by AI technologies. In addition, the research contributes to emerging literature by suggesting legal responses to AI-enabled exploitation of indigenous knowledge rather than traditional forms of cultural appropriation. Thus, the goals of this study are to analyze the connection between AI and indigenous cultural sovereignty in Lesotho; to assess the adequacy of national and international legal regimes that protect indigenous community knowledge from algorithmic extraction; to reveal the regulatory gaps that affect the collective indigenous rights; to explore the implications of AI-enabled knowledge appropriation for cultural preservation; and to develop policy recommendations that could address the issues.

2. METHOD

This research takes a doctrinal legal research methodology in exploring the sufficiency of legal protection available to prevent the algorithmic extraction of indigenous community knowledge using artificial intelligence in Lesotho. The research will use a qualitative research methodology in analyzing and interpreting primary and secondary doctrinal sources of law, such as legal rules, judicial principles, customary legal rules, and international regulations about indigenous cultural rights and AI regulation. The primary sources of law will include, among others, the Constitution of the Kingdom of Lesotho, the various intellectual property laws, customary law, case law, and international law treaties, such as the Convention on Biological Diversity, the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, and various World Intellectual Property Organization treaties about traditional knowledge. Secondary doctrinal sources will include peer-reviewed journal articles, textbooks, law reports, policy papers, government publications, UNESCO reports, WIPO reports, United Nations reports, and authoritative legal commentaries on AI regulation and indigenous rights. The data will be analyzed using doctrinal legal analysis, comparative legal analysis, and thematic content analysis.

3. RESULTS AND DISCUSSION

3.1. Conceptual Connection of AI and Lesotho indigenous knowledge

The conceptual framework represents the relationship that exists between artificial intelligence and the indigenous cultural knowledge of Lesotho [17]. The

[14] Ibid

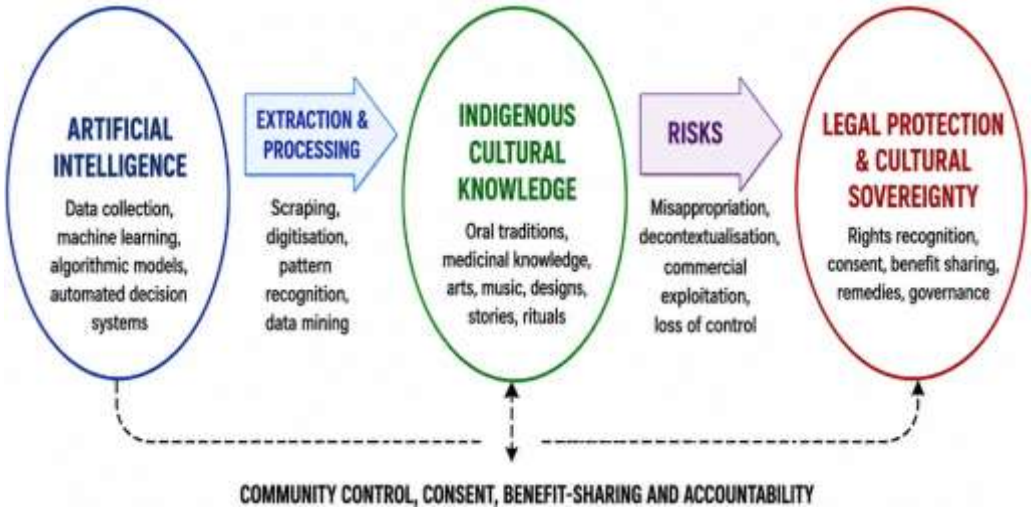
[15] Fochi Amabilis Nwodo, "Balancing AI-Driven Climate Data Analysis and Data Protection Rights in Africa," *African Journal of Legal Studies* 18, no. 1 (2026): 73–95.

[16] Ibid

[17] Yakub Burhan Abdullahi et al., "Empowering Health Sovereignty in Africa through Innovations for Self-Reliant Healthcare," *Discover Public Health* 22, no. 1 (2025): 770.

conceptual framework shows that the use of artificial intelligence technology leads to the algorithmic harvesting of community knowledge[18], thereby posing the risk of cultural appropriation and[19], thus, underscoring the need for proper legal protection[20].

Figure 1: Showing the connection of technology, indigenous knowledge and the laws



AI technology has revolutionized the acquisition, processing, storage, and dissemination of knowledge through its capability to accomplish processes that required human intelligence, like learning, predicting, reasoning, and natural language processing. Modern AI algorithms utilize large data sets acquired from digital libraries, published literature, audio-visual content, Internet sites, and cultural archives to enhance their efficiency[21]. Indigenous knowledge is a source of cultural heritage for Lesotho since it contains all the knowledge generated by the Basotho nation throughout generations. It includes oral traditions, indigenous governance systems, traditional medicine, agriculture methods, conservation practices, folklore, music, initiation rites, art, and religious beliefs that together form the culture of Basotho[22]. Indigenous knowledge differs from other types of information sources because it is collective, culturally oriented, and passed down based on customary laws. Therefore, the connection between AI and Basotho indigenous knowledge poses certain advantages and threats[23]. First, AI technology can be used for documenting threatened languages and recording oral history as well as raising cultural awareness. On the other hand, the threat lies in possible unauthorised access to cultural heritage and its commercial use. Thus, the link is not only technological but also legal, cultural, and ethical.

[18] Ibid
[19] Ibid
[20] Jason Hall, "Interconnected Consciousness: An Exploration of African Perspectives on the Meanings and Functions of Consciousness and Its Applications to Artificial Intelligence" (PQDT-Global, 2025).
[21] Metolo Foyet, "Using Digital and Rights-Based Approaches to Understand Institutional Linkages Between Social Media, Wildlife Activism and the New Conservation Movement in Southern Africa …" (University of Florida, 2025).
[22] Charles Prempeh, *Gender, Sexuality and Decolonization: A Socio-Philosophical Engagement* (African Books Collective, 2023).
[23] Ibid

Artificial intelligence works using highly complex computing mechanisms of data gathering, machine learning, pattern identification, natural language processing, predictive analytics, and decision automation[24]. To make these processes successful, artificial intelligence requires vast amounts of structured and unstructured data collected from various digital sources. As can be seen from the conceptual model below, the initial stage of artificial intelligence's interaction with indigenous knowledge consists of massive data collection and algorithm training, which implies the inclusion of cultural knowledge into digital data sets[25]. Nowadays, an increasing number of publications containing information on Basotho's healing techniques, ethnography, oral traditions, customary law, songs, proverbs, and indigenous knowledge about biodiversity are being digitized and published in electronic databases. Thus, there is an opportunity for AI creators to utilize this information for algorithm training without consulting indigenous communities[26]. While this trend undoubtedly facilitates technology development, it often neglects the issue of community ownership and cultural sensitivity regarding indigenous knowledge. Unlike any other information available for public use, Basotho cultural knowledge has its spiritual, historical, and communal value that cannot be turned into mere data[27]. Therefore, the reliance of AI on large amounts of data raises numerous legal and ethical issues.

The conceptual framework further illustrates that after collecting data, AI technologies go ahead with the extraction and processing of data using automated technologies such as web scraping, digitization, data mining, pattern recognition, and computation. Algorithmic extraction helps AI technologies to discover relationships, generate new data, reproduce traditional art forms, translate indigenous languages[28] and generate data that is generated through community knowledge. Though technology has great potential to provide learning and scientific opportunities, it also raises serious threats for the indigenous communities in Lesotho. Traditional medicine knowledge, oral narratives, religious rituals, indigenous music, designs, and customary practices can be taken out of the database and used in commercialized AI technologies without getting free prior informed consent from the originating communities[29]. Algorithmic extraction often takes cultural knowledge away from its socio-spiritual context, thereby losing the authenticity of cultural knowledge. In addition, AI technologists can earn large profits by commercializing the indigenous knowledge without considering the collective rights of Basotho communities. Therefore, algorithmic extraction makes communal cultural knowledge

[24] Ibid

[25] Deibi Sibrian, "Thriving Through Adversity: Ancestral Wisdom and Environmental Justice," *Environmental Justice* 18, no. 4 (2025): 278–290.

[26] Nai Lee Kalema, "The 'Digital Transformation for Development' Anti-Politics Machine: A Case Study on Global Digital Development Governance and Public-Sector Digital Transformation in Uganda," *Policy & Internet* 16, no. 4 (2024): 750–763.

[27] Trust Matsilele and Lungile A. Tshuma, *Generative AI in African News Media: Opportunities and Challenges* (Taylor & Francis, 2025).

[28] Keneilwe Masego Makgeledise, "4IR and the Readiness of the SADC Region: A Comparative Analysis of South Africa, Botswana, Namibia and Malawi" (PQDT-Global, 2024).

[29] Ibid

into commercialized digital assets and raises questions over existing legal principles of intellectual property, customary law, and indigenous cultural rights[30].

After algorithmic extraction, there are several risks that arise as a result of the AI-enabled exploitation of indigenous knowledge. Such risks include cultural appropriation, decontextualisation, commercialisation, unauthorised reproduction and the gradual loss of control by the indigenous communities of their traditional knowledge. Cultural appropriation arises when the use of AI reproduces the cultural expressions of indigenous people without acknowledging their history, spirituality and customs[31]. The process of decontextualisation goes further to isolate the indigenous culture from the context within which the cultural expression was generated, leading to the transformation of spiritual, ritualistic, medicinal and oral knowledge into information that can be used through algorithms. This risk is also evident when the outputs of the use of AI generate profit without any recognition and benefit going back to the indigenous communities[32]. Another risk lies in the loss of control by the indigenous communities of their cultural heritage, whereby they no longer have the ability to decide on the access, interpretation and dissemination of the knowledge they possess. Such processes pose great dangers to the Basotho people, and not only affect cultural identity but also the transfer of traditional knowledge between generations and customary governance[33].

Legal protection and cultural sovereignty make up the last component of the conceptual framework in ensuring the necessary balance between technological innovations and indigenous rights. Legal protection can be achieved when the indigenous communities are recognized as right-holders and are endowed with powers regarding the creation, management, utilization, and monetisation of their traditional knowledge[34]. From the conceptual framework, it is evident that legal protection should include rights recognition[35], free, prior, and informed consent, fair benefit sharing, access to legal remedies, governance, and accountability in the process of AI development. The foundation of community control, consent, benefit sharing[36], and accountability is a demonstration of how the governance of AI should not just entail regulation of technologies but should allow the Basotho communities to exercise cultural sovereignty[37]. This is consistent with the international standards being

[30] Rogers Rugeiyamu, Benedict Sulley, and Boniphace Kumburu, "Higher Education Response to Artificial Intelligence on Academic Integrity in Africa: A Systematic Review," *Innovation and Education* 7, no. 2 (2026): 139–160.

[31] Matthew Kelly, *Knowledge, Reading and Culture: Studies in Information Practice* (Walter de Gruyter GmbH & Co. KG, 2026).

[32] Gabriel Kabanda, "The ODL African Continental Education Strategy: Anchoring AI/Machine Learning on the African Technological Innovation and Investment Table." *West African Journal of Open and Flexible Learning* 10 (2), 33-96, 2022

[33] Nande Fose et al., "Empowering Distribution System Operators: A Review of Distributed Energy Resource Forecasting Techniques," *Heliyon* 10, no. 15 (2024).

[34] Michelle Pfeifer, *Data and Borders: Tracking Media Technologies of Migration Control in Europe* (New York University Press, 2022).

[35] Gianluca Iazzolino and Nimesh Dhungana, "Prediction and Data Curation in Digital Humanitarianism," *Big Data & Society* 12, no. 3 (2025): 20539517251361111.

[36] Serge Stinckwich et al., "AI Systems as Digital Public Goods Evidence and Recommendations from a Multi-Stakeholder Assessment," *arXiv* preprint arXiv:2607.03427 (2026).

[37] Ibid

developed to promote indigenous rights and ethical governance of AI technologies. Within the context of Lesotho, it would entail entrenching constitutional protections, recognition of customary law, improvements in the intellectual property framework[38], and specific legislation to regulate the extraction of cultural information via algorithms and AI.

3.2. AI and Algorithmic Extraction of Community Knowledge

AI derives community knowledge of indigenous populations using computational algorithms that detect, harvest, analyze and learn from huge amounts of digital information. Modern AI systems use the principles of machine learning algorithms, LLMs, NLP, web crawling, image recognition, speech recognition, and data scraping to create knowledge databases that can create human-like output[39]. UNESCO (2024) reported that more than 67% of cultural heritage collections in the world have been fully or partially digitized, making the indigenous cultural content easily accessible to AI developers. Similarly, WIPO (2024) noted the rapid growth of the digital databases containing traditional knowledge despite the lack of regulation on how AI training datasets should be legally used. Digitised data about Basotho folklore, songs, oral history, agriculture, law, medicine, and rituals in Lesotho becomes easily available for AI systems in academic databases, museums, governmental repositories, and online resources[40]. AI systems are able to detect patterns in these materials, reproduce cultural expression, and create output based on them without any interaction with the communities. Therefore, technological development has resulted in turning indigenous knowledge into a valuable digital resource while creating new threats for it.

Traditional medicine is one of the most vulnerable forms of indigenous knowledge that can be extracted using algorithms powered by AI. Indigenous medicinal practices across Africa have been extensively documented in scientific journals, ethnobotanical databases, pharmaceuticals and government research institutions[41], which have provided rich sources of data for machine learning applications. According to the World Health Organization (WHO, 2023), an estimated 80% of Africa's population uses traditional medicine as their primary healthcare, hence proving the significance of indigenous medicinal knowledge. Developers of AI use Natural Language Processing and web scraping to obtain data about medicinal plants, their formulations, applications, and techniques of using the same in the treatment of diseases from digitized sources. Algorithms based on machine learning then analyze this data to establish pharmacological connections that could advance pharmaceutical research and business ventures[42]. In Lesotho, traditional healers have a deep understanding of various medicinal herbs for curing respiratory illnesses, digestive issues, reproductive conditions, and livestock diseases. Once digitized,

[38] Morgan Mouton and Ryan Burns, "Digital Neo-Colonialism in the Smart City," *Regional Studies* 55, no. 12 (2021): 1890–1901.
[39] Tracy L. Johnson, *Domicile and Community: Stopping the Hegemonic Engine* (Tomorrow, LLC., 2025).
[40] Imad Antoine Ibrahim, Rafael Dean Brown, and Jon Truby, *Big Data Analytics and Its Impact on Basin Water Agreements and International Water Law: A Study of the Ramotswa Aquifer* (Brill, 2022).
[41] Alexis Henshaw, *Digital Frontiers in Gender and Security: Bringing Critical Perspectives Online* (Policy Press, 2024).
[42] Ibid

however, this indigenous knowledge can easily be utilized in AI-based training algorithms without seeking the consent of the Basotho community [43]. This compromises community ownership while enabling outside businesses to reap considerable financial gains from this knowledge without due recognition.

Moreover, AI technology captures indigenous languages, folklore, songs, oral history, and rituals using advanced speech recognition technology, Natural Language Processing, and Large Language Models that can analyze multilingual datasets. As per UNESCO Atlas of the World's Languages, about 40 per cent of 7,000 languages in the world suffer from different levels of endangerment; therefore, there have been several digital preservation efforts[44]. These efforts have resulted in large language databases that AI developers use to train multilingual language models. The Sesotho language of Lesotho is an expression of thousands of years of indigenous knowledge that has been captured through oral traditions, proverbs, praise poems, songs, folktales, initiation knowledge, and oral history[45]. With the help of speech recognition technologies, oral recordings can be converted to searchable text while Large Language Models learn from the digitized corpus the structure of the language, its vocabulary, idioms, and culture. AI technology can then recreate or reinterpret Basotho folktales, ceremonial songs, traditional stories, and ritual phrases without understanding their cultural importance or indigenous ownership[46]. Moreover, image recognition technology helps recognize ritual objects, sacred symbols, and ritual attire from digital images that are used by AI technologies to create culturally inspired visual outputs.

There is an increasing trend where agricultural knowledge, indigenous designs, cultural artefacts, and Basotho blanket designs are being algorithmically extracted using the methods of image recognition, computer vision, machine learning, and data mining. Indigenous agricultural knowledge includes practices such as crop rotation, drought-resistant cultivation [47], animal husbandry, seasonal prediction, soil protection, and biodiversity conservation developed by generations of collective experience. According to the Food and Agriculture Organisation (FAO, 2023), indigenous agricultural knowledge is crucial for building climate resilience and sustainable food systems globally [48]. In order to enhance precision agriculture technology, AI developers use analysis of digitized agricultural data sets. Likewise, image recognition algorithms analyze visual features of traditional Basotho blankets, beadwork, pottery, basket weaving, architecture, ceremonial attire, and indigenous artistic designs. Computer vision algorithms are used to identify repetitive geometric shapes, colours, motifs, and designs that are later replicated through AI-generated

[43] Ibid
[44] Esther Turnhout and Casey R. Lynch, "Raising the Carbonized Forest: Science and Technologies of Singularization," *Environment and Planning F* 4, no. 2 (2025): 111–123.
[45] Justin Bryant, "Africa in the Information Age: Challenges, Opportunities, and Strategies for Data Protection and Digital Rights," *Stanford Technology Law Review* 24 (2020): 389.
[46] Moritz Hennemann, Raymond Atuguba Akongburo, Sena Afua Dei-Tutu, and Patricia Boshe, *African Data Protection Laws: Regulation, Policy, and Practice* (De Gruyter, 2024).
[47] Ibid
[48] Ibid

products[49]. Although these kinds of technological applications promote innovative ideas, they do not understand that indigenous artistic designs have collective ownership protected by customary law and not by intellectual property laws.

The combination of data scraping, machine learning, web crawling, image recognition, speech recognition, natural language processing, and large language models has drastically transformed the way in which the indigenous communities' knowledge is acquired and exploited around the globe[50]. Recent reports by the OECD (2024) state that current models of AI are fed on trillions of words and billions of images gathered through publicly available digital resources, with the lack of clear documentation about the nature of datasets and indigenous consent[51]. In the same vein, UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021) stresses the need for AI governance to acknowledge cultural diversity, indigenous rights, transparency, accountability, and equal distribution of benefits at all stages of AI's lifecycle. In Lesotho, the process of digitizing the cultural heritage of the Basotho poses both cultural preservation possibilities and threats of algorithmic exploitation of this culture[52]. Traditional medicine, indigenous languages, folktales, music, stories, rituals, agricultural practices, cultural artefacts, the designs of Basotho blankets, and other artistic expressions of the indigenous community might be used for commercial purposes by AI models without the acknowledgement of collective intellectual property[53]. Effective governance therefore requires comprehensive legal frameworks that regulate AI data acquisition, recognise indigenous cultural sovereignty, strengthen community consent, and establish enforceable mechanisms for accountability, compensation, and equitable benefit-sharing.

Table 1: AI Techniques for Algorithmic Extraction of Basotho Indigenous Community Knowledge

Category of Indigenous Knowledge	**AI Extraction Method**	**AI Technology Used**	**Potential Risk to Basotho Communities**	**Required Legal Protection**
Traditional medicine	Data scraping from journals and databases	Machine Learning, NLP	Biopiracy, commercial exploitation, loss of ownership	Prior informed consent, benefit-sharing, sui generis protection

[49] Danwood Chirwa and Caroline Ncube, *The Internet, Development, Human Rights and the Law in Africa* (Taylor & Francis, 2023).
[50] Ibid
[51] Ife Adebara and Muhammad Abdul-Mageed, "Towards Afrocentric NLP for African Languages: Where We Are and Where We Can Go," in *Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)* (2022), 3814–3841.
[52] Vongai Chimeri, "Developing a Regulatory Framework for Electronic Commerce in the Southern African Development Community: The Prospects and Challenges" (Faculty of Law, University of Fort Hare, 2023).
[53] Ibid

Category of Indigenous Knowledge	AI Extraction Method	AI Technology Used	Potential Risk to Basotho Communities	Required Legal Protection
Indigenous languages	Speech digitisation and text mining	Speech Recognition, Large Language Models	Language appropriation, inaccurate cultural representation	Community linguistic rights and AI governance
Songs and oral traditions	Audio collection and transcription	Speech Recognition, NLP	Unauthorized reproduction and commercialization	Copyright reforms and customary rights recognition
Folklore, rituals and oral history	Web crawling and text extraction	Large Language Models, NLP	Cultural misappropriation and decontextualisation	Cultural heritage legislation and community consent
Agricultural knowledge, Basotho blanket patterns, indigenous designs and cultural artefacts	Image scraping and computer vision analysis	Image Recognition, Machine Learning	Commercial copying, AI-generated replicas, loss of cultural sovereignty	Indigenous intellectual property protection, AI accountability, equitable benefit-sharin

Sources: FAO[54], UNESCO[55], WHO[56] and WIPO[57]

This table illustrates how AI uses complex algorithms in obtaining Basotho traditional knowledge. Although these technologies help in bringing about innovation and digitalisation, some threats arise due to the misappropriation of culture[58], exploitation for commercial purposes and lack of community control, hence the need for strong laws.

[54] Food and Agriculture Organization (FAO), *The Status of the World's Land and Water Resources for Food and Agriculture: Systems at Breaking Point* (FAO 2023).
[55] United Nations Educational, Scientific and Cultural Organization (UNESCO), *Recommendation on the Ethics of Artificial Intelligence* (UNESCO 2021).
[56] World Health Organization (WHO), *WHO Traditional Medicine Strategy 2025–2034* (WHO 2025).
[57] World Intellectual Property Organization (WIPO), *The Protection of Traditional Knowledge: Updated Overview of Policy and Legal Developments* (WIPO 2024).
[58] Ainehi Edoro, *Forest Imaginaries: How African Novels Think* (Columbia University Press, 2026).

3.3. Legal Protection against Algorithmic Extraction of Community Knowledge in Lesotho

The law surrounding AI and indigenous cultural sovereignty in Lesotho is essentially contained in the Copyright Order of 1989. It is important to note that the law seeks to provide protection for what is termed as "expressions of folklore." Expressions of folklore are those creations which entail characteristics of traditional artistic heritage that have been created and preserved through generations by the Basotho people. According to Section 19, anyone who makes use of these expressions for purposes of deriving gain must obtain prior authorization from the Minister[59]. From this perspective, any form of algorithmic extraction whereby AI models are made to learn indigenous music, stories, or designs for commercial purposes would be considered illegal. The problem here is that this law does not provide provisions for algorithmic techniques of extraction, such as data scraping and neural network training. In other words, the law fails to capture modern forms of exploitation since the terminology used in the law is obsolete[60].

Protection is further available in the Industrial Property Order of 1989[61], which covers patents, designs, and marks. An essential clause in section 4(a), which excludes "discoveries, scientific theories and mathematical methods" from being patented, is of particular relevance since AI algorithms are mathematical methods[62]. As such, the clause bars the privatization of the logic behind the algorithm used by AI to extract or process community knowledge. Nevertheless, the clause cuts both ways because it not only prohibits other parties from owning the algorithm but also restricts the community's ability to use proprietary rights to protect their own community algorithmic process or technology[63]. On the other hand, industrial designs cover "the composition of lines or colors giving a special appearance to a product", and as such, they can protect the patterns from digital replication by AI. The newness clause in designs, however, poses an obstacle to sovereignty since it often conflicts with the evolutionary aspect of indigenous knowledge across generations[64].

The Constitution of Lesotho forms the highest legal document and offers a wider mandate for culture protection. It is stated in Section 35(1): "the state shall endeavour to ensure that every citizen has an opportunity to freely participate in the cultural life of the community"[65]. Most importantly, Section 35(2) stipulates the duty of the state to "adopt policies designed to protect the interests of any citizen in any scientific, literary or artistic production of which he is the author". Such constitutional principle confirms the sovereign rights of the Basotho community over their intellectual

[59] Ibid
[60] J. Osafo et al., "The Lancet Commission on Self-Harm," *The Lancet Commissions* (2024).
[61] Industrial Property Order of 1989
[62] Ibid
[63] David Gray Widder and Dawn Nafus, "Dislocated Accountabilities in the 'AI Supply Chain': Modularity and Developers' Notions of Responsibility," *Big Data & Society* 10, no. 1 (2023): 20539517231177620.
[64] Raymond J. Salanga, Judith S. Kahamba, and Edwin E. Ngowi, "Book Review: Challenging Global Development—Towards Decoloniality and Justice, Edited by Henning Melber, Uma Kothari, Laura Camfield, and Kees Biekart: 'A Review of Decolonial …,'" *The Sub-Saharan Journal of Social Sciences and Humanities* 1, no. 1 (2026): 1–16.
[65] Constitution of Lesotho

productions. In regard to AI, the provision might be viewed as the duty of the state to stop the algorithmic exploitation that excludes citizens from artistic productions. Nevertheless, Section 35 is the Principle of State Policy and cannot be enforced in the court, but is meant to be used in legislation. The commitment of Lesotho is also evident in the African Union (AU) Plan of Action on Cultural and Creative Industries. The continental strategy acknowledges that traditional knowledge is an important "inspiration" in initiatives to promote economic development and social inclusiveness. It calls on the Member States to protect intellectual property rights and increase copyright compliance by 10% over a period of ten years. Indeed, under Activity VI, states are called upon to ensure that their legislation is tested "to withstand creative abuse of intellectual property rights," which can be considered the predatory mining of culture through AI without compensation. Through this adherence to the AU plan, the community knowledge of Lesotho can be seen as part of the broader struggle against digital colonialism in Africa. However, the AU strategy is still aspirational and will need Lesotho to incorporate this strategy into its AI regulations.

Historical Monuments, Relics, Fauna and Flora Act of 1967[66] is yet another form of legal protection that applies only to physical items. The law protects "relics," which include drawings or paintings made on rock (petroglyphs) by Bushmen or other aboriginals. Although this act focuses on the physical damage or exporting of such objects, this law indirectly ensures that original sources of information from which AI can get cultural images are protected. In case the AI developer uses digital scans of such "protected relics" for commercial purposes without permission, this could be viewed as breaching the intent of Sections 9 and 10 that prohibit damaging or altering the artefacts. Nevertheless, it should be noted that the law is aimed at the physical location of objects, not the informational value they possess. This creates an evident "information gap" between the physical object and its digital copy. Finally, there are the Copyright Regulations of 2015 and the existing Society of Authors and Artists that act as the administrative bodies for the collection and enforcement of royalties. According to Section 32 of the Copyright Order[67], it is the role of the Society to "collect and distribute any royalties" to its members. In the age of algorithms, the institution could be employed as the gatekeeper of the community data, where access to cultural datasets would be licensed for training algorithms in return for benefits for the community[68]. However, at the moment, the Registrar concentrates on traditional media such as phonograms and broadcasts. In order for there to be real cultural sovereignty, these administrative bodies should be given powers to oversee the digital environment. Absence of such power allows the knowledge of the community to get into the global AI algorithms without any control, which goes against the "authorization" of the Basotho artistic heritage.

3.4. Issues and Challenges concerning Existing Legal Frameworks

The main problem is the obsolescence of statutory provisions such as the Copyright Order of 1989[69] due to technological changes. Statutory provisions in place today are based on the period of physical media and deal with issues of "reproduction

[66] Historical Monuments, Relics, Fauna and Flora Act of 1967
[67] Copyright Order
[68] Matthew N. O. Sadiku, *Emerging Technologies in Africa* (Walter de Gruyter GmbH & Co. KG, 2025).
[69] Copyright Order of 1989

in printed or analogous form of reproduction" and "distribution by cable." Algorithmic extraction uses a process that involves non-human elements and non-centralised computation, which do not fall under the term "person" or "legal entity" performing a work. In a situation where the algorithm extracts the knowledge of the community to create a new one, there would be creation of "derivative work" which is "inspired by expressions of folklore," but statutory law does not define when a work created by an AI constitutes an unauthorized transformation of community data. This gives a legal loophole to developers to claim "fair use" in the name of research or personal use with an aim of a commercial model[70].

The other problem lies in the lack of visibility in the process of algorithms. Existing systems require the "acknowledgement of source" of folklore, pointing out the community or geographical location of the source. However, AI models may become "black boxes," where particular training examples are hidden. In the case of Lesotho, if a traditional pattern from a particular community is incorporated into a global dataset, there is no way to force an international AI company to reveal its sources or prove the receipt of "written authorization" according to Article 22. The AU Plan of Action highlights such "lack of reliable cultural data" and "weak enforcement mechanisms" as the main threats[71]. This happens due to the poor institutions supporting the shift to the digital era by African copyright societies, which obtain less than 1% of global royalties. The third matter relates to the questions of ownership and authorship relating to works created through AI. According to the Industrial Property Order, the "inventor" enjoys the right to obtain a patent, while the creator of an industrial design has to be a person. There are no provisions in the current laws of Lesotho that would state whether a community could be considered as the joint author of AI-generated works, which have incorporated the collective knowledge of that community, or who would own the "residual sovereignty" of the extracted data[72]. This problem is aggravated by section 14 of the Act, according to which the rights assigned to an employer in the process of fulfilment of his or her duties allow tech companies to own the extracted "intellectual creation," while the source community obtains nothing[73].

There is also a serious disjuncture between cultural preservation and economic exploitation. Whereas the Constitution and 1967 Act are concerned about preservation, the Intellectual Property Order is interested in exploitation. This creates a scenario in which community knowledge is protected against being physically extracted, but at the same time digitally exploited without any coherent legal policy. According to the AU Plan of Action, most CCIs work in the "informal sector" without any financial aid and thus become vulnerable to "algorithmic extraction" of their

[70] Bishota Mary Wanjira Mbuthia, "Evaluation of the Legal and Regulatory Framework for Consumer Protection in Mainland Tanzania's Digital Economy" (The Open University of Tanzania, 2025).
[71] Raymond J. Salanga, Judith S. Kahamba, and Edwin E. Ngowi, "A Review of Decolonial Praxis in Development Studies," *Sub-Saharan Journal of Social Sciences and Humanities* (2026).
[72] Zimkhitha Manyana, "Amalgamating Liberal Democracy and Traditional Forms of Governance in Africa: The Case of the Kgotla System of Direct Participation in Botswana" (PQDT-Global, 2021).
[73] Haider A. Khan, "Africa as Part of the Global South: A Framework for Building Innovation Systems and Technological Learning in an Unevenly Developing Africa," in *21st Century African Development Strategies: Facing the Challenges with Innovative Approaches* (2026), 151–223.

knowledge by others[74]. In the absence of integrated legislation that treats "digital cultural data" as a sovereign resource, the informal digital economy becomes an area of algorithmic exploitation and not empowerment, failing the aim of the AU to utilize technology for global competitiveness of indigenous industries.

4. CONCLUSION AND RECOMMENDATION

Legal protection of women working in the informal digital economies of Kenya and Uganda necessitates a holistic approach where intellectual property rights are aligned to gender-sensitive economic policies. From the framework analysis, it is clear that women form the core custodians of traditional knowledge and craft in the two countries but are equally the most vulnerable in cases of algorithmic extraction and digital exploitation, as they form the majority of informal workers. In this case, it is advisable that "Traditional Knowledge Protections" that embrace collective ownership and also "Benefit Sharing Agreements" in the use of community-generated motifs or data be instituted by the two nations. Moreover, according to the AU Plan of Action, the government should offer "seed funding and innovative financial support" to women-owned digital start-ups so as to transition them from being just "data sources" to becoming "data owners". Increased capacity of national collecting societies to monitor the use of data digitally and collect royalties will enhance the "social and economic rights" of such women and make the informal digital economy sustainable for cultural indigenous sovereignty and gender equality.

References

Abdullahi, Yakub Burhan, Naima Ibrahim Ahmed, Sharmake Gaiye Bashir, Yusuf Hared Abdi, Mohamed Sharif Abdi, Omar Abdulkarim Saeed Alhammadi, Olalekan John Okesanya, Abdulmajeed Opeyemi Agboola, and Mohamed Mustaf Ahmed. "Empowering Health Sovereignty in Africa through Innovations for Self-Reliant Healthcare." *Discover Public Health* 22, no. 1 (2025): 770.

Adebara, Ife, and Muhammad Abdul-Mageed. "Towards Afrocentric NLP for African Languages: Where We Are and Where We Can Go." In *Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, 3814–3841. 2022.

Agbenonwossi, Elolo Emmanuel. "Decolonizing Artificial Intelligence Ethics: Ubuntu as a Philosophical Paradigm for AI Governance in Africa." University of Malta, 2026.

Ataguba, Grace, Oladapo Oyebode, Bilikis Banire, Fidelia Orji, Gerry Chan, Sandra Meier, George Frempong, and Rita Orji. "Artificial Intelligence in Africa: Prospects, Challenges and Opportunities Based on Social Media Discourse." In *Proceedings of the 5th Biennial African Human Computer Interaction Conference*, 165–185. 2025.

Brokensha, Susan, Eduan Kotzé, and Burgert A. Senekal. *AI in and for Africa: A Humanistic Perspective*. CRC Press, 2023.

[74] Witness Mudzamatira, "Spatial Information Technology and Heritage Management in the Southern Gauteng Province, South Africa" (PQDT-Global, 2020).

Bryant, Justin. "Africa in the Information Age: Challenges, Opportunities, and Strategies for Data Protection and Digital Rights." *Stanford Technology Law Review* 24 (2020): 389.

Chimeri, Vongai. "Developing a Regulatory Framework for Electronic Commerce in the Southern African Development Community: The Prospects and Challenges." Faculty of Law, University of Fort Hare, 2023.

Chirwa, Danwood, and Caroline Ncube. *The Internet, Development, Human Rights and the Law in Africa*. Taylor & Francis, 2023.

Edoro, Ainehi. *Forest Imaginaries: How African Novels Think*. Columbia University Press, 2026.

Food and Agriculture Organization (FAO), *The Status of the World's Land and Water Resources for Food and Agriculture: Systems at Breaking Point* (FAO 2023).

Fose, Nande, Arvind R. Singh, Senthil Krishnamurthy, Mukovhe Ratshitanga, and Prathaban Moodley. "Empowering Distribution System Operators: A Review of Distributed Energy Resource Forecasting Techniques." *Heliyon* 10, no. 15 (2024).

Foyet, Metolo. "Using Digital and Rights-Based Approaches to Understand Institutional Linkages Between Social Media, Wildlife Activism and the New Conservation Movement in Southern Africa …" University of Florida, 2025.

Goshu, Belay Sitotaw, and Muhammad Ridwan. "Ubuntu, Algorithms, and Ancestral Epistemologies: A Systematic Review of AI–Indigenous Knowledge Integration in African Societies." *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal* 9, no. 2 (2026): 81–100.

Hall, Jason. "Interconnected Consciousness: An Exploration of African Perspectives on the Meanings and Functions of Consciousness and Its Applications to Artificial Intelligence." PQDT-Global, 2025.

Hall, Jason. "Interconnected Consciousness: An Exploration of African Perspectives on the Meanings and Functions of Consciousness and Its Applications to Artificial Intelligence." PQDT-Global, 2025.

Hennemann, Moritz, Raymond Atuguba Akongburo, Sena Afua Dei-Tutu, and Patricia Boshe. *African Data Protection Laws: Regulation, Policy, and Practice*. De Gruyter, 2024.

Henshaw, Alexis. *Digital Frontiers in Gender and Security: Bringing Critical Perspectives Online*. Policy Press, 2024.

Iazzolino, Gianluca, and Nimesh Dhungana. "Prediction and Data Curation in Digital Humanitarianism." *Big Data & Society* 12, no. 3 (2025): 20539517251361111.

Ibrahim, Imad Antoine, Rafael Dean Brown, and Jon Truby. *Big Data Analytics and Its Impact on Basin Water Agreements and International Water Law: A Study of the Ramotswa Aquifer*. Brill, 2022.

Johnson, Tracy L. *Domicile and Community: Stopping the Hegemonic Engine*. Tomorrow, LLC., 2025.

Joseph, Nankyer Sarah, and Amir Sa'ad. "Ethical AI in African Contexts: Data Sovereignty and Indigenous Knowledge Systems." *AUN International Conference* 3, no. 1 (2025).

Kabanda, Gabriel. "The ODL African Continental Education Strategy: Anchoring AI/Machine Learning on the African Technological Innovation and Investment Table."

Kabanda, Gabriel. "The ODL African Continental Education Strategy: Anchoring AI/Machine Learning on the African Technological Innovation and Investment Table." *West African Journal of Open and Flexible Learning* 10, no. 2 (2022): 33–96.

Kakraba, Samuel, Edmund Fosu Agyemang, and Sudesh K. Srivastav. "Cognitive Sovereignty and Decolonial Public Health: Reclaiming Epistemic Authority in the Global AI Era." *Frontiers in Public Health* 14 (2026): 1785170.

Kalema, Nai Lee. "The 'Digital Transformation for Development' Anti-Politics Machine: A Case Study on Global Digital Development Governance and Public-Sector Digital Transformation in Uganda." *Policy & Internet* 16, no. 4 (2024): 750–763.

Kalema, Nai Lee. "The 'Digital Transformation for Development' Anti-Politics Machine: A Case Study on Global Digital Development Governance and Public-Sector Digital Transformation in Uganda." *Policy & Internet* 16, no. 4 (2024): 750–763.

Kelly, Matthew. *Knowledge, Reading and Culture: Studies in Information Practice*. Walter de Gruyter GmbH & Co. KG, 2026.

Khan, Haider A. "Africa as Part of the Global South: A Framework for Building Innovation Systems and Technological Learning in an Unevenly Developing Africa." In *21st Century African Development Strategies: Facing the Challenges with Innovative Approaches*, 151–223. 2026.

Kuranga, Cry, and Tlou M. Masenya. "Convergence of Indigenous Knowledge Systems and Artificial Intelligence: Forging Pathways Between Indigenous Wisdom and Technological Innovation." In *Ethics, Justice, and Governance in the Age of AI and Digital Societies*, 293–322. 2026.

Kuranga, Cry, and Tlou M. Masenya. "Decolonizing Digital Technologies for Indigenous Knowledge Systems." In *2025 Conference on Information Communications Technology and Society (ICTAS)*, 1–6. 2025.

Lebakeng, Teboho J., and Andreas Velthuizen. *African Intelligence, Diplomacy and National Security: Statecraft Tools for Navigating an Insecure World*. Taylor & Francis, 2026.

Makgeledise, Keneilwe Masego. "4IR and the Readiness of the SADC Region: A Comparative Analysis of South Africa, Botswana, Namibia and Malawi." PQDT-Global, 2024.

Manyana, Zimkhitha. "Amalgamating Liberal Democracy and Traditional Forms of Governance in Africa: The Case of the Kgotla System of Direct Participation in Botswana." PQDT-Global, 2021.

Matsilele, Trust, and Lungile A. Tshuma. *Generative AI in African News Media: Opportunities and Challenges*. Taylor & Francis, 2025.

Mouton, Morgan, and Ryan Burns. "Digital Neo-Colonialism in the Smart City." *Regional Studies* 55, no. 12 (2021): 1890–1901.

Mudzamatira, Witness. "Spatial Information Technology and Heritage Management in the Southern Gauteng Province, South Africa." PQDT-Global, 2020.

Mwinsa, Golden Lwando, Benjamin Ferguson, and Frances Griffiths. "Data-Driven HIV Humanitarianism, Data Colonialism, and Data Ethics: A Sub-Saharan African (SSA) Perspective." *Law, Technology and Humans* (2026).

Nasila, Mark. *Mastering Sovereign Artificial Intelligence: Owning and Shaping the Future in the Age of AI*. Jonathan Ball Publishers, 2025.

Nothias, Toussaint. "An Intellectual History of Digital Colonialism." *Journal of Communication* 75, no. 5 (2025): 385–397.

Nothias, Toussaint. "An Intellectual History of Digital Colonialism." *Journal of Communication* 75, no. 5 (2025): 385–397.

Nwodo, Fochi Amabilis. "Balancing AI-Driven Climate Data Analysis and Data Protection Rights in Africa." *African Journal of Legal Studies* 18, no. 1 (2026): 73–95.

Pfeifer, Michelle. *Data and Borders: Tracking Media Technologies of Migration Control in Europe*. New York University Press, 2022.

Prempeh, Charles. *Gender, Sexuality and Decolonization: A Socio-Philosophical Engagement*. African Books Collective, 2023.

Rugeiyamu, Rogers, Benedict Sulley, and Boniphace Kumburu. "Higher Education Response to Artificial Intelligence on Academic Integrity in Africa: A Systematic Review." *Innovation and Education* 7, no. 2 (2026): 139–160.

Sadiku, Matthew N. O. *Emerging Technologies in Africa*. Walter de Gruyter GmbH & Co. KG, 2025.

Salanga, Raymond J., Judith S. Kahamba, and Edwin E. Ngowi. "A Review of Decolonial Praxis in Development Studies." *Sub-Saharan Journal of Social Sciences and Humanities* (2026).

Salanga, Raymond J., Judith S. Kahamba, and Edwin E. Ngowi. "Book Review: Challenging Global Development—Towards Decoloniality and Justice, Edited by Henning Melber, Uma Kothari, Laura Camfield, and Kees Biekart: 'A Review of Decolonial …'" *The Sub-Saharan Journal of Social Sciences and Humanities* 1, no. 1 (2026): 1–16.

Sibrian, Deibi. "Thriving Through Adversity: Ancestral Wisdom and Environmental Justice." *Environmental Justice* 18, no. 4 (2025): 278–290.

Stinckwich, Serge, Natalie Wong, Ally S. Nyamawe, Jia'an Liu, Farhan Latif, and Jaimee Stuart. "AI Systems as Digital Public Goods—Evidence and Recommendations from a Multi-Stakeholder Assessment." *arXiv* preprint arXiv:2607.03427 (2026).

Turnhout, Esther, and Casey R. Lynch. "Raising the Carbonized Forest: Science and Technologies of Singularization." *Environment and Planning F* 4, no. 2 (2025): 111–123.

United Nations Educational, Scientific and Cultural Organization (UNESCO), *Recommendation on the Ethics of Artificial Intelligence* (UNESCO 2021).

Widder, David Gray, and Dawn Nafus. "Dislocated Accountabilities in the 'AI Supply Chain': Modularity and Developers' Notions of Responsibility." *Big Data & Society* 10, no. 1 (2023): 20539517231177620.

World Health Organization (WHO), *WHO Traditional Medicine Strategy 2025–2034* (WHO 2025).

World Intellectual Property Organization (WIPO), *The Protection of Traditional Knowledge: Updated Overview of Policy and Legal Developments* (WIPO 2024).