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Artificial Intelligence, Climate Change and the African Experience: Challenges, Resilience and Opportunities

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Public Perception of AI: Awareness and Trust in Artificial Intelligence (AI)

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Ubuntu in Artificial Intelligence (AI) Governance: Towards an Inclusive and Democratic Technological Future

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Introduction

Dr. Isaac Mutelo PhD
Editor

This special issue emerges from papers presented at the 2024 World Philosophy Day International Conference, held at Arrupe Jesuit University in Zimbabwe. This annual conference is often jointly organised by several universities in Zimbabwe, including the University of Zimbabwe, Arrupe Jesuit University, the Catholic University of Zimbabwe, Great Zimbabwe University, and St. John Fisher and Thomas More National Seminary. The 2024 conference was held under the theme "Artificial Intelligence, Climate Change and the African Experience: Challenges, Resilience and Opportunities".

The theme arose from the realisation that the African continent and its people face several complex challenges at the intersection of Artificial Intelligence [AI] and climate change. African leaders, policymakers, civil society organisations, and scholars must be at the forefront of advocacy and policy initiatives that seek to address the intersectionality of AI, climate change, and the lived experiences of African people. One of the primary challenges faced by Africans is the disproportionate impact of climate change. Extreme weather events, natural disasters, and environmental degradation often disrupt livelihoods, food security, and access to essential resources. Compounding these climate-related challenges are the concerns and opportunities presented by AI systems.

The 2024 World Philosophy Day Conference in Zimbabwe focused on the intersectionality of AI, climate change, and the African experience. This interdisciplinary conference featured 28 presentations by experts from various fields, including philosophy, and included presenters from outside Zimbabwe. The conference brought together scholars and researchers from different disciplines to deliberate on the intersectionality of AI, climate change, and the lived experiences of African people. The extent to which these global issues affect African communities, both on the continent and in the diaspora, and how they intersect with existing social, economic, and political contexts cannot be underestimated. This conference provided a vital platform for dialogue and collaboration, aimed at fostering solutions that address the unique challenges faced by African communities in the context of AI and climate change. This issue of JOCAP features key papers presented at the conference.

Exploring The Perpetuation of the Racial "Other" in the Environmental Justice Movement

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MA Candidate (University of the Western Cape, South Africa)

Abstract

This paper poses the question, "How do different philosophical perspectives of race contribute to a critical understanding of how the racial 'Other' is perpetuated in the environmental justice movement?" The grounding work is the book What is Race? Four Philosophical Perspectives, authored by S. Haslanger, C. Jeffers, Q. Spencer, and J. Glasgow. I will critically examine the intersection of racial theory and the environmental justice sphere. I will interrogate how race, as a political construct, results in a hierarchy by drawing on Sally Haslanger's argument. Additionally, I will consider how these notions of race help us to understand the role of race in the environmental justice movement. The study will delve into the historical and contemporary contexts of the environmental justice movement, emphasising how racial constructs have influenced its development and operations. The application of these approaches to race in the research will further clarify the mechanisms through which racial constructs perpetuate the concept of the racial "Other," further entrenched by environmental injustices. Through a critical analysis of theoretical frameworks and case studies, this paper aims to provide a comprehensive understanding of the perpetuation of racial "Othering" and offer insights for more equitable and inclusive environmental policies and practices. This paper contributes to the broader discourse on race, environmental justice, and social equity, advocating for a more intersectional and philosophically informed approach to addressing systemic injustices.

Keywords: Race, Racial "Other", Racial Constructs, Environment, Social Justice, Environmental Justice, Climate Change, Environmental Racism

Photo by John Cameron on Unsplash

Introduction

Since its emergence in the late 1960s, the environmental justice movement has become an important social effort to address climate change and its effects on both our environment and human civilisation [Schlosberg & Carruthers, 2010; Opperman, 2019]. Historically, this movement has been perceived as focusing on the protection of wildlife and the environment [Taylor, 2000]. However, the environmental justice movement has now become part of mainstream social justice discourse, as more people realise that environmental justice must also address the impacts of climate change on individuals and their livelihoods. In the past, the notion of environmental justice as social justice did not align, as different social markers, such as race, gender, and class, were not considered in terms of their effect on how people experience climate change and its impacts. Communities primarily composed of racialised individuals bear a disproportionate burden of the climate crisis [Bullard, 1993]. These groups often have limited access to ecological recreational spaces due to historical injustices, such as racial spatial planning, which confined racialised communities to areas with poor infrastructure and amenities. Consequently, they bear a heavier burden of air, waste, water, and environmental problems. In this way, race and the effects of racism particularly shape our notions of access, justice, equality, and how we experience the environment.

However, race and the impending ecological collapse are seldom considered to be interconnected concepts. Because climate change affects us all, it is suggested that something as divisive as race has no place in the movement, as it might hinder collective action on broader environmental concerns [Faber & O'Connor, 1993]. In contrast, racialised groups are affected in disproportionate ways due to historical and persistent inequalities arising from race. As Pellow [2005] states, it is evident that where social inequalities exist in society, environmental inequalities also prevail. This paper aims to bring the concept of race and the impending ecological collapse together in an effort to interrogate how racial constructs perpetuate the concept of the racial "Other" within the environmental justice movement. As noted above, this is an important task; drawing connections between race and environmental justice can better assist the movement in ensuring that its work is more equitable and adequately addresses the concerns of people marginalised because of race.

To do justice to this paper, I will begin by outlining Sally Haslanger's [2019] account of race, which advances the view of race as hierarchical, as this definition is the most suitable and plausible for the purposes of this paper. This will assist in illustrating how race is produced and, in turn, how the racialised subject is constituted. I will then provide a brief overview of the environmental justice movement and its history to contextualise its goals, the nature of the movement, and the key actors involved. Once this groundwork has been laid, I will attempt to explain the perpetuation of the racial "Other" in the environmental justice movement by examining the movement itself and the disproportionate effects of environmental racism on racialised communities. Lastly, I will present my proposal for a humanistic approach to environmentalism using Kimberlé Crenshaw's [1996] concept of intersectionality.

Understanding the Notion of Race

The debate on the nature of race has significantly evolved, with various scholars offering differing perspectives on whether race is biologically real or a social construct. The belief that race is biologically real has driven arguments that racialised groups are intellectually inferior; therefore, they cannot make erudite contributions to society [Fanon, 1952]. Additionally, a set of beliefs and practices aimed at "improving" the genetic quality of the population, namely eugenics, has also been based on and driven by the idea that race is biologically real [Foucault, 2003]. Therefore, we must pause and consider what we mean when we refer to race, because an incorrect understanding can be harmful. The definition I deem most plausible is that of Sally Haslanger [2000], who argues that race is a social/political construct in a similar way to gender, in that they are both shaped by hierarchical social structures and power dynamics. Gender is espoused around a social hierarchy that places men above women, and race is espoused around a social hierarchy that places white people over black people. This quote from Haslanger further explains this:

> **"There is overwhelming evidence that differences between racial groups in educational attainment, health outcomes, incarceration rates, and the like are due to the looping effects of social structures that impose a racial hierarchy"**
> [Haslanger, 2019: 23]

Haslanger's work is instrumental in understanding the foundations of how racial identities are formed and maintained, particularly in the context of systematic oppression, such as environmental racism. Haslanger's analysis is crucial for understanding how race operates as a tool for marginalisation within environmental justice contexts. Haslanger [2019] argues that Social/Political Race (SPR) is the core account of race, the most plausible, and the one that should be adopted. This paper employs Haslanger's [2019] SPR to better understand the concept of race. I will do this for two reasons. Firstly, Haslanger contends that race is not only a social construct but also a political one. Secondly, Haslanger's SPR account hinges on race being built on a hierarchy in which one group is privileged whilst the "Other" is subordinated. The abovementioned reasons do a significant amount of work in better demonstrating the making of the racial "Other" within the construction of the racialised subject.

Haslanger's SPR account of race is as follows: a group G is racialised relative to the context of C if and only if members of group G are (all and only) those: a) who are observed or imagined to have certain bodily features presumed in C to be evidence of ancestral links to a certain geographical region (or regions), for instance skin colour; b) whose having (or being imagined to have) these features marks them, within the context of the background ideology in C, as appropriately occupying certain kinds of social positions that are either subordinate or privileged, and so justifies and motivates their occupying such a position; c) whose satisfying (a) and (b) plays (or would play) a role in their systematic subordination or privilege in C, that is, who are, along some dimension, systematically subordinated or privileged when in C, and whose satisfying (a) and (b) plays (or would play) a role in that dimension of privilege or subordination.

Essentially, with Haslanger's [2019] SPR account, the idea is that races are racialised groups. They are bound by the geographical associations that accompany the perceived body types of the members of these groups, and when these associations take on a social meaning with regard to how members of different groups must be treated and viewed, this places the groups within a social hierarchy. For Haslanger [2002; 2019], skin colour is to race as binary sex is to gender: it is used as a basis for explaining why the hierarchy must exist and for rendering it justifiable. This is the defining feature of the political constructionist account of race and explains how, in Haslanger's characterisation of race, the racial "Other" is created and perpetuated. A racial subject is produced that deviates from and is distinct from the "normal" subject; hence, its subjugation is justified.

Haslanger's [2019] account offers the best way for us to understand the historical development of the making of race. This speaks to a history of racialisation, one that is accompanied by European imperialism. People with lighter skin colour, for instance white people, who are from regions in Europe and have ancestral links to Europe, are, because of their observable skin colour, seen as a superior human species and therefore as deserving of a higher position in society. They hold a position of privilege, while those who are not of their skin colour, namely black people, are assigned a more

Yellow brick road Creator: Magano, Patrícia Date: 2013 Publisher: Centro Português de Serigrafia Providing institution: National Library of Portugal Aggregator: National Register for Digital Objects Providing Country: Portugal Public Domain Yellow brick road by Magano, Patrícia - 2013 - National Library of Portugal, Portugal - Public Domain.

subordinate position in society. Their race ("whiteness") is used to justify their position of privilege, whilst for racialised groups their race ("blackness") is used to justify their subordinate position. As such, this position of privilege has allowed white people to colonise, dispossess, and subject others to race-based systems, such as apartheid laws. This, in turn, introduces a hierarchy in society in which white people are at the top, and racialised groups are positioned below them in varying degrees. Haslanger's [2019] political constructionist account offers a seamless explanation of the development of racial differences, the legacies of which are experienced in the environmental justice movement to this day.

This provides a smooth segue into another compelling facet of Haslanger's [2019] account. This account is best attuned to how race matters socially and better allows us to address issues of inequality. The presence of a hierarchy in society, in this case one perpetuated by race, breeds inequality. The hierarchy as described by Haslanger [2019] is an instance of social inequality, which leads to other forms, such as socio-economic inequality. Socio-economic inequality arises as some are seen as inferior or subordinate, whilst others are seen as superior, placing them in a position of privilege. With Haslanger's social/political constructionism, we are better able to explain the inequalities we observe in society. With this understanding, we can then address these issues of inequality by recognising that, for them to be resolved, we must first deal with the hierarchy. This account also proves to be better attuned to people's experiences of race, particularly those of racialised groups. They experience the perils of the hierarchy and bear its brunt in their everyday lives. They fall victim to race and must navigate life accordingly, whilst, on the other side of the racial divide, those privileged within the hierarchy enjoy positions of opulence and freedom, benefiting from advantaged lives economically, politically, environmentally, and in other ways. Take, for instance, how black people were forced to live in underdeveloped townships while having

to work in developed, affluent suburbs. They were stark victims of race; however, they still had to navigate life and essentially "get over" the disparities between their lives and those of the white families for whom they worked.

Lastly, Haslanger's [2019] social/political constructionism emphasises the importance placed on hierarchy when it comes to race by the general public. This stands in contrast to other social constructionist scholars, such as Chike Jeffers [2019], who believe that importance is placed on culture. Jeffers' [2019] view is important for understanding how race may remain significant once hierarchy is dismantled. However, when discussing how race has impacted the public, understanding hierarchy is of greater importance. This can be attributed to the effects and influences of race on people's lives, in particular on racialised groups, who have received the short end of the stick in terms of their position within the racial hierarchy. Viewing race in this way is helpful because it allows for a clearer understanding of the systematic injustices that racialised people face. The political social constructionist account of race reveals race as a system of power, one that has placed value on members of white society whilst devaluing those who are not part of that society. With the understanding that those who fall outside the ambit of white society are disadvantaged, broader society can begin to pave the way forward regarding what reparations should look like. Haslanger's [2019] account of race is therefore appealing for projects of social justice, as it provides a coherent understanding of the origins of race and how to address its hierarchical legacies. Haslanger's account suggests that with the fall of racial hierarchy will come the fall of race itself. This implies that the elimination of inequalities between different racial groups would amount to the elimination of racial classification. Race survives on the notion that white people are superior and should be privileged, whilst black people are inferior and should be subordinate. With the elimination of this notion, the concept of race would serve no purpose; as the hierarchy would no longer exist, race itself would cease to exist.

As a system of hierarchy and social repression, race is not only destructive but also produces a particular kind of discourse, which "activates or forms the subject" [Butler, 1997: 84]. From Haslanger's conception of race, we can deduce that a racialised subject has been produced, a subject we might call the racial "Other". This is because this subject is distinct from the "normal" subject, who enjoys a privileged position within the hierarchy. To clarify this further, it is necessary to understand and define what the "Other" looks like. "Othering" refers to a process in which, through discursive practices, different subjects are formed: hegemonic or privileged subjects, that is, subjects in powerful social positions, as well as those subjugated to these powerful conditions [Thomas-Olalde & Velho, 2011]. In the case of racial "Othering", different racial subjects are formed, with some occupying privileged social positions while subjugating those who are subordinate to these powerful conditions. Racial groups with darker skin colour, who are systematically differentiated and marginalised, are positioned as inferior and are often not afforded the same rights, opportunities, and resources as racial groups with lighter skin colour [Whyte, 2018]. This process of racial "Othering" is deeply etched into society, and in the sections that follow, I will explore how it emerged within the environmental justice movement.

Protesters preventing trucks filled with soil contaminated by polychlorinated biphenyl (PCB) from reaching the proposed Warren County landfill in Afton, North Carolina, September 1982
Credit:Ricky Stilley/Henderson Dispatch
On: https://www.nrdc.org/stories/environmental-justice-movement

The Environmental Justice Movement

Having defined race through the lens of Haslanger [2019] above, it is important to contextualise the environmental justice movement. Environmental justice activists and communities began turning their attention to environmental issues as a result of Hurricane Katrina; however, concerns about climate change and its impacts have long been present within the environmental justice movement [Schlosberg & Collins, 2014]. The emergence of the movement has been traced by many academics and activists to the 1982 protests against the disposal of PCB-tainted soil at a new landfill in Warren County, North Carolina [Schlosberg & Collins, 2014]. The movement emerged as a response that sought to address the unequal impacts of environmental hazards on communities, with particular attention paid to how these hazards disproportionately affect marginalised communities. Since the 1980s, the movement has grown from addressing environmental issues in isolation to becoming a global movement that highlights how local environmental inequities translate into global environmental inequities [Taylor, 2000]. Additionally, the movement has expanded into one that confronts global environmental challenges, such as the climate crisis itself, and advocates for structural and systematic changes to address the impacts of climate change, which continue to be exacerbated by other forms of inequality, such as race.

As such, it can be asserted that the roots of the environmental justice movement extend back to the activism of the 1980s, which exposed the unequal distribution of the burdens of environmental hazards and climate change towards racialised communities. This activism focused on revealing the systematic inequalities and discriminatory policies that disproportionately exposed these communities to pollution and other environmental risks [Schlosberg & Collins, 2014]. As awareness of climate change and its impacts on marginalised populations grew, the environmental justice movement expanded to incorporate global environmental issues and their effects.

The first generally acknowledged reference to climate justice appeared in a 1999 report titled Greenhouse Gangsters vs. Climate Justice, published by the Transnational Resource & Action Center [Bruno et al., 1999]. The report focused on the oil and petroleum industry as the largest contributor to the climate crisis and outlined approaches for responding to it. Tokar [2019: 4] succinctly summarises the key points of the report as follows:

> **"Addressing the root causes of global warming by holding corporations accountable; Opposing the destructive impacts of oil development and supporting communities most affected by weather-related disasters; Looking to environmental justice communities and organised labour for strategies to encourage a just transition away from fossil fuels; Challenging corporate-led globalisation and the disproportionate influence of international financial institutions."**

This report marked a shift from addressing local environmental hazards to confronting global environmental issues and their root causes. Environmental justice advocates increasingly focused on the unequal burdens borne by vulnerable communities as a result of environmental degradation and have called for greater community participation in environmental decision-making.

In terms of its composition, the environmental justice movement consists of a broad coalition of stakeholders and actors. These include environmental non-governmental and non-profit organisations, grassroots organisations, labour unions, indigenous communities, as well as state actors and governments [Guerrero, 2011; Tokar, 2019]. One of the core principles of the movement is the "polluter pays" principle. This principle holds that those who contribute most to environmental degradation must bear the responsibility for addressing and remedying its impacts. The movement recognises that those who contribute the least to environmental degradation often bear the heaviest burdens; therefore, a justice-oriented response to the climate crisis is required, one that equitably distributes responsibilities [Guerrero, 2011; Schlosberg & Collins, 2014; Tokar, 2019]. For example, Climate Justice Now!, a network formed in 2007 that organised alternative actions at the United Nations Framework Convention on Climate Change [UNFCCC] Conference of the Parties [COP] in Bali, has called for measures such as reduced consumption and the protection of indigenous land rights as integral components of environmental justice [Guerrero, 2011].

Over its lifespan, the movement has had key concerns that have shaped the way it has responded to the climate crisis and how it has sought accountability and action on the part of major polluters. One

of the key concerns of the environmental climate justice movement is the notion of "environmental debt". This refers to the idea that countries with high levels of industrial development and urbanisation owe a debt to developing countries because of their massive historical and ongoing contributions to pollution and climate change. Environmental activists argue that wealthy nations should lead mitigation and adaptation efforts, as well as address loss and damage [Schlosberg & Collins, 2014]. This is one of the ways in which the disproportionate impacts of climate change can be addressed. The 2002 Bali Principles of Climate Justice articulate these concerns, calling for the Global North to compensate Global South nations for environmental degradation and to support sustainable energy initiatives [Tokar, 2019]. By Global North and Global South, I am not referring to geographic regions but rather to the relative power and wealth of countries in different parts of the world, with the former being wealthier and the latter being more disadvantaged and underdeveloped [Braff & Nelson, n.d.].

The environmental justice movement has stressed the importance of community participation and sovereignty in environmental policy decisions. There is an insistence that affected communities should be empowered and capacitated to make decisions about climate solutions and have the right to reject initiatives that threaten their environment or well-being [Guerrero, 2011]. This focus on procedural justice aligns with the broader environmental justice movement's view that all communities must have an active role and voice in decisions impacting their environment and quality of life [Schlosberg & Collins, 2014].

Several key stakeholders have played an instrumental role in the formation and continued growth of the environmental justice movement. Indigenous communities, who are often based in regions most affected by climate change, have been at the forefront of advocating for the protection of their environment and land [Whyte, 2018]. Grassroots organisations, coalitions, and alliances have also played a critical role in leading the fight for environmental justice. For instance, the Climate Justice Alliance, a coalition formed in 2012 in the United States, represents a group of grassroots organisations focused on ushering in a "just transition" that seeks to do away with fossil fuels [Schlosberg & Collins, 2014]. Another organisation is the African Climate Alliance, a youth-led grassroots organisation closer to home. It is an Afrocentric alliance that advocates for environmental and social justice on the African continent, with a particular focus on youth and the amplification of African youth voices [African Climate Alliance, n.d.]. The organisation is currently leading a court case against the South African government to halt 1,500 MW of coal-fired power.

Despite the commendable work carried out by grassroots organisations, they often face significant challenges. These include tensions with more mainstream environmental organisations and intergovernmental efforts, such as the United Nations Framework Convention on Climate Change Conference of the Parties. Such bodies often prioritise emissions reduction, advancing solutions that place profits over people's lives and livelihoods, and are frequently blind to the intersectionality of environmental justice with racial justice and other forms of socio-political justice. Environmental justice activists argue that these approaches allow countries and corporations in the Global North to continue polluting while shifting the responsibility for mitigation onto marginalised communities, typically in the Global South [Tokar, 2019]. Additionally, the movement has faced challenges in uniting the needs and concerns of its diverse constituencies. Differing priorities and approaches to environmental action have often led to conflict over strategies and goals [Faber & O'Connor, 1993].

As it stands, the environmental justice movement represents a formidable response to the global climate crisis and the environmental challenges it presents. It has demonstrated that environmental action can be rooted in equity and justice. However, despite the significant progress made, there has been insufficient recognition of how the environmental justice movement may continue to perpetuate the idea of the racial "Other".

Graffiti, diversity, wall art, and inclusion in Lima, Peru by Miles Peacock
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The Perpetuation of the Racial "Other" in the Environmental Justice Movement

The concept of race features prominently in discussions of environmental justice. Bullard [1993] argues that racialised communities bear a disproportionate burden of environmental issues. He asserts that "even in today's society, race influences the likelihood of exposure to environmental and health risks as well as accessibility to health care" [Bullard, 1993: 23]. This impact is felt as a direct consequence of the greater environmental burdens borne by racialised groups. It is therefore important to investigate the role race plays in shaping how people, particularly racialised groups, experience the environment and the impacts of the climate crisis, as well as how conceptual frameworks contribute to these experiences.

As outlined above, Haslanger's [2019] conception of race helps us to understand the hierarchy upheld by racial classification. It produces two subjects: one privileged and one subjugated. The subjugated subject takes on the identity of the racial "Other". To pursue this argument further, it is necessary to clarify how the racial "Other" also informs the creation of the environmental "Other". Put differently, the racial "Other" perpetuates multiple forms of "Othering", and the environmental justice movement has not been exempt from this process. The connection between race and the environmental justice movement becomes apparent through an examination of the creation of the environmental "Other". Although environmental degradation affects everyone, it does not affect everyone equally. By the environmental "Other", I refer to those people who are disproportionately affected by environmental degradation as a result of their race.

The concept that does much of the explanatory work in demonstrating how "Othering" operates within the environmental justice movement is environmental racism. Tubert [2021] defines environmental racism as the disproportionate exposure of racialised people to environmental hazards. This occurs through structural and systematic mechanisms, such as policy-making practices, legislation, directives, and the exclusion of racialised communities from decision-making processes. Robert Bullard [1993], one of the early scholars to examine environmental racism in the 1990s, offers a similar understanding. He highlights how racialised communities are disproportionately affected by climate change and environmental hazards, such as pollution. Bullard [1993] argues that these communities often bear the brunt of environmental collapse and degradation, while wealthier, often white, communities have access to cleaner and healthier environments and are better positioned to adapt to climate-related hazards. For Bullard, this unequal distribution of environmental burdens is not accidental but reflects society's racist history and the deep-seated racial biases embedded in structural systems that shape environmental policy.

Tubert [2021], however, adds an important dimension by arguing that environmental racism is derivative of other forms of racism. She develops a more philosophical account by proposing two conditions for an act or omission to qualify as environmental racism: i) environmental burdens and benefits must be distributed according to race, and ii) this distribution must be caused by a history of racism. Tubert argues that this causal claim must be understood counterfactually, meaning that "if the history of racism had not occurred, the current distribution of environmental burdens and benefits would not have occurred" [Tubert, 2021: 557]. In essence, Tubert's position is that, in the absence of racism, the current racially disproportionate distribution of environmental burdens and benefits would not exist. This is the account of environmental racism that I will be working with.

Aerial view of the Noor 3 solar power station, near Ouarzazate, southern Morocco, April. 1, 2017.
The king unveiled one of the world's biggest solar plants, taking advantage of the Sahara sunshine and a growing global push for renewable energy.
© https://www.voaafrica.com/

Disproportionate Effects of Environmental Racism on Racialised Communities

Environmental racism is evident in the disproportionate impacts of the climate crisis on racialised communities. The burdens of the crisis are distributed disproportionately towards racialised communities; furthermore, they are often left to adapt on their own. Holifield [2001] further demonstrates the extent of environmental racism by highlighting its institutionalisation. This institutionalisation is perpetuated not only through the uneven distribution of the burdens and risks of the climate crisis but also through the systematic and structural exclusion of marginalised communities from decision-making processes, structures, and platforms. According to Holifield [2001], racialised communities are frequently excluded from environmental governance, which ensures that their interests are not prioritised and their concerns are easily overlooked.

One such structure is the UNFCCC, where the Global North holds the greatest power, and decisions regarding policy implementation often favour its needs and concerns [Tokar, 2019; Guerrero, 2011]. This exclusion reinforces the marginalisation of racialised communities and positions them as the racial (environmental) "Other", separate from the political and social processes that shape their environments [Holifield, 2001]. Environmental racism, therefore perpetuates a form of institutional "Othering" that denies racialised groups the ability to shape their environmental conditions.

Pulido [2014] expands on this understanding by emphasising that environmental racism is not simply the result of individual acts of discrimination but is rooted in broader structural processes such as white privilege. Pulido [2014] argues that white communities often distance themselves from environmental hazards through socio-economic and political power, allowing them to maintain environmental privilege while marginalised groups are disproportionately exposed to pollution and environmental risks. For instance, in a case where a large company were to initiate plans to establish a power plant in an affluent white community, that community would most likely pool its political and financial resources to oppose and halt such plans. They would be able to pursue legal action and exert influence over political leaders, which would, in turn, stop such a project. A racialised community, however, is less likely to have the capacity to pursue such avenues because of its limited political and socio-economic power. This process of distancing not only perpetuates racial inequalities but also reinforces the spatial segregation of racialised communities [Pulido, 2014]. By spatial segregation, I am referring to the physical separation of people living in different areas of the same city based on social class, including race. Pulido's [2014] work highlights how the spatial dynamics of environmental racism are deeply tied to the construction of the racial and environmental "Other", whereby marginalised communities are systematically excluded from desirable and safe environments and relegated to spaces of environmental harm.

Let me draw attention to the construction of the Ouarzazate Solar Power Plant in Morocco. For this paper, I will not dwell on the level of debt Morocco, an already debt-burdened country, has incurred for the construction and operation of the plant. However, it is worth mentioning this context, as the indebtedness of African countries is a legacy of colonisation and plays a role in their subjugation. I will focus primarily on the displacement, appropriation, and environmental impact of the solar plant.

The solar mega-project began operating in south-central Morocco and covers an area of 3,000 hectares, making it the largest solar power plant in the North African nation [Hamouchene, 2016; 2023]. The plant was constructed with the intention of supplying Morocco with electricity, with power exported to Europe. In his chapter, Hamza Hamouchene [2023] notes that people in the surrounding area were not consulted about the installation of the plant or included in the site-selection process. Additionally, the communal land on which the plant was subsequently built was sold at a fraction of its value, as those purchasing the land justified the price by claiming it was based on the "marginality" and "non-productivity" of the land [Hamouchene, 2016: par. 13]. One community member interviewed by Karen Randall lamented that "the project people talk about this as a desert that is not used, but to the people here it is not desert; it is a pasture. It is their territory and their future is in the land. When you take my land, you take my oxygen" [Randall, 2012: 19].

Adding salt to the wound of dispossession experienced by the Ouarzazate community was the impact this solar plant had on the water supply of this already water-strained region. The solar plant required water to be channelled from a nearby dam to assist in the cooling process [Hamouchene, 2016]. This affected the already strained water supply intended for consumption by the communities surrounding the plant. At the time Hamouchene [2016] wrote his article, estimates suggested that the plant would use two to three million cubic metres of water annually [Kouz, 2011, cited in Hamouchene, 2016]. Almost eight years later, during Hamouchene's [2023] visit, the dam had dried up, leaving surrounding communities without water for consumption and agriculture.

This case is an important one, as it clearly illustrates how environmental racism operates and subjugates racialised groups by positioning them as the environmental "Other". Environmental racism is evident in the lack of consideration given to how the solar plant would affect surrounding communities. Priority was placed on generating electricity in a manner deemed environmentally acceptable; however, insufficient attention was paid to how the installation of the Ouarzazate Solar Power Plant would affect the lives and livelihoods of local communities. The environmental burdens were delegated to a racialised community for the benefit of Europe, thereby benefiting Europe without incurring the environmental costs associated with the power plant. Community members were not consulted during the process and were dispossessed of land to which they had strong social and economic ties, under the justification that it was "unproductive". Moreover, this supposed environmental solution further exacerbated local conditions by completely drying up the dam used for drinking water and agriculture.

Examining the Movement Itself

Now, I turn to examine the movement itself. Doing so will enable me to draw the connection between how the disproportionate effects exhibited above are dealt with. Secondly, this will help examine whether organisations that form part of the environmental justice movement is dealing with these impacts or continue perpetuating them, whether by staying silent and tone-deaf or by reinforcing them through the ways in which they go about their activism. I will be using a second case study of Extinction Rebellion (XR) as it is one of the biggest organisations in the environmental justice movement. I will look into the culture of the organisation, how it is perceived, and the ways in which they have gone about their advocacy initiatives. This will show that there is an exclusionary culture that is perpetuated by environmental justice organisations by not paying attention to the racial legacies that lead to racialised groups being disproportionately affected by the climate crisis. Therefore, in this way, they have perpetuated the cycle of the racial (environmental) "Other."

According to their website, Extinction Rebellion (XR) is a decentralised, international, and politically non-partisan movement using non-violent direct action and civil disobedience to persuade governments to act justly on the climate and ecological emergency. However, many racialised and working-class communities have expressed that they do not feel represented by the organisation [Bell & Bevan, 2021]. Akec [2019] writes that it is important for XR to realise that the organisation lacks diversity and glamourises experiences such as arrests that are tone-deaf to the context of racialised youths. A central critique of the tone-deafness of the organisation revolves around its dominant strategy of civil disobedience, which often leads to arrests. Bell and Bevan [2021] argue that this has the potential to alienate racialised youths because of the already disproportionate challenges they face with the criminal justice system. There is often an emphasis placed on arrest by the organisation, viewing it as a symbol of commitment and putting one's body on the line for the cause; however, this overlooks the much harsher consequences for activists from racialised communities compared to their white counterparts, who are most likely to experience leniency [Bell & Bevan, 2021]. Additionally, as bad as it already is, XR does not account for migrants who risk deportation should they get arrested.

This tactic has prompted much-needed critique from activists, such as those from the Wretched of the Earth coalition in the United Kingdom. It is worth contextualising that this coalition is named after Frantz Fanon's text "The Wretched of the Earth," which seeks to describe the plight of Black people living in racist societies. The coalition argues that XR's methods reflect a privilege that is not afforded to all, particularly based on racial lines; this has led to many racialised youths feeling unsafe in the face of systemic racial discrimination [Wretched of the Earth, 2019]. In the open letter, Wretched of the Earth makes reference to Greta Thunberg's words "Our house is on fire," urging world leaders to act on the climate crisis, and they further say:

> **"Our communities have been on fire for a long time and these flames are fanned by our exclusion and silencing. Without incorporating our experiences, any response to this disaster will fail to change the complex ways in which social, economic, and political systems shape our lives – offering some an easy pass in life and making others pay the cost. In order to envision a future in which we will all be liberated from the root causes of the climate crisis – capitalism, extractivism, racism, sexism, classism, ableism, and other systems of oppression – the climate movement must reflect the complex realities of everyone's lives in their narrative."**
> [Wretched of the Earth, 2019: 110]

In the research conducted by Bell and Bevan [2021], the main reasons expressed by possible participants as to why they would not get involved in initiatives organised by XR were that, firstly, they do not see themselves as part of the demographic that the organisation is trying to reach. Their demographic and leadership are lacking in diversity, often being white and middle class, and this has contributed to the idea of exclusion of racialised peoples within the organisation. Secondly, participants expressed that they did not relate to the culture of the organisation, as they viewed it as "hippyish" or eccentric, which did not resonate with their lived realities. Comments from interviewees underscored how XR's predominantly white membership sometimes failed to connect with the specific social and economic concerns that marginalised groups face, from economic survival to racial justice [Bell & Bevan, 2021].

XR's approach to climate activism has also drawn criticism for neglecting the broader social justice dimensions of climate change. Many marginalised communities experience environmental issues such as air pollution, poor housing, and limited access to green spaces as immediate threats; yet, XR's messaging often focuses on global climate collapse without addressing these localised issues. This "one-size-fits-all" narrative can feel disconnected from the everyday struggles of marginalised communities, which often revolve around securing basic environmental and social rights. XR's demand for urgent climate action, while it resonates, fails to incorporate a focus on the intersectional nature of environmental and social justice, which is crucial for marginalised people. This omission reinforces a perception that XR's agenda does not fully understand or prioritise the specific needs of these communities [Akec, 2019].

The examination of XR above provides the perfect segue to the three main arguments I intend to make. Firstly, society has been socialised to view climate change as a Western issue, one that is less about bread-and-butter issues. I argue that this is evident in the strategies taken up by XR and their ilk. Secondly, the prioritisation of the "planet" over people is anti-Black/Brown (racialised peoples). Lastly, the environmental justice movement prioritises the needs of the Global North over those of the Global South. This imbalance in the priorities of the environmental justice movement is rooted in the history of racism and thus perpetuates the racial (environmental) "Other."

I argue that there has been socialisation to view climate change as a Western issue, one that is not "bread and butter." It is no secret that the Global South is riddled with an array of issues, such as debt, poverty, and underdevelopment. However, this does not negate the fact that the Global South is affected by climate change, with catastrophic effects [Bullard, 1993]. Some scholars have lamented that, in fact, the Global South is affected by climate change disproportionately. Additionally, indigenous communities have strong ties to the environment and land, so they are not blind to the impacts of climate change [Whyte, 2018; Wretched of the Earth, 2019]. If anything, this should cause them to be even more interested and involved in climate action. However, the culture of the environmental justice movement has been alienating and exclusionary to racialised groups, and this has unfortunately been presented as a lack of interest. The issues that are considered to be more bread-and-butter than the climate crises are the ones that exacerbate their experience of climate change and cause a disproportionate impact. For instance, a person who stays in a shack is disproportionately affected by a flood, and it exacerbates their condition of not having a reliable structure as a home.

Incorporating social justice in tackling racial and socioeconomic inequality would go a long way in offering sustainable solutions to address the disproportionate impact of climate change on racialised communities. The move to understanding environmental justice as social justice would be a better approach than one that prioritises just the planet over the lives and livelihoods of racialised people. I will be addressing this claim further in a moment.

For now, I want to pivot to my other argument: that the environmental justice movement prioritises the needs of the Global North over those of the Global South. This is made evident by how platforms for environmental policy reforms are inaccessible for racialised people, and there are no efforts made to make said platforms accessible for them [Pulido, 2014]. This means that the voices and concerns of racialised communities are not paid enough attention to, and as a result, are hardly ever considered in the decision-making processes. This also means that there is no room made to accommodate racialised people's interests, and they are not seen as a group of people who can meaningfully contribute to the shaping of solutions that are developed on these platforms. This speaks directly to the false notions perpetuated by eugenics, presenting racialised people as intellectually inferior with no ability to make erudite contributions [Foucault, 2003]. This has contributed to the subjugation of racialised people, and their indigenous knowledge systems have been undermined and subsequently erased. Once again, racialised groups have been portrayed as a deviation from the norm and thus are "Othered."

Lastly, the argument I will advance in this section is that the prioritisation of the "planet" over people is anti-Black/Brown. The focus of big environmental justice organisations, like XR, has been the conservation of the planet [Bell & Bevan, 2021]. Whilst they have not explicitly claimed that they are more interested in the conservation of the planet over people, their culture has made it clear where their priorities lie. The tone-deafness of XR's strategies and approaches to climate change

issues has evidenced that they are prioritising the planet above people. While the planet must be conserved and protected from the impacts of the climate crises, people equally must be protected. I delve deeper into this in the section to follow by proposing a humanistic approach to environmentalism.

Towards a Humanistic Environmentalism

A possible objection is that an approach which prioritises humans above non-human animals is anthropocentric. In response to this, I construct an argument that a humanistic approach to environmental justice is not inherently anthropocentric; rather, it is ethically grounded in humanism. To advance my response, I must distinguish between two main concepts that are at play here, namely, anthropocentrism and humanism. Hayward [1997] defines anthropocentrism as attitudes, values, or practices which promote human interests at the expense of the interests or well-being of other species or the environment. This typically involves viewing human beings as the focal point of moral concern [Cave, 2021]. Contrariwise, humanism, as an ethical framework, is centred on the idea that all human lives have inherent value and moral worth, while also acknowledging and respecting the value of non-human entities within the broader ecological system [Kopnina et al., 2021]. This distinction supports the notion that environmental justice, when approached through a humanistic lens, is ethically robust rather than merely human-centred, as it prioritises equity for marginalised communities without negating the intrinsic value of nature.

Humanism, especially when applied to environmental justice, seeks to alleviate disparities in the impact of climate change on racialised communities. Such an approach does not inherently exclude or devalue non-human concerns; rather, it integrates the well-being of both human and non-human entities. With humanism, we are able to bring into focus not only concerns about the planet but also varied human experiences of climate change. As Di Paola [2024] describes, virtue ethics and humanism align in their commitment to the virtues of care, empathy, and justice, which can extend beyond human interests to encompass broader ecological concerns. This virtue-centred framework enables humanistic environmental justice to ethically support those who suffer disproportionately from environmental degradation, namely, racialised and economically marginalised communities, without reducing nature to a mere tool for human welfare.

Critics of anthropocentrism argue that it centres human welfare at the cost of non-human life, fostering environmental degradation through speciesism and human supremacy [Kopnina et al., 2021]. However, a humanistic approach to environmental justice that prioritises marginalised groups in climate discourse does not inherently adopt an anthropocentric stance. Instead, it advocates for the fair treatment of those disproportionately affected by climate change, acknowledging that these communities have been systematically excluded from environmental benefits while withstanding the worst of ecological harm. This humanistic perspective aligns with an ethical commitment to address historical injustices, rather than centring human interests to the detriment of other species.

Acknowledging the unequal impact of environmental harm on specific human communities can be seen as a necessary step toward more inclusive ecological ethics. By centring human justice within environmental justice efforts, we recognise that some racialised communities hold unique relationships with their local ecosystems, which are often shaped by historical and cultural connections to the land. These connections emphasise the moral and practical importance of preserving both human and non-human lives within these ecosystems, which are seen as interdependent rather than competing entities [Di Paola, 2024]. A humanistic approach to environmental justice, rather than being a shallow endorsement of anthropocentrism, can bridge human and non-human concerns. By fostering empathy and solidarity with affected communities, humanism naturally expands into a broader ecological ethic. Hayward [1997] highlights the danger of conflating humanism with anthropocentrism, suggesting that the former need not imply the exclusion of non-human interests. Instead, humanism in environmental justice emphasises a shared sense of agency and responsibility among diverse human and non-human communities, which challenges the narrow anthropocentric framework that views the environment merely as a resource [Kopnina et al., 2021].

In addition, a humanistic approach can address the systemic inequalities that often exacerbate environmental degradation. For instance, affluent nations and groups tend to consume resources at higher rates and contribute more to ecological crises, while low-income and racialised communities bear disproportionate environmental burdens [Bullard, 1993]. Addressing these inequalities requires a shift towards an ethical framework that recognises shared responsibility across all species, including humans. As Di Paola [2024] notes, virtue ethics—when applied through a humanistic lens—requires environmental action that is both context-sensitive and morally inclusive, focusing on fostering resilience and justice for all life forms involved.

Proponents of ecocentrism argue that human-centred ethics cannot adequately protect non-human entities due to inherent anthropocentric biases [Kopnina et al., 2021]. However, a humanistic approach does not necessitate prioritising human interests above all others but rather acknowledges human responsibility for environmental harm and seeks to rectify it by promoting equitable solutions. By focusing on the ethical imperative to protect vulnerable human communities, humanism can serve as a stepping stone to more comprehensive environmental ethics that include non-human entities as equally deserving of moral consideration. For example, humanistic environmental justice advocates may support policies that protect biodiversity, not only for its intrinsic value but also because the survival of diverse ecosystems directly benefits the communities most reliant on natural resources for their subsistence. This interconnected view opposes the notion of humans as dominant over nature, instead promoting mutual well-being across species. Hayward's [1997] argument, which emphasises legitimate human concern for welfare without anthropocentric domination, aligns with this inclusive ethical stance, which does not reduce non-human entities to mere instruments of human benefit but rather acknowledges them as integral to a just and sustainable world.

Conclusion

In this paper, I have explored how the racial "Other" is perpetuated within the environmental justice movement. My aim was to understand how different philosophical perspectives on race contribute to this perpetuation. Grounding my analysis in a socio-political account of race, as presented by Sally Haslanger [2019], I defined race as a hierarchy in which one group is privileged and another subordinated. This hierarchical structure gives rise to the racial "Other," viewed as a deviation from the norm and thereby justifying subjugation. I contextualised the environmental justice movement as a response to the impacts of environmental hazards, highlighting its key stakeholders, including non-governmental organisations, alliances, coalitions, state actors, and international governmental organisations like the United Nations. Through this foundation, I investigated how environmental racism perpetuates the racial "Other," evidenced by the disproportionate effects of climate crises on racialised communities and the exclusionary culture within organisations such as Extinction Rebellion.

To effectively address the complexities of the environmental crisis, embracing a humanistic approach to environmentalism is essential. This approach prioritises equity for marginalised communities and incorporates intersectionality—a framework coined by Kimberlé Crenshaw [1996]—which examines how overlapping systems of oppression, such as racism, classism, and sexism, shape the experiences of individuals. By applying an intersectional lens, we can recognise the unique experiences of racialised individuals, ensuring that no one is left behind in the pursuit of environmental justice. Abandoning binary perspectives on social issues allows for a nuanced understanding of how various forms of oppression intersect to impact marginalised communities. Moving forward, intersectional humanistic environmentalism presents the best path to address the environmental crisis, providing a framework for inclusive solutions that acknowledge and respect the interconnectedness of human and non-human lives. Additionally, it opens avenues for further research that can deepen our understanding of these critical issues and contribute to more just and equitable environmental practices.

References

Akec, Athian 2019. When I look at Extinction Rebellion, all I see is white faces. That has to change, *The Guardian*, 19.

Bell, Karen, Bevan Gnisha 2021. Beyond inclusion? Perceptions of the extent to which Extinction Rebellion speaks to, and for, Black, Asian and Minority Ethnic (BAME) and working-class communities, *Local Environment* 26/10: 1205–1220.

Bruno, Kenny, Joshua Karliner, and China Brotsky 1999. *Greenhouse Gangsters vs. Climate Justice*.

Bullard, Robert D. 1993. The threat of environmental racism, *Natural Resources & Environment* 7/3: 23–56.

Crenshaw, Kimberlé Williams 2013. Mapping the margins: Intersectionality, identity politics, and violence against women of color, in *The Public Nature of Private Violence*, ed. M. A. Y. (Routledge): 93–118.

Di Paola, Marcello 2024. Virtue, environmental ethics, nonhuman values, and anthropocentrism, *Philosophies* 9/1: 15.

Faber, Daniel, O'Connor James 1993. Capitalism and the crisis of environmentalism, in Toxic Struggles: *The Theory and Practice of Environmental Justice*: 12–24.

Fanon, Frantz 1952. *Black Skin, White Masks*, tr. Charles Lam Markmann: 323–326.

Foucault, Michel 2003. *Society Must Be Defended*: Lectures at the Collège de France, 1975-1976, Vol. 1, Macmillan.

Guerrero, Dorothy 2011. The global climate justice movement, in Global Civil Society 2011: *Globality and the Absence of Justice*, London: Palgrave Macmillan UK: 120–126.

Hamouchene, Hamza 2016. The Ouarzazate solar plant in Morocco: Triumphal 'Green' capitalism and the privatization of nature, *Jadaliyya*.

Hamouchene, Hamza 2023. *Dismantling Green Colonialism: Energy and Climate Justice in the Arab Region*, Pluto Press.

Haslanger, Sally 2012. Gender and Race: (What) Are They? (What) Do We Want Them to Be? in *Arguing About Science*, ed. A. B. (Routledge): 95–116.

Glasgow, Joshua, et al. 2019. *What is Race?: Four Philosophical Views*, Oxford University Press.

Hayward, Tim 1997. Anthropocentrism: A misunderstood problem, *Environmental Values* 6/1: 49–63.

Holifield, Ryan 2001. Defining environmental justice and environmental racism, *Urban Geography* 22/1: 78–90.

Kopnina, Helen, et al. 2018. Anthropocentrism: More than just a misunderstood problem, *Journal of Agricultural and Environmental Ethics* 31/1: 109–127.

Murdock, Esme G. 2019. Nature where you're not: Rethinking environmental spaces and racism, in *The Routledge Handbook of Philosophy of the City*, Routledge: 301–313.

Opperman, Romy 2019. A permanent struggle against an omnipresent death: Revisiting environmental racism with Frantz Fanon, *Critical Philosophy of Race* 7/1: 57–80.

Pellow, David Naguib 2005. Environmental racism: Inequality in a toxic world, in *The Blackwell Companion to Social Inequalities*: 147–164.

Pulido, Laura 2017. Rethinking environmental racism: White privilege and urban development in Southern California, *Environment*, Routledge: 379–407.

Rignall, Karen 2012. Theorizing sovereignty in empty land: The land tenure implications of concentrated solar power in pre-Saharan Morocco, Presentation at the International Conference on Global Land Grabbing II, October.

Schlosberg, David and David Carruthers 2010. Indigenous struggles, environmental justice, and community capabilities, *Global Environmental Politics* 10/4: 12–35.

Taylor, Dorceta E. 2000. The rise of the environmental justice paradigm: Injustice framing and the social construction of environmental discourses, *American Behavioral Scientist* 43/4: 508–580.

Tokar, Brian 2018. On the evolution and continuing development of the climate justice movement, in *Routledge Handbook of Climate Justice*: 13–25.

Tubert, Ariela 2021. Environmental racism: A causal and historical account, *Journal of Social Philosophy* 52/4: 554–568.

Thomas-Olalde, Oscar, Velho, Astride 2011. Othering and its effects–Exploring the concept, in *Writing Postcolonial Histories of Intercultural Education* 2: 27–51.

Whyte, Kyle 2018. Settler colonialism, ecology, and environmental injustice, *Environment and Society* 9/1: 125–144.

The Wretched of the Earth 2019. An open letter to Extinction Rebellion, *Journal of Global Faultlines* 6/1: 109–112.

Investigating the Role of Stakeholder Engagement in Artificial Intelligence Governance and Policy Making: A Case Study of Zimbabwe.

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Abstract

Stakeholder engagement is a crucial aspect of effective governance and policy-making in the field of artificial intelligence (AI). In Zimbabwe, the role of stakeholder engagement in the development and implementation of AI governance and policies has not been extensively studied. This research aims to fill this gap by using Actor-Network Theory (ANT) to explore the network of actors involved in AI governance and policies in Zimbabwe and how their interactions and relationships influence the outcomes. A case study approach was used, incorporating qualitative methods, including interviews and literature review. This research identified key stakeholders, including chief executive officers from industry and the public sector, civil society organisations, ICT experts, and users, by examining their roles and relationships within the network. By applying ANT, this study uncovered the power dynamics and interests of these actors and how they shape the development and implementation of AI governance and policy-making in Zimbabwe. The findings of this research have implications for other countries and regions seeking to develop and implement AI governance and policies. It also contributes to the growing body of research on stakeholder engagement in the field of AI governance.

Keywords: Stakeholder Engagement, Artificial Intelligence, Governance, Policy-Making, Actor-Network Theory.

Introduction

The rapid advancement of Artificial Intelligence (AI) presents both exciting opportunities and significant challenges for societies around the globe [Gordon and Gunkel: 2025, 1897-1903]. As AI technologies become more integrated into various sectors, the need for effective governance and policy frameworks grows increasingly critical [Ghosh, Saini and Barad: 2025, 1-23]. In developing countries like Zimbabwe, this need is especially important. The potential benefits of AI must be carefully weighed against ethical considerations, social impacts, and economic realities. Engaging a diverse array of stakeholders, such as government officials, industry leaders, academics, civil society organisations, and the public, is essential for shaping effective AI governance and policy [Cihon, Schuett and Baum: 2021, 275]. This inclusive approach ensures that multiple perspectives are considered, leading to policies that are not only more effective but also equitable. Therefore, reflecting the unique needs and values of the society they serve, these policies can help navigate the complexities of AI, fostering a future where technology benefits everyone.

Several international studies have been conducted on the role of stakeholder engagement in artificial intelligence governance and policy-making. For example, de Castex [2021:13] conducted a study in the Netherlands that emphasised the significance of engaging multiple stakeholders in AI governance. The research highlights that incorporating diverse perspectives can lead to more effective and ethical AI policies. The author argues that stakeholder participation is essential for grasping the societal impacts of AI and ensuring that these systems align with public values. The study suggests the creation of formal mechanisms for involvement, such as public consultations and collaborative workshops, to encourage dialogue among technologists, policymakers, and affected communities. Radu [2021:188] examined AI governance in Switzerland and identified key stakeholders, including government bodies, industry leaders, academia, and civil society organisations. The findings indicate that effective stakeholder engagement can improve transparency and accountability in AI development. The author recommends establishing inclusive platforms for dialogue to facilitate knowledge sharing and best practices among stakeholders, as well as developing ethical AI guidelines that incorporate stakeholder feedback. Marmolejo-Ramos [2022:11] explored the role of public engagement in shaping AI policy frameworks in the United Kingdom (UK). They found that involving citizens in AI discussions helps demystify the technology and fosters trust between the public and developers. The author advocates for educational initiatives to enhance public understanding of AI technologies and suggests incorporating citizen feedback into the policymaking process to ensure that policies meet societal needs. Pallet [2024:12] focused on the legal aspects of AI governance and underscored the importance of stakeholder engagement in addressing regulatory challenges. Their study reveals that such engagement can lead to more adaptable regulatory frameworks that keep pace with technological advancements. The authors call for the formation of interdisciplinary task forces that include legal experts, technologists, ethicists, and community representatives to collaboratively develop responsive governance strategies for emerging AI technologies.

Theoretical Framework

The theoretical framework for this research, which analyses AI governance in Zimbabwe, is grounded in Actor-Network Theory (ANT) [Latour: 1996, 369-381]. ANT emphasises the relationships and interactions among various actors, both human and non-human, within a network. It posits that the agency of each actor contributes to shaping governance outcomes, highlighting the importance of inclusivity in stakeholder engagement. Within AI, this means recognising the roles of diverse stakeholders, including marginalised communities, technical experts, and civil society members. By understanding how these actors interact, policymakers can identify potential gaps in representation and ensure that AI governance frameworks are designed to reflect a wide array of perspectives, thereby addressing ethical concerns more effectively.

Integrating principles of participatory governance within the ANT framework can enhance the development of ethical guidelines for AI deployment. By fostering collaborative platforms where stakeholders can co-create standards, the governance process becomes more dynamic and responsive to the needs of the community. This participatory approach not only empowers individuals to voice their concerns but also facilitates ongoing dialogue that can adapt to the evolving nature of AI technologies. The theoretical framework underscores the necessity of sustained engagement and transparency in AI governance, enabling a more equitable and responsible implementation of AI systems that align with societal values and priorities in Zimbabwe.

In Africa, Bokhari and Myeong [2023, 5-6] explored how stakeholder engagement plays a vital role in digital transformation and AI governance across various countries. Their research highlighted successful examples where inclusive participation led to improved policy outcomes. In South Africa, Hwabamungu, Brown, and Williams [2018, 36-48] examined the implications of stakeholder engagement in developing AI policies. They found that insufficient engagement fosters mistrust among stakeholders and can hinder effective policy implementation. To address this, the study recommended creating a national AI strategy that ensures ongoing stakeholder involvement throughout the policymaking process, emphasising the importance of transparency in decision-making. Hlongwane et al. [2024, 413, 421-423] focused on the state of AI governance in Zimbabwe. They pointed out the absence of comprehensive policies that include stakeholder engagement. Their research identified key stakeholders—government agencies, private sector representatives, academia, and civil society organisations—highlighting their crucial roles in shaping AI policy. The authors proposed establishing a multi-stakeholder platform to encourage dialogue among all involved in AI governance, along with regular workshops and forums to educate stakeholders about AI technologies and their potential impacts. However, their studies could not evaluate the impact of stakeholder engagement in government agencies, the private sector, academia, civil society, and workshops and forums on governance and policymaking.

Literature Review

Perceptions of Various Stakeholders Regarding the Significance and Impact of AI Technologies

Ernst, Merola, and Samaan [2019, 36-37] examined how AI and automation are affecting labour markets and economic productivity. They found that while AI technologies can greatly boost productivity, there is increasing concern about job displacement for workers. Business leaders and policymakers have expressed mixed feelings about the advantages of AI compared to its potential to increase inequality. To address these challenges, the authors recommend investing in education and training programmes to help workers transition into new roles created by AI advancements. They also advocate for policies that ensure equitable access to technology.

A study by Wolff et al. [2020] assessed the potential economic impact of AI across various global sectors. Their study revealed that stakeholders recognise both the transformative possibilities of AI and the associated risks, especially concerning privacy and ethical issues. They suggest establishing clear regulatory frameworks that address these ethical concerns while also promoting innovation and investment in responsible AI practices. Wamba-Taguimdje [2020, 1910] explored how businesses view the integration of AI into their operations. They found that many companies acknowledge the significant benefits of adopting AI technologies, such as increased efficiency, but also express considerable concerns about data security and ethical implications. The study recommends developing comprehensive guidelines for data usage in AI applications and fostering collaboration between tech companies and regulatory bodies to ensure the responsible use of technology.

Barriers That Prevent Effective Stakeholder Engagement in AI Governance

Kallina and Singh [2024, 7] explored several barriers to effective stakeholder engagement in AI governance. They pointed out that a lack of understanding of AI technologies among stakeholders, insufficient representation of diverse voices, and the complexity of regulatory frameworks create significant challenges. Many stakeholders feel overwhelmed by the technical jargon surrounding AI, making it difficult for them to engage meaningfully. To address this, the authors recommend developing educational programmes specifically designed to enhance stakeholders' understanding of AI technologies. They also suggest creating dialogue platforms that include a wide range of stakeholders, ensuring that marginalised voices are heard throughout the governance process.

Kinney et al. [2024, 7] identified trust issues as another major barrier to stakeholder engagement in AI governance. Many stakeholders harbour distrust towards organisations involved in AI development, often due to past failures in transparency and accountability. The study highlights a common disconnect between policymakers and technologists regarding the implications of AI technologies. To bridge this gap, the authors recommend establishing clear communication channels between stakeholders and developers. They advocate for increased transparency in decision-making processes and suggest conducting regular public consultations to rebuild trust and ensure that stakeholder concerns are taken seriously.

Limani et al. [2024, 11] emphasised the challenge of inclusivity in stakeholder engagement. Their study notes that traditional governance structures often exclude non-expert voices, leading to decisions that do not adequately reflect societal values or needs. They highlight how power imbalances can skew engagement towards more privileged groups. To counter this, the authors recommend implementing inclusive practices, such as participatory design workshops, where diverse groups can actively contribute to discussions about AI governance. They also suggest using digital tools to facilitate broader participation from various demographics, ensuring that all voices are heard.

Current Stakeholder Engagement Practices in AI Governance Frameworks

Drier et al. [2022, 33] underscored the significance of multi-stakeholder engagement in AI governance. They noted that current practices often lack inclusivity, especially from marginalised communities and non-technical stakeholders. The research highlights that effective governance frameworks should incorporate diverse perspectives to address the ethical issues related to AI technologies. The authors recommend establishing formal mechanisms for stakeholder participation, such as public consultations and advisory boards that include representatives from civil society, academia, and industry.

Mensah [2023, 15] examined the role of transparency and accountability in AI systems. The study found that many organisations fail to adequately involve stakeholders during the development of AI technologies, resulting in a disconnect between developers and affected communities. To bridge this gap, the study suggests implementing regular stakeholder engagement sessions throughout the AI life cycle to facilitate ongoing dialogue and feedback. Mensah advocates for clearer communication strategies to inform stakeholders about how their input is being used.

Díaz-Rodríguez et al. [2023, 6] focused on responsible AI and emphasised the importance of involving stakeholders in defining ethical guidelines for AI deployment. They indicated that existing governance frameworks often neglect the voices of end-users and those affected by AI decisions. The study recommends creating collaborative platforms where stakeholders can work together to co-create ethical standards and guidelines for AI use, fostering a sense of ownership regarding the implications of these technologies.

Recommendations for Policymakers Aimed at Enhancing Stakeholder Engagement in AI Governance

Drier et al. [2022, 1] underscored the significance of multi-stakeholder engagement in AI governance. They noted that current practices often lack inclusivity, especially from marginalised communities and non-technical stakeholders. The research highlights that effective governance frameworks should incorporate diverse perspectives to address the ethical issues related to AI technologies. The authors recommend establishing formal mechanisms for stakeholder participation, such as public consultations and advisory boards that include representatives from civil society, academia, and industry.

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Sharma [2020, 1] highlighted that researchers and practitioners focused on AI applications often lack robust governance structures, which can be used as models for policy and regulatory frameworks. This research seeks to address this gap by engaging stakeholders who inform issues of governance and policy formulation.

Methodology

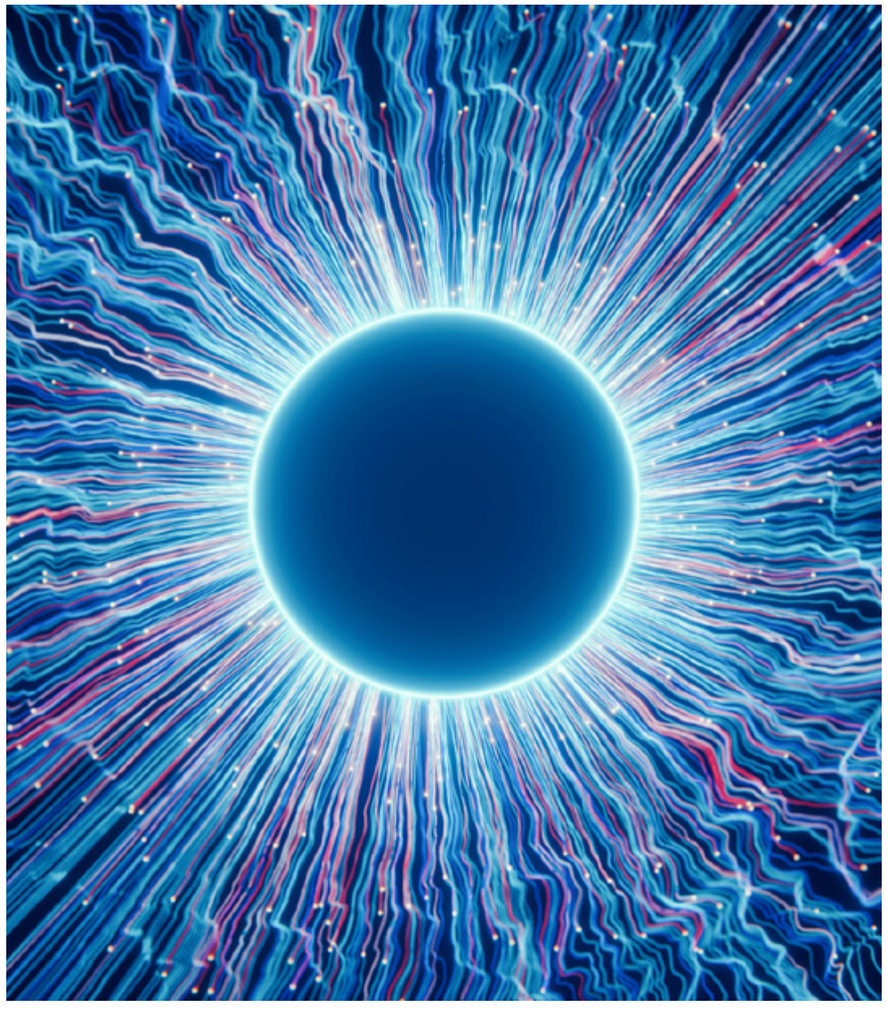

Photo by Luke Jones on Unsplash

This study employed a case study approach to explore the role of stakeholder engagement in Artificial Intelligence (AI) governance and policy-making in Zimbabwe. The qualitative nature of the research aimed to provide a comprehensive understanding of the dynamics at play within this specific context. The case study design was particularly well-suited for this research, as it allowed for an in-depth examination of the complex interplay among various stakeholders involved in AI governance. By focusing on Zimbabwe, the study sought to illuminate how local factors influence stakeholder engagement and how these interactions can shape effective AI policies that align with the needs and values of the community. The research was guided by several key principles. First, it aimed to understand the perceptions, challenges, and opportunities surrounding AI governance as experienced by different stakeholder groups. By recognising that AI technologies are not only technical innovations but also social constructs, the study emphasised the importance of stakeholder perspectives in shaping governance frameworks.

Data collection involved a combination of qualitative methods, including interviews and literature reviews. A total of 60 participants were interviewed, representing a diverse range of stakeholders. This included company executives, Information Communication Technology (ICT) experts, civil society members, and users of AI technologies. The selection of these participants was purposeful, aimed at capturing a wide array of perspectives on AI governance. Company executives provided insights into the business implications of AI, while ICT experts contributed technical knowledge and industry best practices. Civil society members offered a lens into the ethical and social implications of AI deployment, and users shared their experiences and expectations regarding AI technologies.

The interviews were semi-structured, allowing for flexibility in exploring topics while ensuring that key themes were addressed. This format encouraged participants to express their views in their own words, leading to rich and nuanced data. Each interview lasted between 45 minutes to an hour and was conducted in a neutral setting to promote open dialogue. The interviewer recorded the key themes with the consent of the participants and subsequently grouped key themes and patterns related to stakeholder engagement in AI governance.

To complement the primary data collected from interviews, a comprehensive literature review was conducted. This review focused on existing research related to AI stakeholder engagement, governance frameworks, and policy-making in both developed and developing contexts. By situating the findings within the broader academic discourse, the study aimed to identify gaps in the literature and highlight best practices that could inform AI governance in Zimbabwe. The literature review also served to contextualise the challenges faced by Zimbabwe in implementing effective AI policies, drawing comparisons with experiences from other regions.

Ethical considerations were paramount throughout the research process. Participants were informed about the purpose of the study and their rights, including the right to withdraw at any time. Confidentiality was maintained by removing identifiable information from the transcripts and reports. This commitment to ethical research practices not only protected the participants but also contributed to building trust and rapport, which are essential for obtaining candid responses.

Findings

This section discusses the findings of the research on the role of stakeholder engagement in Artificial Intelligence (AI) governance and policy-making in Zimbabwe, framed through the lens of Actor-Network Theory (ANT). The findings are intended to inform policymakers and stakeholders about pathways for enhancing engagement in AI governance, ultimately contributing to the development of effective and inclusive AI policies that resonate with the Zimbabwean community. Thematic analysis was employed to analyse the qualitative data gathered from interviews. This method involved coding the data to identify recurring themes and patterns, which were then organised into categories that reflected the research objectives. The analysis focused on key areas such as stakeholder perceptions of AI technologies, barriers to effective engagement, and current practices in AI governance. By synthesising insights from various stakeholders, the study sought to provide a holistic understanding of the factors influencing AI governance in Zimbabwe.

Stakeholder Perceptions of AI Technologies

The research revealed diverse perceptions among stakeholders regarding the governance and policy formulation of AI technologies in Zimbabwe. Company executives viewed AI as a transformative force, capable of driving economic growth and enhancing efficiency within their organisations. They highlighted the potential for AI to improve service delivery, especially in sectors like industry and agriculture. However, their optimism was tempered by concerns regarding the lack of a comprehensive governance framework. They expressed that, without appropriate regulations and support, the benefits of AI might not reach the broader population.

In contrast, civil society members voiced apprehensions about the ethical implications of AI. They pointed out that the rapid deployment of AI technologies could exacerbate existing inequalities and lead to job displacement. This perspective aligns with the critical stance within ANT, which posits that technology is not neutral and can have varying impacts across different societal segments. The civil society representatives emphasised the need for inclusive governance that considers the voices of marginalised groups, thereby underscoring the importance of stakeholder engagement.

ICT experts advocated for a comprehensive governance and policy framework that aligns with the country's developmental and international goals, such as the National Development Strategy 1 (NDS1), National Development Strategy 2 (NDS2), and the United Nations Sustainable Development Goals (UNSDGs). They stressed the importance of ensuring that AI technologies are harnessed to address local challenges in areas like healthcare, agriculture, mining, and education. The experts highlighted the need for strong regulatory frameworks that ensure ethical AI use while protecting citizens' rights. They also called for policies that promote transparency, accountability, and fairness in AI systems, addressing potential biases and discrimination. Furthermore, ICT experts emphasised the importance of public-private partnerships to leverage resources and expertise, facilitating the sharing of best practices and knowledge. Continuous stakeholder engagement, including input from academia, industry, and civil society, was also deemed essential to ensure that AI policies remain relevant, adaptive, and inclusive.

Users of AI technologies emphasised the need for inclusivity and representation in discussions surrounding AI governance and policy formulation. They advocated for engaging diverse stakeholders, including marginalised communities and non-technical experts, to ensure that AI solutions address a wide array of societal needs. Transparency and accountability were also crucial concerns, as users called for clear communication about how AI systems function and the decision-making processes behind them. Ethical considerations were paramount, with many users advocating for policies that prioritise fairness and prevent biases, ensuring equitable outcomes from AI deployment. Users highlighted the importance of adaptability in policy frameworks to keep pace with the rapidly evolving nature of AI technologies. Ongoing dialogue and reassessment of policies are necessary to tackle emerging challenges effectively. Education and awareness initiatives are also vital in empowering users to engage meaningfully in policy discussions. Additionally, users called for collaboration among stakeholders—government, industry, academia, and civil society—to foster innovation while addressing ethical and societal issues. By incorporating these insights, policymakers can create frameworks that maximise the benefits of AI while minimising its risks

Barriers to Effective Stakeholder Engagement

One critical finding of the study was the identification of barriers that hinder effective stakeholder engagement in AI governance. Interview participants highlighted several issues contributing to this challenge. Many stakeholders, particularly in rural areas, lacked awareness of AI technologies and their implications. This gap in knowledge significantly impeded meaningful participation in governance discussions. Access to relevant information about AI technologies and governance frameworks was uneven within the rural community. Other stakeholders expressed concerns regarding the opacity of decision-making processes, which often excluded those without the necessary technical expertise.

Another significant barrier is the issue of power dynamics; Actor-Network Theory (ANT) emphasises the role of power in shaping networks, and in the context of Zimbabwe, these imbalances were evident. Company executives and government officials frequently dominated discussions, sidelining the perspectives of civil society members and ordinary users. This concentration of power limits the diversity of voices in the policy-making process. Without a clear policy and regulatory framework, the governance landscape for AI in Zimbabwe is characterised by institutional fragmentation, resulting in unclear roles and responsibilities among stakeholders. This fragmentation complicates efforts to engage effectively, highlighting the need for a more cohesive approach to governance.

Current Stakeholder Engagement Practices

The research assessed existing stakeholder engagement practices within AI governance frameworks in Zimbabwe. While some initiatives were identified, such as public consultations and workshops organised by government agencies, others fell short of being genuinely inclusive and participatory. Some stakeholders reported that consultations were superficial, often serving as a formality rather than a platform for genuine dialogue. This aligns with ANT's assertion that networks are only as strong as the relationships within them. When consultation processes are tokenistic, the resulting policies fail to reflect the needs and values of the broader community.

The study found that engagement practices tended to focus predominantly on technology experts and business leaders, neglecting the voices of end-users, especially marginalised groups and civil society. This exclusion not only limits the diversity of perspectives but also risks creating policies that do not resonate with the lived experiences of those affected by AI technologies.

Discussion

Different actors have varying interests in governance and policy-making, as highlighted in the findings.

Multi-Stakeholder Engagement

Dreier et al. [2022, 21] and Hu et al. [2019, 11] stress the importance of inclusive stakeholder engagement in AI governance. ANT posits that every actor, whether a marginalised community member or a technical expert, plays a crucial role in shaping the network's dynamics. The lack of inclusivity often leads to biased AI systems that do not reflect the needs and values of all segments of society. By recognising the agency of diverse stakeholders, policymakers can create more equitable governance frameworks that genuinely represent varied perspectives.

Bridging the Developer-Community Gap

Mensah [2023, 6] highlights the disconnect between AI developers and affected communities. According to ANT, this gap can be understood as a failure in the network of actors to effectively communicate and collaborate. Regular stakeholder engagement sessions, proposed by Mensah, can be viewed as attempts to reinforce connections within the network. These sessions aim to facilitate dialogue, allowing stakeholders to voice concerns and contribute to the AI development life cycle. By fostering ongoing communication, stakeholders can better understand how their input influences AI technologies, thereby enhancing transparency and accountability.

Collaborative Platforms for Ethical Guidelines

Díaz-Rodríguez et al. [2023, 24] and Dreier [2022, 20-22] advocate for collaborative platforms where stakeholders can co-create ethical guidelines for AI deployment. From an ANT perspective, this approach recognises that ethical standards are not predetermined but are constructed through interactions among diverse actors. By creating spaces for collaboration, stakeholders can negotiate and redefine ethical considerations, ensuring that guidelines reflect the collective values and concerns of all involved. This participatory approach fosters a sense of ownership regarding AI technologies and their implications, empowering stakeholders to influence governance actively.

Implications of AI Governance and Policy Making in Zimbabwe

The implications of AI governance and policy-making in Zimbabwe are profound, emphasising the need for inclusive and participatory frameworks. Ensuring that marginalised and non-technical stakeholders are actively involved in AI policy discussions can lead to more robust and representative governance, ultimately reflecting the diverse values of society. Understanding the dynamics between various actors within the stakeholder network is crucial for identifying barriers to effective engagement and facilitating collaboration. Involving a broad range of stakeholders in defining ethical standards can result in guidelines that are culturally sensitive and relevant to local contexts. Sustained engagement throughout the AI life cycle fosters transparency and builds trust among stakeholders, contributing to more responsible AI practices.

Overall, a comprehensive approach to AI governance in Zimbabwe not only enhances ethical considerations but also promotes social equity, ensuring that AI technologies serve the interests of all citizens. The application of Actor-Network Theory to the study of AI governance in Zimbabwe underscores the critical importance of multi-stakeholder engagement. By recognising the interconnectedness of various actors and fostering inclusive dialogue, policymakers can develop more ethical, transparent, and accountable AI systems that reflect the diverse needs of society. This approach not only enhances the governance landscape but also promotes a collaborative atmosphere essential for addressing the complex challenges posed by AI technologies.

Recommendations for Enhancing Stakeholder Engagement

Based on the findings, several actionable recommendations emerged to enhance stakeholder engagement in AI governance. Firstly, implementing awareness campaigns is crucial for educating stakeholders about AI technologies and their implications. These campaigns should target diverse audiences, including rural communities, to ensure broad participation. Secondly, establishing transparent decision-making processes can help build trust among stakeholders. Clear communication about how their input is considered in policy formulation can mitigate feelings of disenfranchisement. It is also essential to create platforms that amplify the voices of marginalized groups, ensuring their perspectives are integrated into governance discussions. Dedicated forums or advisory committees focusing on the needs of vulnerable populations can facilitate this inclusion.

Thirdly, strengthening institutional frameworks is vital for developing a cohesive governance structure for AI, which clarifies roles and responsibilities among various stakeholders. This framework should promote collaboration among public, private, and civil society actors. Lastly, leveraging technology to facilitate engagement can enhance participation by utilizing online platforms. Such platforms allow for the gathering of input from a wider audience and enable contributions regardless of geographical barriers.

Conclusion

This study highlighted the critical role of stakeholder engagement in the governance and policy-making processes surrounding AI in Zimbabwe. Through the lens of Actor-Network Theory, the findings reveal the complex interplay between various stakeholders, their perceptions, and the power dynamics that influence engagement practices. While opportunities exist for enhancing AI governance and policy-making through inclusive participation, significant barriers remain. Addressing these barriers requires concerted efforts to raise awareness, promote transparency, empower marginalised voices, and strengthen institutional frameworks. By fostering a more equitable and participatory governance and policy-making landscape, Zimbabwe can better harness the potential of AI technologies while addressing the ethical, legal, and social concerns that accompany their deployment. The integration of diverse perspectives in AI governance will not only lead to more effective policies but also ensure that the benefits of AI are shared broadly, contributing to the overall well-being of Zimbabwean society.

References

Bokhari, S.A.A. and Myeong, S., 2023. The influence of artificial intelligence on e-Governance and cybersecurity in smart cities: A stakeholder's perspective, *IEEE Access* 11: 5-6.

Cihon, P., Schuett, J. and Baum, S.D., 2021. Corporate governance of artificial intelligence in the public interest, *Information* 12(7): 275.

Resseguier, Anaïs, Brey, Philip, Dainow, Brandt, Drozdzewska, Anna, 2021. *SIENNA D5.4: Multi-stakeholder Strategy and Practical Tools for Ethical AI and Robotics*, Zenodo, published 29 September 2021, URL = https://zenodo.org/records/5536176

Díaz-Rodríguez, N., Del Ser, J., Coeckelbergh, M., De Prado, M.L., Herrera-Viedma, E. and Herrera, F., 2023. Connecting the dots in trustworthy artificial intelligence: From AI principles, ethics, and key requirements to responsible AI systems and regulation, *Information Fusion* 99: 1-16.

Dreier, V., Gelissen, T., Oliveira, M., Riezebos, S., Saxena, R., Sibal, P., Yang, S.Y., 2022. Multi-stakeholder AI development: 10 building blocks for inclusive policy design, *UNESCO Publishing*.

Ernst, E., Merola, R. and Samaan, D., 2019. Economics of artificial intelligence: Implications for the future of work, *IZA Journal of Labour Policy* 9(1): 1-35.

Ghosh, A., Saini, A. and Barad, H., 2025. Artificial intelligence in governance: Recent trends, risks, challenges, innovative frameworks and future directions, *AI & SOCIETY*: 1-23.

Gordon, J.S. and Gunkel, D.J. 2025. Artificial intelligence and the future of work, *AI & SOCIETY* 40(3): 1897-1903.

Hlongwane, J., Shava, G.N., Mangena, A. and Muzari, T., 2024. Towards the integration of artificial intelligence in higher education: Challenges and opportunities in the African context, a case of Zimbabwe, *Int J Res Innov Soc Sci* 8(3S): 417-435.

Hu, X., Neupane, B., Echaiz, L.F., Sibal, P., Rivera Lam, M,. 2019. Steering AI and advanced ICTs for knowledge societies: A rights, openness, access, and multi-stakeholder perspective, *UNESCO Publishing*.

Hwabamungu, B., Brown, I., Williams, Q., 2018. Stakeholder influence in public sector information systems strategy implementation: The case of public hospitals in South Africa, *International Journal of Medical Informatics* 109: 39-48.

Kallina, E. and Singh, J., 2024. Stakeholder involvement for responsible AI development: A process framework, in *Proceedings of the 4th ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimisation* 2024 Oct 29: 1-14.

Latour, B., 1996. On actor-network theory: A few clarifications, *Soziale Welt*: 369-381.

Limani, E., Hajdari, L., Limani, B., Krasniqi, J., 2024. Enhancing stakeholder engagement: Using the communication perspective to identify and enhance stakeholder communication in place management, *Cogent Business & Management* 11(1): 2383322.

Kinney, M., Anastasiadou, M., Naranjo-Zolotov, M., Santos, V., 2024. Expectation management in AI: A framework for understanding stakeholder trust and acceptance of artificial intelligence systems, *Heliyon* 10(7).

Marmolejo-Ramos, F., Workman, T., Walker, C., Lenihan, D., Moulds, S., Correa, J.C., Hanea, A.M., Sonna, B., 2022. AI-powered narrative building for facilitating public participation and engagement, *Discover Artificial Intelligence* 2(1): 7.

Mensah, G.B., 2023. Artificial intelligence and ethics: A comprehensive review of bias mitigation, transparency, and accountability in AI systems, *Preprint*, November 10(1): 1.

Pallett, H., Price, C., Chilvers, J., Burall, S., 2024. Just public algorithms: Mapping public engagement with the use of algorithms in UK public services, *Big Data & Society* 11(1): 12.

Radu, R., 2021. Steering the governance of artificial intelligence: National strategies in perspective, *Policy and Society* 40(2): 178-193.

Robles, P., Mallinson, D.J., 2025. Artificial intelligence technology, public trust, and effective governance, *Review of Policy Research* 42(1): 11-28.

Sharma, G.D., Yadav, A., Chopra, R., 2020. Artificial intelligence and effective governance: A review, critique and research agenda, *Sustainable Futures* 2: 1.

Wamba-Taguimdje, S.L., Wamba, S.F., Kamdjoug, J.R.K., Wanko, C.E.T., 2020. Influence of artificial intelligence (AI) on firm performance: The business value of AI-based transformation projects, *Business Process Management Journal* 26(7): 1893-1924.

Wolff, J., Pauling, J., Keck, A., Baumbach, J., 2020. Systematic review of economic impact studies of artificial intelligence in health care, *Journal of Medical Internet Research* 22(2).

Indigenous Cultures and Environmental Preservation

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Abstract

Indigenous cultural and religious practices made it possible for tribes to coexist peacefully with their surroundings. This promoted a balanced and sustainable utilisation of natural resources. Today, the world is stirring at an environmental disaster of catastrophic magnitude. This is practically experienced through drastic environmental degradation and extraordinary changes in weather patterns, among others. This has brought a plethora of related effects, such as diseases that are continually being discovered. These conditions are risky to humanity if they continue unabated because there is a link between human activity and the destruction of the ecosystem. This paper, therefore, draws from our African indigenous cultural practices to rediscover how they preserved the ecosystem. This can be an African contribution to the larger pool of initiatives toward environmental preservation. The work is guided by the following questions: i. What are the threats of environmental degradation in Kenya? ii. What are those indigenous African cultural practices that critically enabled the preservation of the environment? iii. What strategies are adoptable and applicable in contemporary times for the enhancement of environmental preservation? This is fundamentally important in conscientizing all persons in society toward their responsibility in environmental preservation, as declared in the Laudato Si! movement initiated by the late Pope Francis.

Keywords: Indigenous Cultures, environmental disaster, ecosystem preservation, contemporary, conscientizing

Introduction

Indigenous cultural and religious practices have long enabled tribes to coexist harmoniously with their environments, fostering a balanced and sustainable use of natural resources. However, the world today faces an environmental crisis of catastrophic proportions, marked by severe ecological degradation and unprecedented shifts in weather patterns. These changes have led to a cascade of adverse consequences, including the emergence of new diseases and heightened risks to human populations. The persistent link between human activities and environmental destruction necessitates a reevaluation of traditional practices that once supported ecological balance. This paper aims to explore African indigenous cultural practices that have historically contributed to ecosystem preservation. This article argues that confronting the acute environmental degradation in Kenya requires a theoretical understanding of the human-nature nexus. By analysing indigenous African cultural practices, the paper uncovers a proven model of sustainable mediation. The final section explores how to adapt these principles for contemporary application, asserting that such cultural reinvigoration is essential for effective and equitable preservation.

Local tribesman fishing with a net on a stick at the top of Victoria Falls during sunset, Zimbabwe. Photo by Ed Wingate on Unsplash

The Threats of Environmental Degradation in Central Kenya

In Central Kenya, many people still live within their cultural context despite the onslaught of forces of modernisation. This might not be easily noticed when society is living within what is assumed to be normal daily experiences. However, during extraordinary circumstances when a society is facing challenges like severe droughts, Africans and people from Central Kenya quickly return to their traditional beliefs and practices [Mbiti, 1991]. Under the threat of severe environmental degradation, we take recourse from our traditional beliefs and practices to mitigate the threat.

Most parts of Central Kenya are now urbanised. This has come along with the mega construction of infrastructures like roads and houses that have gradually turned some sections of Central Kenya into a jungle of stones. Some parts of Central Kenya that were predominantly calm and peaceful are now turned into business hubs. Traffic and noise pollution are the order of the day. Natural rivers that used to provide clean water and create a serene environment for city dwellers are now dumping sites. Heaps of garbage are stretching for many kilometres in Nairobi's

Eastlands, producing the most disgusting odour.

City dwellers are literally pushed to the edge of life, and many contagious diseases are spreading like wildfire. Psychologically, many Nairobians are overwhelmed by air and noise pollution. Cases of suicide, murder, and other vices are on the rise as the standards and value of life in the city are compromised. The worrying factor is that people do not take individual responsibility for the impending environmental crisis. Rather, they point an accusing finger at the elected members of the City Council for their inability to govern and put strategies in place that can contain and develop a better environment. Due to unmitigated levels of corruption, it is certain that our environmental crisis is an issue that will remain unattended.

Large populations in Central Kenya are predominantly agriculturalists. Therefore, they depend on physical environmental resources for their livelihoods. Pressure has been placed on the available resources as a result of the growing population, fossil fuel use, and global climate change. This has resulted in the abuse or deterioration of essential resources like soil, water, animals, and forests. This is resulting in profound severe ecological degradation.

The major environmental issues include flooding, water shortage, river silting, deforestation, soil erosion, desertification, degraded water quality, poaching, and domestic and industrial pollution, as well as an increase in human-wildlife conflicts, poverty, overcrowding, war, and human rights abuses. The contribution of indigenous religious practices and beliefs to environmental preservation has not received much scientific attention. Apparently, these religious beliefs and practices are frequently disregarded or dismissed during environmental conservation strategies and debates by contemporary scientists and scholars who are also proponents of secularisation [Nyandika, 2019]. There is increased dependence on science and technology, which is an unattainable exercise because of cost implications and expertise that are not affordable within the local context. Efforts to promote environmental consciousness cannot stand if they are not supported by regional, national, and global policies that enhance environmental preservation.

Human-Environment Relationship Theory

This study is guided by the Human-Environment Relationship theory [Ingold, 1992], which posits that human interaction with nature is mediated by culture and belief. This framework is apt for analysing how communities in Central Kenya historically negotiated their ecosystem. The theory elucidates a dynamic relationship: humans adapt to the environment, actively shape it to their needs, and are in turn shaped in character by it through cultural lenses.

We apply this triad to Central Kenyan indigenous knowledge: (1) Adaptation is seen in rituals regulating resource use; (2) Shaping is evident in agro-ecological methods like terracing; and (3) Mutual Influence is embodied in beliefs that sacralize nature, fostering a conservation ethic. While this theory provides a vital macro lens, it often lacks specificity on cultural mechanisms. This research, therefore, seeks to deepen its application by detailing the precise practices of Central Kenyan communities, thereby exploring a community's tangible capacity for environmental preservation – a dimension the theory acknowledges but seldom elaborates.

Indigenous African Cultural Practices for Preservation of the Environment

Indigenous religious beliefs and practices are the values, customs, laws, symbols, and rituals that members of a particular community uphold and pass down from one generation to the next. They include aspects of religious beliefs that are visible and aspects that are hidden from conscious awareness [Hans & Neil, 1992]. It is in this sense that nature is never only "natural" for a religious person; since nature is a sacred creation of the gods, it is imbued with religious significance. It is in this regard that [Francis, 2015] alluded that:

"Efforts to promote a sustainable use of natural resources are not a waste of money, but rather an investment capable of providing other economic benefits in the medium term. If we look at the larger picture, we can see that more diversified and innovative forms of production, which have less impact on the environment, can prove very profitable. It is a matter of openness to different possibilities which do not involve stifling human creativity and its ideals of progress, but rather directing that energy along new channels."

The gods accomplished more than just communicating sacrality, as in the case of an object consecrated by the divine presence; they exhibited the various modalities of the sacred in the world's structure and cosmic process. The world presents itself in a way that helps the religious person learn about the various ways of being holy and in contemplation. The planet appears to be the creation of the gods and has orderly structures free from disorder. The various facets of the divine are organically revealed by these cosmic works. For instance, [Wanjohi, 1997] noted that the ground takes on the role of a mother and nurse, while the sky demonstrates the transcendence of the divine. The modes of being and sacrality are revealed by the cosmic rhythm that makes harmony, permanence, and order evident.

Historically, there are numerous instances of diverse communities' religious beliefs and practices closely related to their environment. The United Nations [2017] Conference on Environment and Development identified the contribution of indigenous knowledge as beneficial and urgently needed for the protection of the ecosystem. Due to enormous potential for environmental conservation for sustainable living and as a reaction to global environmental deterioration and climate change, the protection, management, and security of ecological and sacred sites have recently attracted attention on a global scale. The local people and the environment have a symbiotic relationship, and maintaining such sites is usually tied to conserving local culture, religious beliefs, and practices [Francis, 2020].

In the 19th century, the move towards environmental conservation came from elite hunting communities in North America and the United Kingdom. This was the result of a notable decrease in game animals, which ushered in the "age of preservation." Following this, the idea of conservation began to encompass not only preventing animal hunting but also the duty of humans to preserve the environment [Ladle & Whittaker, 2011]. The idea of nature encapsulated the importance of contemplation and beauty in nature as an essential component of many people's cultural legacies. This was followed by the construction of natural monuments throughout Europe and other continents. These spots were guarded and kept off limits as "fortress conservation." This led to a number of ideas that humans are to blame for the devastation of nature and that human activity is responsible for almost all biodiversity loss.

Diverse societies, through indigenous religious beliefs and cultural practices, have varied insights, beliefs, and practices concerning the use of water, land, and wildlife resources. The Awa people of the Amazon rainforest consider the jungle to be sacred and their source of food; hence, they forbid any human activity in the reserved forest areas. In India, Jharkhand is statistically undisputed to be the most biodiverse region globally [Devis & Choyal, 2024]. It is associated with extraordinary tribal inhabitants who share a harmonious union with the environment. These communities live harmonious lives in close connection with the environment and rely on it for survival. To protect and maintain the environment and natural resources, their religious taboos and beliefs have evolved. Due to totemism among many cultural communities, most plant and animal species in India have been safeguarded.

The majority of African civilisations prohibit the improper use and ingestion of specific environmental products. African communities believe that gods, goddesses, or spiritual beings reside in areas that are protected from utilisation, entrance, exploitation, and agricultural activities. The Igbo society has preserved old religious practices that are ecologically friendly. For example, they accept a causal relationship between the natural set-

ting and the moral state of its inhabitants, which predicates that the environment is sacred. The Shona belief system can be leveraged to increase agricultural production and environmental preservation in modern society. The indigenous cultural beliefs and knowledge are pivoted on a holistic philosophy that views and advocates for unity between humanity and the environment [Mehta, 2017]. The harmony between the environment and humankind inspires the Shona community to use natural resources sustainably and encourages the preservation of the environment.

In Kenya, most traditional communities have their lives punctuated by many rituals at every stage of life. The spiritual, ethical, and environmental principles that promote ecological protection are typically incorporated in rituals [Wanjohi et al., 2020]. For instance, young males in the Rendile, Bukusu, and Maasai undergo a period of seclusion in the jungle during the circumcision ceremony to acquire skills pertaining to family obligations. The communities, therefore, respect and protect the forest where those rituals or training take place. These forests are sacred and are also a primary source of herbs. The Mijikenda people of the coastal region use their indigenous knowledge to preserve the Kaya forest as a sacred grove. Religious beliefs and practices have helped conserve common bird species and other bioindicators. Today, the Kaya forest is recognised as a World Heritage Site for vulnerable species and traditional methods of caring for species by the International Union for Conservation of Nature.

These African cultural and religious beliefs and practices that foster environmental management and preservation are eroded by modernisation. This calls for an urgent need to reconsider the strategies and principles of African indigenous religious cultural practices to reinvigorate the preservation and management of natural resources.

Local tribesman fishing with a net on a stick at the top of Victoria Falls during sunset, Zimbabwe. Photo by Ed Wingate on Unsplash.

Adoptable Traditional Religious Practices

Like other African societies, people in Central Kenya maintain a worldview that has a religious character, which informs their relationship to the natural environment. God is the creator, sustainer, provider, protector, and nourisher. God penetrates all His creatures with His presence. Therefore, we must not treat creatures—animals, plants, etc.—recklessly but deal with them sensitively, with empathy and reverence. Whoever commits a fault against creatures commits a fault against God, the Creator Himself [Bujo, 1988]. For an African, the environment has both religious and physical dimensions [Mbiti, 1991]. Therefore, there exists a thin distinction between the religious and physical world in African ontology [Mtetwa, 1996].

The sacredness of the environment is not only because God created it, but also because of its ontological sacredness and significance. Among the Agikuyu, nature is seen as the abode of spirits and deities manifested through preserving sacred groves (forests, hills, riverbanks, and water catchment areas) [Mbiti, 1991]. Setting aside places shows deep environmental reverence for their ontological sacredness. They designate such areas for religious ceremonies like oaths, appeasing evil spirits, and cleansing members believed to have committed serious crimes. They also consider places inhabited by clan gods and spirits, where cosmic energies or forces converge to enable communication with ancestors. There was an excellent mutuality between nature and humanity.

The forest was viewed as a weather regulator. Giant trees pull the rain from the skies [Gathogo, 2013]. This explains why prayers and sacrifices for rain were either done in the forest or under a big tree. Some trees were viewed as windbreakers, sources of habitat for other animals, and hideouts for human beings during inter-ethnic or inter-clan disputes. Children, women, older people, and animals were hidden in the forest during raids by enemies. For this reason, no paths were allowed in the forest. Africans are notoriously eco-friendly.

The Agikuyu people also practised traditional enclosure, which helps combat land degradation and pastoral mobility as a proper grazing system [Wanjohi, 1997]. Closer within the context of the Agikuyu meant that after farming or grazing in a piece of land for a duration of time, they would leave that area bare for some time in order to recuperate or regain its fertility. This exhibits a profound presence of indigenous knowledge for the preservation of biodiversity and management of rangelands.

There was a concerted effort among the Agikuyu aimed at preserving some rare species of animals and plants. For instance, there were construction-related taboos that surrounded building, from site selection to the materials used in construction. In this context, the community was prohibited from eating lazy animals such as snails due to a belief that they transmitted laziness. These animals were also perceived to be helpless, and if eaten, they might be easily wiped out of an ecosystem [Kenyatta, 1938]. Scare trees species are those that take a long time to mature and are not used for firewood or construction for outstanding environmental lessons. A building could not be erected where a fig tree grew, as the sacred tree could never be planted. The tree is considered sacred and is protected based on its potential to attract all sorts of animals, birds, and insects beneath it [Amutabi, 2017].

Conclusion

The introduction of Christianity, Islam, and the paradigm of scientific modernity to Africa instigated profound changes in the cultural perception of the ecosystem. This shift fostered a dichotomous worldview that increasingly objectified the environment, stripping it of its inherent sacredness and reducing it to a mere resource for exploitation.

In contrast, African traditional religions and cultural practices are anchored in a holistic ethos that cultivates mutual respect and reciprocity with the natural world. Through taboos, totems, and the sacralization of places, these systems encoded an environmental ethic—exemplified by the Agikuyu community of Central Kenya—that mandated conservation and sustainable use. This framework shaped not only behaviour but also indigenous architecture and land-use patterns, ensuring that human activity remained integrated within ecological limits.

Central to this philosophy is the recognition of the environment as a subject, not an object. While economic and religious use of natural resources is permitted, it is governed by normative constraints that prevent exploitation. The preservation of sacred forests and species-specific taboos is are prime example of regulations that cultivated a conscientious African attitude toward environmental stewardship.

A critical finding of this work is that contemporary environmental degradation, notably from unchecked construction and infrastructure development, starkly contrasts with indigenous planning principles. African societies did not erect buildings randomly; sacred sites and critical habitats were protected from disruption. This wisdom urgently calls for the integration of similar ecological consciousness into modern urban and regional planning.

Ultimately, the environmental crisis in Central Kenya and beyond demands a reevaluation of this inherited wisdom. The knowledge embedded in African indigenous practices is not a relic of the past but a vital resource for the present. It advocates for a return to personal and communal responsibility, offering a culturally-grounded blueprint for sustainability. As supported by the vision of Laudato Si', the path forward requires policies and mindsets that once again see the natural world as a sacred trust, imperative for the well-being of all creation.

References

Amutabi, M., 2017. *African Indigenous Knowledge and Environmental Management*, Nairobi: Paulines Publications.

Bujo, B., 2009. *Is There a Specific African Ethics? Towards a Discussion with Western Thought*, ed. Munyaradzi Murove, University of KwaZulu-Natal Press: 113–128.

Candlish, Stewart, 2007. *The Identity Theory of Truth*, The Stanford Encyclopedia of Philosophy (Spring 2007 Edition), ed. Edward N. Zalta, URL = http://plato.stanford.edu/archives/spr2007/entries/truth-identity/

Devis, H.C., Choyal. G., 2024. "Conservation Practices of Plants Within the Socio-Religious Context of the Meiteis in Manipur," *Naturalista Campano* 28/2: 188–195.

Gathogo, J., 2013. *Environmental Management and African Indigenous Resources: Echoes from Mutira Mission*, Kenya, Nairobi: Acton Publishers.

Hans, H., Smelser, N.J., 1992. *Social Change and Modernity*, University of California Press.

Ingold, T., 1992. *Culture and the Perception of the Environment*, Routledge.

Kenyatta, J., 1938. *Facing Mount Kenya: The Traditional Life of the Gikuyu*, Heinemann.

Ladle, R.J., Whittaker, R.J., eds., 2011. *Conservation Biogeography*, Blackwell Publishing.

Mbiti, J., 1991. *Introduction to African Religion and Philosophy*, 2nd ed., Heinemann.

Mehta, S., 2017. "Role of Traditional Practices in Conserving the Environment: A Case of Manesar Village, Gurgaon," *Journal of Humanities and Social Sciences* 22/11: 45–52.

Mtetwa, S., 1996. "African Spirituality in the Context of Modernity," *Bulletin for Contextual Theology in Southern Africa and Africa* 3/1: 12–20.

Nyandika, O., 2024. *Environmental Crisis in Central Kenya*, URL = <search?q=Environmental+crisis+in+central>.

Pope Francis, 2015. *Laudato Si: On Care for Our Common Home*, Nairobi: Publications Africa.

Wanjohi, G.J., 1997. *The Wisdom and Philosophy of the Agikuyu Proverbs: The Kihooto World-View*, Pauline Publications.

Wanjohi, G.J., 2020. *Indigenous Knowledge and Environmental Conservation*, Nairobi: University of Nairobi Press.

Indigenous Knowledge Systems (IKS) and Artificial Intelligence for Climate Change in Zimbabwen

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Abstract

Climate change presents a global challenge that demands innovative, inclusive, and context-sensitive responses. A significant research gap exists regarding the systematic, ethical, and effective integration of IKS into AI systems, particularly in rural African contexts. This study explores the integration of Indigenous Knowledge Systems (IKS) with AI as a culturally embedded approach to climate change adaptation and mitigation. Employing a qualitative research design, including semi-structured interviews, direct observation, and content analysis, this research draws on sociometric theory to examine community social structures and identify key custodians of Indigenous knowledge. These insights inform the development of context-aware AI models capable of incorporating traditional knowledge into climate solutions. Triangulation of qualitative data ensured depth and cultural relevance in assessing the approach's effectiveness. Findings reveal that integrating IKS into AI strengthens local applicability and acceptance of climate interventions while fostering the preservation and recognition of traditional knowledge. The study offers insights with implications for policy, sustainable development, and inclusive innovation, particularly in regions vulnerable to climate change. This research highlights the importance of leveraging diverse knowledge systems to co-create resilient, community-driven responses to environmental challenges.

Keywords: Sociometric Theory, Climate Change, Artificial Intelligence, Indigenous Knowledge Systems

Introduction

Climate change remains one of the most urgent global challenges, with profound impacts on ecosystems, economies, and human communities [Malhi et al., 2020]. In Zimbabwe, its effects are increasingly evident through erratic rainfall patterns, prolonged droughts, and frequent extreme weather events. Rural areas such as Chivi District are particularly vulnerable due to their dependence on rain-fed agriculture and natural resources for livelihoods. In such contexts, innovative, locally grounded solutions are essential to strengthen community resilience and adaptive capacity. Indigenous Knowledge Systems (IKS) have garnered increasing recognition as crucial components in climate change adaptation strategies [Gaza and Masere, 2025]. These systems consist of long-standing traditions, practices, and belief structures developed through continuous interaction with local ecosystems [Berkes, 2018]. In Zimbabwe, where adaptive capacity remains limited and rural populations face increasing climate-related stressors, the integration of IKS with advanced technologies such as Artificial Intelligence (AI) presents a promising pathway for addressing environmental challenges. According to projections by the Intergovernmental Panel on Climate Change [IPCC, 2021], Zimbabwe is likely to experience rising temperatures, declining rainfall, and more frequent extreme weather events. These climatic shifts pose significant threats to food security and agricultural productivity, particularly in vulnerable regions such as Chivi District, where subsistence farming underpins the local economy. As such, the integration of traditional knowledge with cutting-edge technology is increasingly viewed as a strategy to enhance resilience and sustainability. IKS have proved to offer locally relevant, sustainable approaches to managing natural resources, predicting weather patterns, and guiding agricultural practices. When combined with the predictive and analytical capabilities of AI, which can process large datasets and generate climate models, these traditional systems can be reinforced and revitalised [Reed et al., 2019]. The convergence of IKS and AI thus holds significant potential for improving climate preparedness and informed decision-making, especially in resource-constrained rural settings.

Background and Research

Chivi District in Masvingo Province, Zimbabwe, is experiencing severe impacts from climate change, including erratic rainfall patterns, prolonged droughts, and extreme weather events that jeopardise the livelihoods of its predominantly agricultural communities [Magwegwe et al., 2024: 126]. Traditional farming practices, which have sustained these communities for generations, are increasingly inadequate in addressing these emerging environmental challenges. With limited literature, there is consequently an urgent need for innovative approaches that integrate Indigenous Knowledge Systems (IKS) with modern technologies, particularly Artificial Intelligence (AI), to enhance community resilience and safeguard food security under changing climatic conditions. Despite the potential benefits of such integration, the methods and frameworks for effectively combining these distinct knowledge systems remain insufficiently explored. Critical questions persist regarding the contextual relevance, cultural sensitivity, and practical feasibility of implementing hybrid IKS-AI approaches in rural Zimbabwean settings.

The integration of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) offers both opportunities and challenges that warrant careful exploration. This study is therefore guided by the following research questions: How can Indigenous Knowledge Systems be effectively integrated with Artificial Intelligence to enhance climate change resilience in Chivi District? What social dynamics and power structures influence the transmission and adoption of Indigenous Knowledge within the community? How can AI algorithms be designed to incorporate Indigenous Knowledge in a manner that is culturally sensitive and contextually relevant? and What are the anticipated benefits and potential challenges associated with the integration of IKS and AI in addressing the impacts of climate change?

Recent Initiatives

Recent initiatives demonstrate the promising potential of integrating Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) to enhance climate resilience. The Climate Change Adaptation and Resilience project in Kenya combines traditional ecological knowledge with AI technologies to promote climate-smart agricultural practices. This initiative has successfully supported thousands of farmers by leveraging AI-driven, locally tailored weather forecasts and agricultural advice aligned with Indigenous practices [O'Neill et al., 2021]. The Indigenous Climate Change Assessment in Canada also applied AI to systematically document and analyse IKS, ensuring Indigenous perspectives are incorporated into climate change discourse and policymaking processes. Indigenous Knowledge Systems offer a rich, context-specific, and holistic approach to environmental management, with a strong emphasis on community engagement and participatory decision-making. These systems provide low-cost, adaptive solutions but face challenges in scalability due to reliance on oral transmission, which risks knowledge erosion over time [Sillitoe, 2002]. Conversely, AI excels in scalability and large-scale data processing, enabling more precise climate modelling and resource optimisation. However, adopting AI in resource-constrained contexts is complicated by issues such as data bias, limited contextual relevance, and high implementation costs. The convergence of IKS and AI thus presents a compelling avenue to bolster climate resilience, particularly in vulnerable communities such as those in Chivi District, Masvingo Province, Zimbabwe. Therefore, by synthesising the strengths of traditional knowledge and cutting-edge technology, this hybrid approach offers sustainable, equitable, and culturally appropriate solutions that empower communities to participate actively in climate adaptation efforts.

Indigenous Knowledge Systems (IKS)

Vogel and Bullock [2021] emphasise the critical role of integrating Indigenous Knowledge Systems (IKS) with scientific approaches to enhance climate resilience. Their study in Canada highlights how Indigenous communities hold unique and valuable insights into local ecosystems and sustainable practices. The authors advocate for collaborative frameworks that honour Indigenous rights and knowledge, ensuring AI tools are developed in partnership with these communities to maximise cultural relevance and effectiveness. Similarly, Gomes and Guerra [2023] examine case studies from the USA where the integration of IKS into climate adaptation strategies has yielded culturally relevant and effective climate action plans. They call for policy reforms that recognise IKS as a vital component of climate science and for increased funding to support projects merging AI with traditional knowledge. Ayoola et al. [2024] explore how AI can support the documentation and dissemination of Indigenous knowledge on biodiversity conservation in the USA. They recommend developing accessible, AI-powered platforms that empower Indigenous communities to share knowledge widely while retaining control over its use.

IKS represent a vital resource for communities in Zimbabwe's Chivi District, contributing significantly to climate change adaptation and food security. These knowledge systems have evolved through sustained interactions between people and their environment, forming rich, context-specific, and culturally embedded understandings [Berkes, 2018]. Their deep-rooted connection to local ecosystems allows communities to address environmental challenges with a nuanced understanding often absent in conventional scientific approaches, which may overlook these critical contextual insights [Belle et al.]. IKS embody a holistic environmental management approach, integrating social, spiritual, and ecological dimensions [Nakashima et al., 2019]. Traditional agricultural practices, for example, frequently involve rituals and communal gatherings that strengthen social cohesion while promoting sustainable resource use, thereby enhancing resilience amid climate variability [Gadgil et al., 2003].

A key strength of IKS lies in its emphasis on community participation. Local communities are central to decision-making, fostering ownership of environmental stewardship [Mercer et al.]. This inclusive approach increases the likelihood of successful climate adaptation strategies as interventions align with community values and knowledge. Furthermore, IKS often present low-cost, locally appropriate solutions, especially important in resource-constrained settings by leveraging accessible materials and practices without requiring expensive technologies [Thornton et al.]. Their adaptive nature, shaped by continuous evolution, allows traditional practices to respond flexibly to changing environmental conditions [Berkes et al.]. Indigenous communities worldwide have demonstrated this adaptability by modifying agricultural methods to cope with shifting weather patterns.

Nonetheless, Indigenous Knowledge Systems face significant challenges. Their scalability is limited, as practices effective in one locality often do not easily transfer to different geographic or cultural settings [Gondo et al.]. Furthermore, the oral transmission of much Indigenous knowledge complicates efforts to preserve and disseminate it across generations and regions, increasing the risk of loss and cultural erosion [Grey et al.].

AI Algorithms

Artificial Intelligence algorithms bring distinct advantages and constraints to climate change mitigation. AI has proved to be capable of rapid, large-scale data analysis, enabling the detection of patterns and trends not readily discernible through traditional methods, enhancing climate understanding and informing policy and interventions [Hawkins et al.]. Predictive modelling is another critical benefit of using AI models. AI models have proved capable of forecasting climate-related events such as extreme weather by analysing historical data and key indicators, facilitating proactive risk management [Fischer et al.]. AI models have also proved to optimise resource management through automation. A good example is AI-driven irrigation systems that adjust water use based on weather predictions, thereby promoting efficiency and sustainability [Zhou et al.]. Its ability to integrate diverse data sources further enriches climate models, providing comprehensive, multi-dimensional views of environmental scenarios [Teng et al.].

However, AI implementation faces challenges, including data bias, contextual limitations, and significant costs, which may exacerbate inequalities in resource-poor environments [Obermeyer et al.]. For AI to be effective and equitable, it must be designed with cultural sensitivity and respect for Indigenous knowledge.

Comparison of IKS and AI Algorithms

Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) offer complementary strengths while facing distinct challenges. IKS are highly valued for their contextual relevance, holistic approach to environmental management, and strong emphasis on community engagement—factors crucial for tackling complex climate issues. In contrast, AI's strengths lie in its scalability, advanced data analytics, and predictive capabilities. The low-cost, adaptive nature of IKS stands in contrast to AI's often high implementation costs and susceptibility to bias [Fischer et al.]. While IKS struggles with limited scalability and dependence on oral transmission, which hinders wider application, AI's technical capacities enable broader reach but require careful adaptation to local contexts to avoid mismatches.

Hybrid Approach

Integrating Indigenous Knowledge Systems (IKS) and AI presents a promising hybrid model to enhance climate resilience. One key strategy involves incorporating IKS into AI algorithms, as embedding traditional knowledge improves contextual accuracy and cultural relevance. Additionally, AI can be used to document and preserve IKS by digitising oral traditions, enabling broader intergenerational knowledge transfer.

Developing community-based AI initiatives is another vital approach; co-creating AI solutions with local communities ensures relevance, ownership, and effective climate adaptation. Furthermore, integrating traditional knowledge into climate modelling allows AI-enhanced models to provide nuanced, accurate predictions that inform decision-making. This hybrid approach leverages the strengths of both IKS and AI, fostering sustainable, equitable, and culturally grounded climate solutions. It empowers vulnerable communities to actively shape their adaptation strategies while bridging traditional and modern knowledge systems.

The literature revealed significant potential in merging Indigenous Knowledge Systems with Artificial Intelligence to bolster climate resilience. This synergistic integration respects cultural traditions while harnessing technological advances, promoting sustainable practices and community empowerment. Therefore, by combining these forms of knowledge, vulnerable communities can better navigate the challenges of climate change and contribute to shaping resilient futures.

Methodology

This research employed a qualitative approach combined with an extensive literature review to comprehensively investigate the integration of Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) for enhancing climate change resilience in Chivi District, Zimbabwe. The use of qualitative methods allowed the study to capture the complex community dynamics and the multifaceted nature of IKS.

In-depth interviews were carried out with 50 key informants, including local leaders, elders, traditional knowledge holders, and agricultural experts. These interviews gathered rich, detailed insights into individual experiences with climate adaptation strategies and the role of IKS. Focus group discussions brought community members together to explore their perspectives on climate change, the value of IKS, and the potential integration of AI technologies. This participatory approach enriched the data and encouraged community engagement and ownership of the research process.

Sociometric analysis played a crucial role in identifying key IKS knowledge holders and mapping social networks within the community. Sociometric techniques visualised relationships among community members, revealing influential individuals who possessed critical traditional knowledge. This analysis deepened understanding of how knowledge was transmitted and utilised within the community, highlighting the social structures supporting IKS.

A literature review identified AI algorithms suitable for climate resilience applications. Collaboration with local stakeholders took place through co-design workshops, where AI tools incorporating IKS were developed. These workshops facilitated knowledge exchange between technologists and community members, ensuring AI algorithms were culturally sensitive and contextually appropriate. This collaborative process empowered local stakeholders by involving them directly in technological development, thereby enhancing the likelihood of successful adoption and implementation.

Findings and Discussion

The integration of Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) offers a distinctive opportunity to enhance climate resilience in Chivi District, Zimbabwe. Drawing on interviews, observations, and literature review, this study identified key traditional practices with potential for synergy with modern technology.

Flocking Birds as Weather Indicators

Local communities have long used the behaviour of flocking birds as a natural indicator to predict weather patterns. Machine learning models, such as Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) networks, can analyse large datasets combining historical bird migration patterns with recorded weather data. These models identify complex patterns and trends that may not be obvious through observation alone. In order to capture bird flock movements, technologies such as satellite imagery, GPS tracking devices, drones, acoustic sensors, and camera trap networks can be employed to collect spatial and temporal data on bird activity. This data, when combined with environmental variables such as rainfall, temperature, and humidity, allows AI models to learn how specific bird behaviours correlate with weather conditions over time. As a result, the AI can generate timely and accurate alerts about upcoming weather events. This integration enhances the traditional method by providing farmers with actionable, data-driven forecasts that support better decision-making for planting and harvesting.

Algorithm	Application
1. Recurrent Neural Networks (RNNs)	Suitable for time-series data, RNNs can identify trends in bird migration patterns over time, predicting future movements in relation to weather.
2. Long Short-Term Memory Networks (LSTMs)	Capturing long-term dependencies, LSTMs can analyze how historical weather patterns influence bird migration, providing insights for future conditions.
3. Support Vector Machines (SVM)	SVMs classify migration patterns based on environmental variables, predicting a typical behaviors associated with specific weather conditions.
4. Random Forests	This ensemble method analyzes diverse features related to the environment and bird behavior, improving accuracy in forecasting weather events.
5. Gradient Boosting Machines (GBM)	Effective for regression tasks, GBMs can predict weather metrics like temperature and rainfall based on historical bird migration data.

Table 1: Algorithms for Analyzing Flocking Birds

These machine learning models can enhance the predictive capabilities of traditional bird observation methods, empowering local farmers with actionable insights for effective agricultural planning.

Brewing of Traditional Beer

The brewing of traditional beer remains a vital cultural and spiritual practice, often linked to rainmaking rituals and ancestral appeasement during drought. Traditionally, elders selected optimal brewing times by observing environmental cues such as temperature, humidity, and the lunar cycle. AI models could augment this practice by analysing historical brewing events in relation to climate data. Algorithms such as Decision Trees, Multivariate Regression, Neural Networks, and Time Series Analysis were employed to determine the optimal climatic conditions for successful brewing. These models used inputs such as brewing dates, fermentation success rates, and environmental parameters, with data sourced from ethnographic interviews, weather stations, IoT sensors measuring temperature and humidity, and historical calendars. The integration of AI into this practice ensures cultural preservation while promoting climate-aligned timing that enhances both ritual efficacy and agricultural resilience.

Algorithm	Application
Decision Trees	Create models evaluating factors impacting brewing conditions, such as temperature and humidity, to determine optimal brewing times.
Time Series Analysis	Techniques like ARIMA can analyze historical brewing data alongside climate trends to forecast the best times for brewing.
Multivariate Regression Analysis	This method helps understand relationships between fermentation time, ingredient quality, and climate conditions, optimizing brewing processes.
Neural Networks	Feedforward neural networks can predict successful brewing outcomes by capturing complex relationships between brewing data and climate variables.
Reinforcement Learning	This algorithm optimizes brewing practices by simulating conditions and learning which methods yield the best results.
K-Means Clustering	An unsupervised learning algorithm to group historical brewing data into clusters based on similar conditions, helping identify optimal practices.

Table 2: Algorithms for Brewing Traditional Beer

Integrating these algorithms into the brewing process enhances the resilience and sustainability of traditional practices, ensuring cultural significance while adapting to changing climatic conditions.

Water Management Techniques

Water management techniques, particularly rainwater harvesting, are vital in the Chivi District, where communities face inconsistent rainfall and frequent droughts. Traditionally, local farmers relied on indigenous knowledge, such as observing soil dryness, plant stress, or cloud movement, to decide when and how to collect and use rainwater. While these practices have supported survival for generations, their accuracy and timing can be improved through the application of Artificial Intelligence (AI).

AI predictive algorithm models, such as Random Forest Regression, Support Vector Machines (SVM), and Long Short-Term Memory (LSTM) networks, can be trained using historical rainfall data, soil moisture levels, evapotranspiration rates, and topographical features. These models draw on data collected through IoT soil sensors, satellite imagery, weather stations, and local climate records. By analysing these variables, the models forecast rainfall trends, predict drought onset, and determine optimal irrigation schedules. This integration allows farmers to make data-driven decisions on water usage, ensuring that stored rainwater is used efficiently and sustainably. It also enhances traditional knowledge systems by combining them with scientific precision, thereby improving agricultural resilience and food security in the face of climate change.

Algorithm	**Application**
1. Random Forest Regression	Predict soil moisture levels based on environmental factors like rainfall and temperature, providing robust insights for irrigation scheduling.
2. Support Vector Regression (SVR)	Model the relationship between soil moisture and climatic inputs, capturing non-linear relationships to predict water availability.
3. Artificial Neural Networks (ANN)	Train on historical rainfall and soil moisture data to predict future moisture levels, optimizing irrigation practices.
4. Time Series Forecasting	Models such as ARIMA can analyze historical rainfall data to forecast future precipitation patterns, aiding irrigation adjustments.
5. K-Means Clustering	Categorize weather patterns and corresponding soil moisture levels to tailor irrigation strategies to specific scenarios.
6. Genetic Algorithms	Optimize irrigation schedules by simulating various strategies based on predictive models of rainfall and soil moisture
7. Reinforcement Learning	Facilitate real-time decision-making for irrigation by simulating strategies and learning which methods are most effective under changing conditions.

Table 3: Algorithms for Water Management

These algorithms enable farmers in Chivi District to develop a comprehensive water management system that conserves water and optimizes irrigation practices, ultimately improving agricultural resilience.

Observation of Seasonal Patterns of Plants

The rich indigenous knowledge of plants and their seasonal patterns presents a valuable opportunity for AI integration. Local communities often share detailed oral narratives and stories about plant behaviours, flowering times, and harvesting periods, which are traditionally passed down through generations. Natural Language Processing (NLP) models can analyse these narratives collected via interviews, focus groups, or community archives to extract key information about seasonal patterns and plant-related practices. By converting unstructured oral knowledge into structured digital data, these models help create comprehensive databases that preserve traditional wisdom and support climate-adaptive agricultural planning.

Algorithm	**Application**
1. Latent Dirichlet Allocation (LDA)	Identify themes within local narratives about plants, uncovering prevalent seasonal patterns and associated practices.
2. Named Entity Recognition (NER)	Extract specific plant names and seasonal cues from narratives, creating structured data that reflects local knowledge.
3. Sentiment Analysis	Gauge community attitudes toward certain plants and practices, providing insights into cultural significance and changes due to climate variability.
4. Word Embeddings	Create vector representations of words to analyze relationships between plants and seasonal behaviors, identifying relevance to specific conditions.
5. Clustering Algorithms	Group similar narratives based on plant characteristics and seasonal patterns, identifying common practices across communities.
6. Sequence-to-Sequence Models	Generate summaries or interpretations of seasonal patterns, distilling complex information into accessible formats for farmers.
7. Reinforcement Learning	Optimize decision-making related to planting and harvesting based on seasonal patterns through simulated scenarios.

Table 5: Algorithms for Traditional Weather Forecasting

Adopting these algorithms can enhance traditional weather forecasting methods, making them more accurate and relevant to local conditions. This integration of AI with Indigenous Knowledge Systems (IKS) not only preserves cultural practices but also equips farmers with the necessary tools to adapt to changing climatic conditions, ultimately improving agricultural resilience and food security.

By leveraging Indigenous Knowledge Systems through AI algorithms, the Chivi District can empower local communities, fostering a holistic approach to climate adaptation that respects and preserves their cultural heritage while addressing contemporary challenges.

Integrating Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) offers significant benefits for agriculture and community resilience. This fusion improves decision-making by combining traditional insights with advanced predictive analytics, enabling farmers to adapt effectively to climate change and improve crop yields. It also supports cultural preservation by documenting and respecting traditional practices within modern technological frameworks. AI enhances climate resilience through detailed local environmental analysis, aiding communities in understanding and responding to climatic shifts vital for food security. Tailoring solutions to local contexts ensures their relevance, while interdisciplinary collaboration encourages respect and innovation between indigenous knowledge holders and scientific experts.

Conclusion

This study explores the integration of Indigenous Knowledge Systems (IKS) with AI as a culturally embedded approach to climate change adaptation and mitigation. Based on its findings, community engagement must remain central to enhancing the integration of Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI), ensuring that local voices and traditional knowledge are respected and included in AI development. Firstly, capacity-building initiatives should empower community members through training programmes focused on data collection and analysis, promoting ownership and sustainability of these practices. Secondly, the establishment of open data platforms will facilitate the sharing of observations and findings, enriching datasets for AI models and encouraging collaboration across regions. Furthermore, interdisciplinary research partnerships offer opportunities to combine diverse perspectives and drive innovation. Moreover, pilot projects that merge IKS and AI across different agricultural contexts can act as effective models for broader implementation. In addition, continuous monitoring and evaluation frameworks are crucial for refining approaches and measuring their impact. Finally, advocacy for supportive policies that recognize and promote the integration of IKS and AI will improve access to resources and funding. This strategic collaboration enhances agricultural resilience and productivity while preserving cultural heritage for future generations.

References

Abegunde, V.O.; Sibanda, M.; Obi, A. 2022. Indigenous Knowledge and Science-Based Predictors Reliability and Its Implication for Climate Adaptation in Ghana. African Journal of Science, Technology, *Innovation and Development* 14(4): 1007–1019.

Adego, T.; Woldie, G.A. 2024. Integrating Indigenous Knowledge Systems into Global Climate Adaptation Policies. *International Journal of Engineering Research and Development* 20(12): 223–231.

Afuye, G.A., et al. 2022. Indigenous Knowledge and Science-Based Predictors Reliability and Its Implication for Climate Adaptation in Ghana. African Journal of Science, Technology, *Innovation and Development* 14(4): 1007–1019.

Ayoola, A., et al. 2024. Exploring AI Support for the Documentation and Dissemination of Indigenous Knowledge on Biodiversity Conservation in the USA. *Journal of Environmental Management* 300: 123–135.

Belle, J., et al. 2024. Factors Influencing Rural Women's Adoption of Climate Change Adaptation Strategies: Evidence from the Chivi District of Zimbabwe. *Climate* 12(11): 191. https://doi.org/10.3390/cli12110191.

Berkes, Fikret. 2008. *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*. 2nd ed. Routledge.

Datta, P.; Behera, B. 2024. Decolonizing Climate Change Adaptations from Indigenous Perspectives: Learning Reflections from Munda Indigenous Communities, Coastal Areas in Bangladesh. *Sustainability* 16(2): 769. https://doi.org/10.3390/su16020769.

Figueiredo, P.; Perkins, P.E. 2013. Women and Water Management in Times of Climate Change: Participatory and Inclusive Processes. *Journal of Cleaner Production* 60: 188–194.

Fischer, E.M., et al. 2019. Predictive Modeling for Climate Change Adaptation. *Nature Climate Change* 9(3): 181–188.

Gadgil, M., et al. 2003. Indigenous Knowledge for Biodiversity Conservation. *Conservation Biology* 17(5): 1410–1412.

Gaza, C. and Masere, T.P. 2025. Integrating Indigenous Knowledge Systems (IKS) in Climate Change Policies in Africa: Barriers, Strategies and Future Directions. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development* 25(1).

Gomes, S. and Guerra, P. 2023. Integrating Indigenous Knowledge into Climate Adaptation Strategies in the USA. *Climate Policy Journal* 18(4): 567–580.

Gondo, R., et al. 2022. Challenges in Scaling Indigenous Knowledge Systems for Climate Adaptation. *Journal of Sustainable Development in Africa* 20(3): 98–110.

Grey, M.S., et al. 2021. Oral Transmission and the Risk of Knowledge Erosion in Indigenous Communities. *Indigenous Knowledge and Development Monitor* 10(1): 25–30.

Hawkins, E., et al. 2020. The Role of AI in Climate Change. *Environmental Research Letters* 15(8): 084012.

Kimmerer, R.W. 2012. Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action. *BioScience* 62(3): 202–207.

Leonard, S., et al. 2013. The Role of Culture and Traditional Knowledge in Climate Change Adaptation: Insights from East Kimberley, Australia. *Global Environmental Change* 23(3): 623–632.

Mastrorillo, M., et al. 2016. The Role of Indigenous Knowledge in Climate Change Adaptation: Evidence from the South Pacific. *Regional Environmental Change* 16(7): 1915–1927.

Makondo, C.C. and Thomas, D.S. 2018. Climate Change Adaptation: Linking Indigenous Knowledge with Western Science for Effective Adaptation. *Environmental Science* & Policy 88: 83–91.

Malhi, Y., et al. 2020. Climate Change and Ecosystems: Threats, Opportunities and Solutions. *Philosophical Transactions of the Royal Society* B 375(1794): 2.

Magwegwe, E.; Zivengwa, T. and Zenda, M. 2024. Adaptation and Coping Strategies of Women to Reduce Food Insecurity in an Era of Climate Change: A Case of Chireya District, Zimbabwe. *Climate* 12(8): 126.

Mercer, J., et al. 2020. Community Participation in Indigenous Knowledge Systems for Climate Resilience. *International Journal of Climate Change Strategies and Management* 12(1): 85–99.

Nakashima, D., et al., eds. 2019. *Indigenous Knowledge for Climate Change Assessment and Adaptation*. UNESCO.

O'Neill, B., et al. 2021. Climate Change Adaptation and Resilience Project in Kenya: Integrating Traditional Ecological Knowledge with AI Technologies. *African Climate Resilience Journal* 5(2): 200–215.

Petzold, J., et al. 2020. Indigenous Knowledge on Climate Change Adaptation: A Global Evidence Map of Academic Literature. *Environmental Research Letters* 15(11): 113007. https://doi.org/10.1088/1748-9326/abb330.

Reed, J., et al. 2019. Artificial Intelligence in Climate Change Adaptation: Opportunities and Challenges. *Environmental Research Letters* 14(12): 123456.

Saad, G.E.; Ghattas, H.; Wendt, A.; Hellwig, F.; DeJong, J.; Boerma, T.; Victora, C.; Barros, A.J. 2022. Paving the Way to Understanding Female-Headed Households: Variation in Household Composition Across 103 Low-and Middle-Income Countries. *Journal of Global Health* 12: 04038.

Sillitoe, P. 2002. The Role of Indigenous Knowledge in Development. *Natural Resources Forum* 26(3): 185–193.

Stamos, A. 2023. Uncovering Informal Communication Channels through Sociometric Analysis. *Community Development Journal* 38(4): 345–360.

Thornton, T.F., et al. 2022. Adaptive Nature of Indigenous Knowledge Systems. *Ecology and Society* 13(2): 65–78.

Teng, J., et al. 2017. Integrating AI into Climate Change Mitigation Strategies. *Climate Policy* 17(5): 650–661.

Vogel, C. and Bullock, R. 2021. Integrating Indigenous Knowledge Systems with Scientific Approaches in Canada. *Canadian Journal of Environmental Studies* 29(1): 50–66.

Zhou, Q., et al. 2020. AI and Climate Change: Opportunities and Challenges. *Environmental Data Science* 1(1): 1–10.

Integrating Indigenous Knowledge Systems with Artificial Intelligence for Climate Change Adaptation and Mitigation: A Case Study of Masvingo Farmers in Zimbabwe

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Abstract

This paper explores the convergence of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) to address climate change, utilising a qualitative research methodology. It illustrates how AI can assist IKS-centred climate projects, creating opportunities for collaborative creation and knowledge exchange. The results obtained through focus group discussions, in-depth interviews, and direct observation indicate that climate change poses significant challenges for Indigenous communities, which are already dealing with its negative impacts. It emerged from the discussions that IKS offers a crucial understanding of sustainable practices and environmental stewardship, while AI presents creative approaches for both mitigating and adapting to climate change. The research underscores the importance of centring Indigenous knowledge in AI-enhanced climate solutions, demonstrating how the fusion of IKS and AI can lead to more inclusive and impactful responses to climate issues. However, obstacles related to cultural appropriateness and insufficient contextualised data impede AI's effectiveness in places like Zimbabwe. Consequently, the paper advocates for stakeholders to leverage the strengths of IKS-based initiatives alongside AI advancements to formulate customised strategies for addressing climate change, especially in regions such as Masvingo, which are confronting climate-related difficulties.

Keywords: IKS, AI, integration, climate change, collaborative, sustainable practices

From maize to horticulture, but challenges of succession ahead in Masvingo province land reform sites, Zimbabwe
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Introduction

Indigenous Knowledge Systems (IKS), utilised over many generations, include the traditions, practices, and ecological insights of local communities. These systems provide important perspectives on sustainable farming methods, biodiversity preservation, and resource management. For example, farmers in Masvingo historically leveraged their understanding of seasonal trends and local ecosystems to guide their planting times and crop choices [Zvobgo et al., 2023]. This extensive knowledge was crucial in building resilient agricultural methods that naturally acknowledged local conditions and contributed to sustainable land use. Nevertheless, climate change introduced significant challenges that demanded not only local wisdom but also advances in technology to deal effectively with evolving environmental conditions. Artificial Intelligence (AI), owing to its capabilities in data analysis, predictive analytics, and rapid decision-making, has emerged as a formidable resource that can improve agricultural output while fostering sustainability [Sibanda, 2023]. AI technologies play a role in predicting weather changes, maximising resource efficiency, and selecting crops more suitable for altered climatic scenarios. The opportunity to combine AI with agricultural practices presents a pathway to strengthen the resilience of farmers in Masvingo, ultimately addressing the various challenges that climate change brings.

To investigate the integration of IKS and AI for climate adaptation in Masvingo, this study utilised a qualitative research approach. Focus group discussions and detailed interviews provided rich, contextual information, while purposive sampling ensured that the participants had pertinent knowledge and experience regarding both Indigenous methodologies and AI innovations. Thematic analysis revealed notable themes and insights that emerged from the data, offering a thorough understanding of how these two knowledge frameworks could collaboratively enhance farmers' resilience to climate change. Through this research, the objective was to demonstrate AI's potential to strengthen IKS-based agricultural practices and ultimately tackle the intricate challenges posed by climate change in the region.

Background of the Study

This research investigates the connection between Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) regarding climate-related decision-making among smallholder farmers in Masvingo, Zimbabwe. With ongoing climate change worsening the unpredictability of seasonal rainfall, agricultural practices in the region have become increasingly vulnerable. As noted by Sibanda et al. [2020] and Zvobgo et al. [2023], there is an urgent demand for smallholder farmers to implement effective adaptation strategies that draw from both traditional knowledge and modern technological insights. The incorporation of climate and weather forecasts into their decision-making is considered essential for improving resilience to climate variability and securing food supply.

Globally, there is a growing acknowledgement of the complementary roles that IKS and AI can serve in tackling climate change issues. The Intergovernmental Panel on Climate Change (IPCC [2022]) emphasises the significance of cooperative approaches that utilise both Indigenous knowledge and scientific progress to guide adaptation strategies. This dual perspective is particularly pertinent for agricultural communities, where local knowledge about ecological changes has traditionally informed sustainable practices. Research conducted in Brazil serves as an example of this combination, showcasing that insights from IKS and AI can yield nuanced understandings of local environmental shifts that often exceed those provided by traditional scientific approaches [El-Hani et al., 2022]. Such results underscore the potential for merging Indigenous knowledge with AI modelling to enhance our grasp of climate dynamics and improve local adaptive measures. The ramifications of merging IKS with AI systems are significant, particularly regarding household-level decision-making on climate adaptation among smallholder farmers. By investigating how these two knowledge systems interact and inform each other, this study deepens our understanding of effective adaptation strategies that are specifically relevant to the distinct challenges encountered by farmers in Masvingo. Ultimately, the research aspires to contribute to the conversation on adaptive capacity amid climate change, illuminating ways to strengthen resilience and sustainability in agricultural methods. The fusion of IKS with AI is not solely a technical pursuit but also a socio-cultural one. It requires recognising the local context and the values inherent in Indigenous knowledge. Scholars argue that for AI to be effectively embraced within communities, it must honour and integrate the cultural aspects of farming practices [Zhou et al., 2022]. Collaborations involving local farmers, agricultural specialists, and technology creators are vital to ensure that AI applications cater to the farming realities experienced by Masvingo farmers. This kind of collaboration can promote the creation of AI tools that utilise Indigenous insights, thereby boosting their relevance and efficacy.

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Zimbabwe Embrace Agro-ecology Techniques
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Community Engagement and Resilience

Empirical studies conducted in Masvingo indicate that farmers are more receptive to technology if it aligns with their traditional practices. Community members express a strong desire for their Indigenous knowledge to be acknowledged and incorporated into contemporary agricultural initiatives. This underscores the necessity for a framework that fosters collaborative learning, melding traditional knowledge with modern technological solutions. Involving farmers in the design and implementation of AI tools can lead to innovations that honour local wisdom while leveraging the transformative potential of technology. Furthermore, the combination of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) can improve community cohesion and resilience. By focusing on shared knowledge and local governance, this strategy reinforces social connections among farmers in Masvingo, helping them confront the challenges brought about by climate change together. Collaborative approaches that incorporate both IKS and AI create an atmosphere where farmers can manage their agricultural practices adaptively in response to climate variability, exchanging knowledge gained from their experiences with insights produced by AI systems. Integration, however, faces several obstacles. Critical considerations related to governance frameworks, resource distribution, and technology access need careful evaluation [Mabhiza and Munyiri, 2023]. It is crucial to guarantee that all farmers, particularly those from marginalised backgrounds, have equal access to AI tools to promote inclusive adaptation and mitigation approaches. Technological solutions must not deepen existing inequalities but should encourage fair results that align with local contexts.

Merging Indigenous Knowledge Systems with Artificial Intelligence offers a promising avenue for improving climate change adaptation and mitigation efforts among farmers in Masvingo, Zimbabwe. By appreciating local knowledge while utilising technological progress, stakeholders can create more effective agricultural strategies that withstand the impacts of climate change. This integrated method demands a dedication to recognising the significance of co-learning, equitable technology access, and local governance, ensuring that interventions are deeply embedded in the cultural and social dynamics of the communities they intend to support. As climate change continues to threaten food security and agricultural sustainability in Zimbabwe, this research highlights the urgent need for innovative approaches that honour and harness the rich knowledge inherent in Indigenous practices.

Statement of the Problem

The effects of climate change pose significant existential challenges to the livelihoods and cultural identities of Indigenous populations in Zimbabwe. As these communities wrestle with increasingly unpredictable weather patterns and environmental conditions, the vast traditional knowledge they hold remains an underappreciated asset within the broader conversation on climate change. Indigenous Knowledge Systems (IKS) are often overlooked despite their richness, depth, and complexity, as smallholder farmers face serious environmental shifts. These systems, deeply rooted in generational experience and close ties to local ecosystems, are crucial for sustainable agricultural practices and environmental management [Mabhiza, 2023]. Even though this traditional knowledge is valuable, Indigenous communities are often sidelined in national and international climate change policy dialogues. These discussions typically prioritise scientific viewpoints and external interests, which results in Indigenous perspectives being overlooked and their contributions undervalued. This exclusion raises important issues regarding the regard for knowledge and the representation of diverse communities in shaping climate adaptation and mitigation strategies. The prevailing narratives dominating climate discussions frequently neglect the lived experiences and innovative solutions proposed by Indigenous peoples that could significantly help in addressing climate challenges. Concurrently, the rapidly growing field of Artificial Intelligence (AI) presents new, data-driven approaches to various global issues, including climate change. The swift advancements in AI technology generate optimism regarding their potential use in tackling environmental problems. However, as AI solutions are implemented, they often lack adequate consideration of local contexts and the socio-ecological dynamics specific to Indigenous communities. This oversight can lead to interventions that are not only ineffective but also risk worsening existing vulnerabilities. The disconnect between technology-driven approaches and the nuanced realities of local environments highlights a crucial epistemological conflict between traditional knowledge and scientific methods. In this context, the present research explores the philosophical foundations of merging Indigenous Knowledge Systems with Artificial Intelligence.

The objective is to create climate change adaptation and mitigation strategies that are not just cognizant of cultural sensitivities but also genuinely effective within the Zimbabwean context. By examining the power dynamics present in the conversation around climate change policy, this study intends to rectify the existing biases that typically advantage scientific paradigms. The research emphasises the vital necessity of fairly acknowledging Indigenous insights and their potential to shape modern climate action. The envisioned integration of IKS with AI is seen as a means to deliver substantial advantages for Indigenous communities, encouraging more holistic and inclusive methods for adapting to climate change [Zhou et al., 2024]. This integration goes beyond simple technical collaboration; it symbolises a philosophical dedication to acknowledging, honouring, and valuing various forms of knowledge. By linking traditional wisdom with the innovative potential of AI, the research aspires to uncover strategies that boost climate resilience while reshaping developmental frameworks. Ultimately, this investigation seeks to empower local communities by enabling them to regain control over their adaptation and mitigation strategies. The study suggests that when Indigenous knowledge and technological advancement work together, they can promote sustainable practices that not only address climate change effectively but also safeguard and sustain cultural identities. In this way, the research enhances the understanding of how diverse knowledge systems can come together to tackle the severe challenges posed by climate change, fostering justice, equity, and resilience in affected communities.

The importance of this research lies in its comprehensive strategy to create climate change solutions that are specifically adapted to the distinct socio-cultural and environmental settings of Zimbabwe, thereby promoting sustainable development and equity in climate action. At a time when climate change is among the most urgent global issues, there is an essential need for strategies that resonate with local experiences and the traditional wisdom of communities. This study highlights the crucial necessity of recognising and amplifying Indigenous Knowledge Systems (IKS) in the formulation of climate change policies. By integrating IKS into the conversation surrounding climate issues, decision-makers can tap into centuries of knowledge about environmental care, resource management, and effective adaptation strategies that have been successful across various ecological landscapes.

IKS and AI Integration Socio-Cultural Effects

A further important significance of this research is the investigation of the cultural and social ramifications of incorporating Artificial Intelligence (AI) within Indigenous communities. While AI has the potential to greatly improve climate resilience through data analysis and predictive modelling, its application should be handled with care and cultural awareness [Mawere, 2024]. This research emphasises the necessity of grasping how AI technologies might affect local practices, social frameworks, and cultural identities. Involving Indigenous communities in conversations about the deployment of AI can reveal concerns surrounding data ownership, representation, and ethical implications. Additionally, by analysing these impacts, policymakers and developers can create AI solutions that not only tackle environmental challenges but also resonate with the values and goals of Indigenous populations, fostering a sense of ownership and empowerment over technological advancements. This research calls for the acknowledgement of IKS as a critical element in developing climate change policies. Traditional ecological knowledge consists of the observations, practices, and beliefs that have developed within communities over generations, often specifically suited to the region's climatic and ecological circumstances. By promoting IKS within policy discussions, this study highlights a two-way learning framework where scientific knowledge and Indigenous wisdom can converge to formulate more effective, practical, and culturally attuned climate strategies. This approach not only respects the existing knowledge of Indigenous communities but also empowers them, ensuring their perspectives are prioritised in discussions that shape their futures.

Context-Sensitivity and Inclusive Climate Change Responses

The third noteworthy aspect of this research focuses on the importance of climate change responses that are sensitive to context, participatory, and inclusive. As climate change presents itself differently across various regions, including Zimbabwe, it is vital to develop tailored responses that take into account local circumstances, customs, and community dynamics. This study supports methodologies that encourage active involvement from Indigenous communities in identifying, planning, and executing climate strategies. Such participatory frameworks can enhance community engagement, ensure that initiatives reflect local priorities, and build greater resilience to the impacts of climate change. By advocating for inclusivity in climate action, this research aims to disrupt traditional power dynamics by fostering dialogue among policymakers, scientists, and Indigenous knowledge holders. This inclusive approach acknowledges that different knowledge systems can uniquely contribute to comprehending and addressing the complexities of climate issues. Ultimately, enhancing collaboration among diverse stakeholders enriches the effectiveness of climate responses, paving the way for sustainable development that honours both environmental integrity and social justice.

Overall, the significance of this research extends beyond conventional environmental studies to encompass critical themes of justice, agency, and cultural respect. By advocating for the integration of Indigenous Knowledge Systems into climate change policymaking, exploring the impacts of AI within Indigenous contexts, and emphasising the need for participatory and context-sensitive responses, this study lays the groundwork for innovative and effective solutions tailored to Zimbabwe's unique challenges. As the global community grapples with the realities of climate change, such approaches become essential not only in promoting resilience within affected ecosystems but also in upholding the dignity and rights of those who call these communities home [Mugambiwa, 2020]. The findings of this research contribute to the broader discourse on sustainable development and climate equity, highlighting the invaluable role that local knowledge and cultural heritage play in shaping a more equitable and sustainable future.

Related Literature

The merging of Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) has emerged as a burgeoning area of research in climate adaptation and mitigation. Researchers from various regions and backgrounds have investigated the potential benefits of combining these two knowledge frameworks, emphasising how their synergy can enhance resilience in response to climate change. This literature review begins with broader international discussions and gradually narrows its focus to relevant studies and applications within Zimbabwe.

International Perspectives

Worldwide, many scholars have acknowledged the significance of IKS as a vital resource in climate science. For instance, Berkes [2019] stresses the value of Indigenous knowledge in comprehending ecosystem dynamics, asserting that it provides detailed insights that can complement scientific data. He supports a collaborative approach that fuses local wisdom with scientific methods to tackle complex adaptive systems such as climate change. This intersection is further supported by Davis and Ransom [2020], who investigate how IKS can contribute to ecological modelling and management strategies within biodiversity conservation. AI technologies present the opportunity to boost climate adaptation efforts by analysing large volumes of data for predictive modelling. A study by Liu et al. [2019] illustrated how AI-driven algorithms could recognise patterns in environmental data, aiding in the forecasting of climate-related events. Nonetheless, they warn that failing to incorporate local knowledge into AI applications may inadvertently neglect essential socio-ecological contexts, potentially undermining their effectiveness. This highlights the need for a hybrid model that acknowledges and integrates IKS within AI-based solutions. Moreover, the combination of IKS and AI is not without its hurdles. As noted by Ndlovu-Gatsheni [2018], the dominance of Western scientific methodologies often overlooks the foundational epistemologies of Indigenous practices, thus perpetuating power inequalities. Establishing equitable partnerships in knowledge co-production is essential for addressing historical injustices and fostering authentic collaboration.

Regional Insights in Africa

In Africa, researchers are increasingly recognising the importance of merging IKS with AI for climate action. For instance, Bhandari et al. [2021] examined the use of AI in water management and agricultural practices across various African countries, highlighting the significance of community-based knowledge. Their findings indicate that AI can improve resource management when developed to align with Indigenous practices. They advocate for the establishment of participatory frameworks that prioritise local voices in the technological development process. The contribution of IKS in enhancing community resilience against climate change has also been documented by Mooney and Hendershot [2019], who studied the strategies utilised by Indigenous communities in East Africa to address drought and food insecurity. Their research emphasises the effectiveness of traditional methods in achieving sustainable outcomes, particularly in scenarios where technological solutions may be limited or unsuitable. The integration of AI could support these initiatives by providing additional predictive insights while preserving the autonomy of Indigenous communities.

Specific Studies in Zimbabwe

Shifting attention to Zimbabwe, the combination of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) is becoming recognised as an effective method to tackle climate challenges. Researchers like Chikozho et al. [2017] have explored the potential of IKS to shape climate policies in Zimbabwe, advocating for collaborative approaches that merge local knowledge with contemporary scientific methods. They highlight that communities in Zimbabwe hold substantial traditional knowledge related to agricultural practices, which can be enhanced through the application of AI technologies to improve climate adaptation strategies. A significant illustration in Zimbabwe is the research conducted by Mavoko and Tchervenkov [2020], who analysed the use of AI in optimising water management and crop selection in rural settings. Their findings indicated that local farmers appreciated traditional knowledge but encountered difficulties in adopting modern agricultural techniques, particularly concerning the interpretation of climate forecasts produced by AI. They recommend developing platforms that integrate local practices with AI-generated insights to enable knowledge sharing and the effective execution of agricultural strategies.

Additionally, the incorporation of IKS into AI systems extends beyond agriculture in Zimbabwe. Researchers such as Ndaba and Mabhena [2021] have investigated how Indigenous viewpoints can influence disaster risk reduction methods concerning climate-induced hazards. They argue that Indigenous communities often possess profound knowledge about local environmental conditions and natural disasters, which can significantly enhance the effectiveness of AI-driven early warning systems when integrated properly. In conclusion, the review of the literature suggests that combining Indigenous Knowledge Systems with Artificial Intelligence has notable potential for climate adaptation and mitigation, from global frameworks to localised initiatives in Zimbabwe. The discussions increasingly highlight the necessity for hybrid models that meld IKS and AI, drawing insights from international perspectives that stress collaborative methods as well as African studies that recognise the distinct challenges and benefits of local knowledge.

As research continues to progress, it underscores the need for participatory strategies that prioritise Indigenous perspectives, ensuring that technological advancements remain relevant to the context and culturally suitable. The fusion of these knowledge systems not only strengthens resilience but also advances climate justice, ultimately leading toward a future that is more sustainable and equitable. In Zimbabwe, this integration is especially crucial as communities work to adapt to climate challenges while maintaining their rich cultural heritage and ecological knowledge.

Methodology

The study adopted a qualitative approach to investigate the fusion of Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) to tackle climate change issues in Masvingo, Zimbabwe. This choice is based on the ability of qualitative methods to capture detailed and nuanced insights into participant experiences, viewpoints, and cultural backgrounds [Creswell, 2013]. Qualitative techniques allow for the exploration of complex social phenomena, making them especially suited for analysing the relationship between traditional knowledge and contemporary technological solutions. The research utilised purposive sampling to select participants with substantial knowledge and experience relevant to the research themes. Participants were chosen according to specific criteria, such as their participation in community-driven climate action efforts, expertise in traditional practices, and willingness to discuss the impact of AI in these areas [Patton, 2015]. This deliberate selection approach ensured that the information collected was pertinent and valuable, enhancing the understanding of the community's viewpoints. Regarding data collection methods, in-depth interviews served as a primary data collection method, enabling thorough conversations about participants' experiences with IKS, their perceptions of AI, and their thoughts on climate change. The semi-structured format of the interviews allowed for flexibility, enabling participants to convey thoughts that might not have been anticipated while also covering essential topics [Kvale and Brinkmann, 2015]. Interviews were conducted in the native languages of participants when possible, fostering comfort and encouraging meaningful dialogues.

In addition to in-depth interviews, focus group discussions allowed for a collective examination of shared experiences and community knowledge, promoting dialogue about the merger of IKS and AI. This methodology utilised group dynamics to expand upon ideas shared in individual interviews and provided a platform for participants to build upon each other's insights [Krueger and Casey, 2015]. The focus groups aimed to include a diverse range of voices, encompassing elders, community leaders, youth, and women. Participant observation was also used to immerse researchers in the everyday lives of community members. By directly engaging with their activities, such as traditional agricultural practices, community meetings, and nature-related rituals, researchers developed a deeper understanding of how IKS shapes environmental stewardship. This approach enables researchers to observe contextual elements, social interactions, and cultural practices that influence the experience and management of climate change [Spradley, 2016].

The ethnographic method combines the previously mentioned approaches, highlighting the importance of holistic engagement with the community. The active participation and observation of the research team in natural settings shed light on the intricacies and connections between cultural and technological factors impacting climate change responses. Ethnographic techniques are particularly effective for comprehending the lived experiences of communities, especially in studies focused on Indigenous viewpoints [Clifford and Marcus, 1986]. Within the ethnographic framework, specific case studies were selected based on two criteria: communities with extensive IKS and those showing potential openness to AI applications. This focused strategy ensured that the research findings would not only contribute

to academic discussions but also improve understanding within practical settings and guide future collaborative efforts [Yin, 2018].

A unique element of this study was the focus on collaborative research. Involving Indigenous communities in the co-development of AI solutions fosters the joint creation of knowledge that honours and integrates their IKS while introducing technological benefits. Collaborative research aligns with participatory action research principles, which advocate that those impacted by issues should play a significant role in developing solutions [Reason and Bradbury, 2008]. By actively engaging community members in the research process, the study aimed to empower these communities, promoting ownership of both the knowledge and the results while enhancing the relevance and applicability of AI technologies within their socio-cultural landscape.

Basically, the selected qualitative approach, which employs purposive sampling along with a range of data collection techniques such as in-depth interviews, focus group discussions, and participant observation, establishes a strong foundation for investigating the incorporation of Indigenous Knowledge Systems and Artificial Intelligence in tackling climate change in Masvingo, Zimbabwe. By prioritising collaboration and community involvement, this approach enhances the understanding of how traditional knowledge and technological innovation interact, thereby supporting sustainable development initiatives in the area.

Results and Analysis

The urgency of climate change necessitates innovative approaches that reconcile traditional and contemporary knowledge frameworks. This exploration draws upon Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) within the context of Masvingo, Zimbabwe. It intertwines philosophical inquiries, including epistemological, ontological, and ethical implications, while employing post-colonial theories to critique the existing power structures that shape knowledge production and environmental engagement.

Agriculture in Masvingo's communal areas: limited prospects
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Themes Emerging from the Research

Epistemological Conflicts and Synergies

The combination of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) blurs the line between age-old wisdom and empirical research. IKS, which is frequently regarded as merely anecdotal in mainstream scientific conversations, consists of well-established ecological knowledge passed down through generations. For instance, communities in Masvingo employ traditional methods for managing resources and promoting sustainability. One village Chief said:

"Isu chatinoda muno mudunhu medu, hunhu, zvino hatizivi kuti chirungu chomoda kutipa ichi, chamunoti ndeche ma computer, zvinodyidzana here netsika dzeku. Kana zvichidyidzana zvakanaka tinogamuchira, asi aiwa hatitange nekugashira chirumbi ichi tisati tabvunzawo masvikiro edu. (We appreciate what we have in our community, which is our culture. We are unsure about what the computer can offer us. Does it connect with our traditions? If it integrates well, we welcome it. However, we will not readily accept this new technology without first consulting our ancestors. "

On the other hand, AI provides a structured and data-oriented approach to addressing climate change and developing policies. This study discovered that while IKS offers valuable, context-specific perspectives regarding local ecosystems, AI boosts predictive capabilities and scalability. Nevertheless, as scholars like Agrawal [2002] and Tuhiwai Smith [2012] have noted, this integration must honour and recognise Indigenous knowledge systems instead of overshadowing them with Western ideologies. The conversation must remain mindful of how knowledge is perceived and valued, promoting a collaborative learning framework in which both forms of expertise enhance the dialogue surrounding climate change.

Ontological Perspectives: Nature and the Divine

From a religious standpoint, the intertwining of IKS and AI raises significant inquiries about the essence of creation and humanity's place within it. Indigenous understanding emphasises a relational perspective on existence, nurturing a sense of responsibility towards the Earth, which resonates with numerous religious beliefs. One respondent noted that:

"Tagara isu tine nzira dzedu dzatinoshandisa kukumbira nadzo mvura yakanaka isina njodzi, dzakaita semnheni. Uye tinogara tatozi necheka-re kupfurikidza nemasvikiro edu atinoti manyusa kana kuti vanaisi vemvura. Vanototi udza kana kuchiuya dutu remvura ine mhirizhonga, tinotoziviswa uye toudzwa kuti tokumbirira sei kuti tipone. (We already possess methods for requesting safe and favourable rain, such as observing nature. Our ancestors would typically forewarn us about potential storms and guide us on how to proceed to ensure our safety.)"

This sentiment indicates that we already have our practices for invoking rain that avoids risky thunderstorms. Our ancestors would alert us about dangers ahead of time and guide how to navigate them. In exploring this dimension, we draw upon eco-theological writings (e.g., McFague [2013]) that promote a worldview of interconnectedness, pointing out that climate change harms God's creation. The inclusion of AI in environmental stewardship represents a transition toward mechanistic views unless it is utilised with a framework of care and accountability. The findings indicate that integrating ethical considerations into scientific advancement can promote a more comprehensive strategy for climate resilience, harmonising technological progress with spiritual and cultural narratives.

Ethical Dimensions of Technological Integration

The ethical aspects concerning the fusion of IKS and AI are essential, as the research highlighted issues related to data sovereignty, representation, and fairness. Post-colonial theorists like Spivak [1988] stress the importance of not marginalising Indigenous voices in techno-scientific initiatives. Involving communities in the data-gathering process cultivates a sense of ownership and honours local knowledge. Additionally, ethical frameworks rooted in IKS champion sustainability and justice, contesting the exploitative practices often associated with technology in underprivileged communities. The study indicates that the development of ethical AI must incorporate Indigenous values such as kinship with the land and reciprocity with nature, suggesting avenues for a more inclusive approach to climate solutions. One respondent noted that "*dambudziko ratinaro kuti tisada kugashira chirungu ichi ndeche ma computers, nderekuti isu patsika dzedu hatizooni zvine unhu,*

uye isu tinoda kuchengeta tsika dzedu dzechivanhu." To express it differently, our challenge with blending IKS and AI lies in our desire to uphold our IKS values of hunhu, and we do not wish for AI innovations and solutions to overshadow our IKS.

Socio-Political and Cultural Contexts

Understanding the socio-political environment is crucial to grasping how IKS and AI can work together for climate resilience. The ethnographic insights reveal that traditional practices function within power dynamics shaped by colonial legacies and current governance systems. Participants express a wish for independence in managing their resources, echoing Lumumba's [2014] concept of epistemic justice, where Indigenous viewpoints reclaim authority in environmental dialogues. The research underscores the possibility for AI technologies to either strengthen or undermine these power dynamics. When integrated effectively, AI can empower communities in Masvingo to tackle climate effects, thereby fostering localised solutions that align with cultural identity and values. Conversely, imposing technology from the top down risks alienating communities, resonating with the critiques of technological colonialism raised by scholars like Ndlovu-Gatsheni [2018].

Integrating Indigenous Knowledge Systems with Artificial Intelligence

The growing effects of climate change pose extraordinary challenges, particularly in vulnerable areas like Masvingo Province in Zimbabwe. To confront these challenges, innovative solutions that combine different knowledge systems are necessary. This essay explores the merger of Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) for climate change mitigation and adaptation, focusing on theological views regarding stewardship, fairness, and human dignity while also addressing the intricacies and prospects presented by these two distinct epistemological approaches.

Knowledge Diversity: Foundations of Epistemology

The convergence of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) showcases a complex array of knowledge distinguished by varied epistemological roots. IKS is founded on the lived experiences and insights of local populations, cultivated over generations through close relationships with their surroundings. Researchers like Agrawal [2002] and Dell'Angelo et al. [2017] assert that IKS encompasses comprehensive views of ecological dynamics, values, and cultural identities. In contrast, AI relies on quantitative analysis, computational models, and data-centric decision-making, often emphasising efficiency at the expense of contextual comprehension. The task of merging these diverse knowledge frameworks is considerable. As highlighted by Tuhiwai Smith [2012], the dominance of Western scientific frameworks can eclipse Indigenous perspectives, risking cultural loss and misrepresentation.

However, a shared framework can emerge from the intertwining of both knowledge systems, prioritizing local experiences while harnessing AI's analytical capabilities. By promoting an inclusive dialogue around epistemology, we can develop more impactful climate strategies that align with the cultural essence of Masvingo communities.

Contextual Understanding: Experiences versus Computational Views

Indigenous Knowledge Systems are fundamentally context-specific, originating from centuries of engagement with their environment. They provide crucial insights into sustainable practices, including traditional agricultural methods, water conservation strategies, and biodiversity management tailored to the distinct ecological circumstances of Masvingo. This localised wisdom is essential for comprehending how communities manage the climatic challenges they encounter. In contrast, AI offers wider, abstract models for examining climate trends and forecasting future conditions. While this computational methodology can yield valuable predictive data, it might fail to capture the intricacies of local socio-ecological systems essential for effective adaptation. Scholars such as Kearney [2018] warn that an exclusive focus on abstract models can result in uniform solutions that neglect the unique needs and values of communities. Consequently, the merging of IKS and AI necessitates a continuous dialogue in which AI technologies are persistently refined through the lens of Indigenous knowledge. Platforms that enable collaborations between local practitioners and AI developers can facilitate the co-creation of tools that both inform and resonate with community values and practices.

The combination of IKS and AI entails significant ontological implications for how we perceive reality and our connection to the natural environment. IKS promotes a viewpoint of interrelatedness and reciprocity among all beings, advocating for a moral ecological ethic [Meyer, 2021]. This perspective suggests that climate change is not solely a technical or policy concern but is fundamentally a moral and ethical issue rooted in humanity's connection with creation. Conversely, AI generally emphasises efficiency and optimisation, frequently abstracting human-nature interactions to enhance predictability and control. This mechanistic perspective can obscure the values of stewardship and interconnectedness inherent in IKS. Consequently, questions arise regarding how AI technologies might influence our understanding of reality: Do they promote greater comprehension and responsibility, or do they reduce individuals and communities to mere data points within a broader computational framework? There is a tension between preserving human agency and autonomy in decision-making while employing AI tools. Scholars such as Haraway [2016] argue that technologies should be developed in ways that enhance human agency, especially in critical areas like climate change. Integrating IKS into AI development can help rehumanize technology and ensure alignment with the values of those most impacted by climate-related effects.

Stewardship, Equity and Human Dignity

The theological foundations for merging Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) underscore responsibility for creation, respect for human dignity, and fairness. Both Indigenous cultures and numerous theological traditions promote a caring and mutually beneficial relationship with nature. This viewpoint aligns with the increasing recognition that effective climate change strategies must be built on ethical principles that prioritise justice and equity. As noted by researchers like West et al. [2018], approaches that inclusively acknowledge the perspectives of marginalised groups are vital for attaining sustainable outcomes. Furthermore, integrating IKS with AI has the potential to empower communities in Masvingo, allowing them to have a more significant voice and agency in climate-related decision-making. By ensuring that these communities act as co-creators of knowledge and solutions rather than mere subjects of research, we can promote a fairer distribution of power and resources. Integrating IKS and AI may lead to a more sustainable and equitable future, embodying our collective duty as caretakers of creation. Where faith, culture, and technology intersect lies the potential for significant change, promoting local stewardship of the natural environment. Given the intensifying environmental challenges, reassessing our relationship with nature through the lens of Indigenous wisdom paired with advanced technology could reveal transformative solutions for climate resilience and adaptation. Moving forward demands collective effort, encouraging harmony between these distinct knowledge systems in our pursuit of sustainable development and environmental justice.

The insights indicate that combining Indigenous Knowledge Systems (IKS) with Artificial Intelligence (AI) for climate change mitigation and adaptation in Masvingo, Zimbabwe, offers a transformative opportunity to tackle intricate environmental issues. By recognising and honouring the philosophical, epistemological, and ethical components of both systems, we can develop solutions that are not just scientifically sound but also culturally relevant and ethically solid. As we confront the urgent challenges posed by climate change, an inclusive approach that values diverse knowledge and fosters collaborative efforts can lead to the creation of innovative, localised, and effective strategies.

Conclusion

The urgent threats posed by climate change are particularly pronounced in regions like Africa, where communities contend with increasingly erratic weather, elevated temperatures, and ecological decline. This study has demonstrated that the combination of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) holds considerable promise for tackling these issues through innovative mitigation and adaptation approaches. By acknowledging the distinct strengths of each knowledge system, we have the potential to create collaborative solutions that promote sustainable development while ensuring climate justice.

From a sociological standpoint, this integration transcends a simple blend of knowledge types; it represents a profound acknowledgement of the insights local wisdom provides in addressing climate challenges. IKS is deeply embedded in the cultural, historical, and environmental contexts of communities, offering perspectives on traditional practices that have preserved ecosystems for generations. Conversely, AI delivers analytical thoroughness, scalability, and predictive capabilities, empowering policymakers with data-driven insights that enhance strategy development and execution. The interaction between these forms of knowledge paves the way for culturally relevant solutions that address local contexts while leveraging the technological advancements that shape our contemporary world.

From a philosophical standpoint, the combination of Indigenous Knowledge Systems (IKS) and Artificial Intelligence (AI) challenges the prevailing narratives surrounding knowledge creation and the power dynamics that frequently overlook Indigenous perspectives. It drives us to reconsider our engagement with technology not merely as devices that isolate us from the natural world, but as tools that, when utilised with care and respect, can improve our role as caretakers of the planet. Within this framework, climate justice transcends being solely an environmental issue; it also becomes a social and ethical obligation, promoting fairness and inclusiveness amidst the challenges posed by climate change. This perspective highlights the interconnectedness of all beings and resonates with Indigenous philosophies that promote a balanced coexistence of humans and nature.

References

Agrawal, A. 2002. *Indigenous Knowledge and the Politics of Knowledge, Development and Change* 33/3: 413–439.

Dell'Angelo, J., P. Tschakert, and P. Pinho. 2017. *The Role of Indigenous Knowledge in Climate Change Adaptation: Insights from the Peruvian Andes, Global Environmental Change* 47: 24–34.

El-Hani, C. N. and A. Sato. 2022. *Indigenous Knowledge Influences the Perception of Climate Variability: Causal and Mechanistic Insights, Ambio* 51/6: 2687–2700.

Haraway, D. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*, Durham: Duke University Press.

Kearney, J. 2018. *The Impact of Algorithms on Local Knowledge Systems, Geoforum* 94: 56–65.

McFague, S. 2013. *A New Climate for Theology: God, the World, and Global Warming*, Fortress Press.

Mabhiza, G. and P. Munyiri. 2023. *The Challenges of Integrating Technology and Indigenous Knowledge in Climate Adaptation Strategies, Journal of Environmental Studies and Sciences* 13/1: 24–36.

Meyer, M. 2021. *Bridging the Gap: Ethical Considerations in Indigenous Knowledge Systems and Modern Technologies, Journal of Agricultural and Environmental Ethics* 34/5: 1–16.

Ndlovu-Gatsheni, S. J. 2018. *Epistemic Justice: A Theory of Knowledge and Decoloniality, Transformation: An International Journal of Open Access* 97/2: 1–21.

Sibanda, M. 2023. *Artificial Intelligence and Its Role in Enhancing Agricultural Resilience to Climate Change in Zimbabwe, African Journal of Science, Technology, Innovation and Development* 15/3: 345–357.

Sibanda, S. 2023. *Harnessing Technology for Climate Resilience: Case Studies from Zimbabwean Farmers, Climate Change Adaptation Journal* 12/1: 45–60.

Spivak, G. C. 1988. *Can the Subaltern Speak? In Marxism and the Interpretation of Culture*, ed. C. Nelson and L. Grossberg, Urbana: University of Illinois Press: 271–313.

Tuhiwai Smith, L. 2012. *Decolonising Methodologies: Research and Indigenous Peoples*, London: Zed Books.

West, P., J. Igoe, and D. Brockington. 2018. *Parks and Peoples: The Social Impact of Protected Areas, Annual Review of Anthropology* 47: 421–439.

Zhou, R. et al. 2022. *Cultural Dimensions of Technological Change: A Mixed Methods Study on Farmers and AI in Sub-Saharan Africa, Technology and Culture* 63/4: 774–795.

Zvobgo, P., O. Mutanga, and J. Riddell. 2023. *Indigenous Knowledge and Climate Adaptation Practices in Zimbabwe: The Case of Masvingo Province, African Geographical Review* 42/1: 40–58.

Public Perception of AI: Awareness and Trust in Artificial Intelligence (AI)

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Abstract

Artificial Intelligence (AI) is becoming increasingly integrated into various aspects of daily life, from healthcare and finance to social media and law enforcement. While AI has the potential to enhance efficiency and innovation, concerns about bias within AI systems have emerged. With the public perception of AI bias not being clear, it becomes crucial that the public can trust these technologies. This knowledge gap can impede the effective deployment and acceptance of AI systems, potentially leading to public scepticism and resistance. The study was guided by the following objectives: to explore the public's perception of AI and to evaluate the general public's awareness of AI technologies. The study employed a qualitative research approach by using software like WhatsApp, Twitter, Facebook, YouTube, Snapchat, and Instagram. The study found that awareness of AI technologies varies significantly among different demographic groups. Younger individuals with higher levels of education demonstrated greater awareness of AI and its applications. Higher awareness of AI bias correlated with lower levels of trust in AI technologies. A considerable portion of the public is aware of the concept of AI, though the depth of understanding differs. Trust in AI technologies varied based on the type of AI application. The study also found that media exposure plays a significant role in shaping public perception. Those who consume more news and media content related to AI have a more nuanced understanding of its benefits and risks. Individuals who had direct interactions with AI technologies, such as chatbots, exhibited different levels of trust compared to those who had not. The public expressed concerns over the transparency and accountability of AI systems, leading to varied trust levels depending on how transparent and understandable AI processes are perceived to be. The study found a complex relationship between awareness and trust, where increased awareness of AI's potential biases led to increased scepticism or greater trust due to a better understanding of how these issues are being addressed. The study recommends the need for an increase in public education to enhance public understanding of AI technologies, including their benefits, risks, and potential biases. The research encouraged AI developers to adopt transparent practices, such as clearly explaining how AI systems make decisions and what data they use. Transparency can help build trust by demystifying AI processes. There is a need to create platforms for public engagement and feedback on AI technologies. Involving the public in discussions about AI development and deployment can help address concerns and build trust.

Keywords: Artificial Intelligence, public perception, technologies, public, transparency, accountability of AI systems.

Photo by Luke Jones on Unsplash.

Introduction

Artificial Intelligence (AI) is rapidly transforming various aspects of human life, from healthcare and finance to social media, law enforcement, and academia. Despite its growing presence, public perception and awareness of AI technologies vary widely. Understanding these perceptions is crucial for guiding policymaking, ensuring ethical AI deployment, and fostering trust between AI developers and users. This study, guided by the Technology Acceptance Model (TAM), explores the public's perception of AI and evaluates the general public's awareness of AI technologies. The research is particularly relevant for countries like Zimbabwe, where AI is on the rise, to fill the knowledge gap regarding Zimbabweans' perceptions and awareness of AI technologies. The study aims to address the increasing integration of AI into daily life and the importance of public trust, given concerns about AI bias. The objectives of this study are to explore the public's perception of AI and to evaluate the general public's awareness of AI technologies.

Historical Background of Artificial Intelligence

Artificial Intelligence (AI) is rapidly transforming various facets of human life, from healthcare and finance to social media, law enforcement, and academia. Despite AI being viewed as omnipresent, public perception and awareness of AI technologies vary widely. Understanding these perceptions is necessary to guide policymaking, guarantee ethical AI deployment, and foster trust between AI developers and users. This study explores the public's perception of AI and evaluates the general public's awareness of AI technologies. The research is necessary for countries like Zimbabwe, as AI is on the global rise; hence, it will fill in the knowledge gap regarding Zimbabweans' perceptions and awareness of AI technologies.

Artificial Intelligence (AI) has a rich history, rooted in the quest to create machines that can simulate human thought and behaviour. Its evolution can be traced through various milestones spanning centuries of theoretical speculation, scientific exploration, and technological advancements [Hou et al., 2025]. The concept of Artificial Intelligence predates the development of modern computers. In ancient Greek mythology, there is a depiction of mechanical beings, such as Talos, a giant bronze robot that was forged by Hephaestus, the god of fire and forge, to protect the island of Crete from invasion [Fleck, 2018]. Bates [2024] asserts that in the 17th century, mathematicians such as René Descartes and Gottfried Wilhelm Leibniz speculated on creating systems that are capable of mechanical reasoning, laying the groundwork for AI concepts.

The formalisation of logic and computation theory marked the early steps toward AI. Alan Turing, often regarded as the father of computer science, introduced the concept of a "universal machine" in 1936 that could perform computations similar to a modern computer [Daylight, 2015]. During World War II, Turing's work on breaking the Enigma code highlighted the potential of machines to process information. The term "Artificial Intelligence" was coined in 1956 during the Dartmouth Summer Research Project on Artificial Intelligence, organised by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon [van Assen, 2022]. This event is widely regarded as the official birth of AI as a field of study. Researchers aimed to create machines that could "think" like humans, solving problems and learning from data. Early AI programmes, such as Logic Theorist (1956) and General Problem Solver (1957), showcased the potential of machine reasoning. Early optimism in AI led to high expectations, but progress was hindered due to limitations in computational power, a lack of large datasets, and insufficient funding. This period, known as the "AI Winter," saw reduced interest and investment in AI research [van de Sande et al., 2022]. However, foundational work continued, particularly in machine learning, knowledge representation, and expert systems.

According to Deng [2018], AI experienced a renaissance in the 1990s due to developments in computing power, the improvement of the internet, and the availability of larger datasets. Machine learning algorithms, particularly neural networks, began to realise significant success. Notable milestones include IBM's Deep Blue defeating chess champion Garry Kasparov in 1997. The explosion of big data and improvements in Graphics Processing Units (GPUs) augmented the development of AI [Deng, 2018]. Deep learning, a subset of machine learning, enabled breakthroughs in natural language processing, computer vision, and robotics. Innovations like Google's AlphaGo defeating world Go champion Lee Sedol in 2016, and the rise of virtual assistants like Siri and Alexa, demonstrated AI's potential in everyday applications. The rapid advancement of AI has sparked discussions on its ethical implications, including privacy concerns, job displacement, and the need for responsible AI governance [Camilleri, 2024]. These discussions have become central to ensuring that AI development aligns with societal values and human well-being. The historical trajectory of AI illustrates a journey from philosophical musings to a transformative technology shaping the modern world [Deng, 2018]. While the field has faced challenges, ongoing innovations and interdisciplinary efforts continue to push the boundaries of what AI can achieve, offering profound possibilities for the future. The public's perception and acceptability of Artificial Intelligence (AI) have evolved, shaped by technological advancements, media portrayals, and societal experiences. Camilleri [2024] notes that while some view AI as a transformative force, others approach it with scepticism, often driven by ethical, economic, and existential concerns.

In the initial stages of AI development, mostly in the 1950s and 1960s, there was excitement about AI's potential. Researchers and the public projected a future where machines could solve complex problems and contribute to the everyday lives of humans. The Dartmouth Conference of 1956 embodied the spirit of optimism, with scientists believing that human-level intelligence in machines could be achieved within a few decades [McCarthy et al., 1956]. However, these high expectations were tempered by the technical challenges of creating a truly intelligent system. There was a gap between public aspirations and the practical realities of AI research that eventually led to the "AI Winter" of the 1970s and 1980s, during which enthusiasm faded, and funding for AI projects declined [Minsky, 1991].

The resurgence of AI in the 1990s, prompted by improvements in computing power and the success of systems like IBM's Deep Blue, reignited public interest in AI. Ensmenger [2012] notes that in the 1990s, AI was viewed as a tool designed to solve specific problems like playing chess or diagnosing medical conditions. Through this pragmatic focus, AI became more acceptable to the public, as its applications were viewed in a complementary sense rather than as a threat to human capabilities [Brynjolfsson and McAfee, 2017].

Contemporary Views: Mixed Perceptions

AI is widely accepted in fields like healthcare, where it improves diagnostics and treatment outcomes. A survey by the Pew Research Centre [2018] found that 63% of Americans viewed AI as a tool for societal improvement, particularly in medicine and education. Issues such as privacy, bias, and accountability have made some segments of society sceptical about AI. The Cambridge Analytica scandal in 2018, which involved the misuse of AI-driven data analysis, heightened concerns about the potential misuse of AI technologies [West, 2018]. Trust in AI systems remains a key determinant of public acceptability. Studies show that people are more likely to accept AI when they understand how it works and perceive it as being transparent and fair [Shin, 2020]. Lack of transparency often leads to fears of manipulation or misuse, as seen with algorithmic decision-making in hiring and law enforcement.

"Digital natives," as the younger generations are referred to, tend to have higher levels of trust and acceptance of AI compared to older individuals, possibly due to greater exposure to technology. Cultural factors play a role in whether societies accept or are mistrustful of AI; for instance, societies with a strong emphasis on technological innovation, like Japan, view AI more favourably than those with a more cautious approach, such as some European countries [Vinuesa et al., 2020]. Acceptability of AI has been shaped by perceived benefits and risks that have been observed at different points in history. Fast and Horvitz [2017] note that while optimism in the early days gave way to scepticism during the AI Winter, contemporary AI applications have led to a more nuanced public view. Ensuring ethical practices, transparency, and equitable benefits is crucial for fostering long-term acceptance of AI technologies. AI has been described as a double-edged sword, offering significant benefits while raising concerns about ethics, privacy, and job displacement [Brynjolfsson and McAfee, 2017]. Although AI has increasingly integrated into everyday technologies such as virtual assistants and automated customer services, public awareness of its capabilities and limitations remains inconsistent. Moreover, trust in AI systems is critical to their adoption, as users are less likely to engage with technologies they do not trust [Shin, 2020]. Studies have shown that perceptions of AI often hinge on media portrayals, which sometimes exaggerate its capabilities or potential risks [West, 2018]. This can lead to both inflated expectations and unwarranted fears. By exploring public awareness and perceptions, this research contributes to a deeper understanding of how society interacts with AI and identifies opportunities to enhance education and communication around its use.

Artificial Intelligence (AI) has begun to make significant inroads in Africa, transforming healthcare, agriculture, education, and finance. Notwithstanding its potential to address the continent's developmental challenges, the acceptability, public perception, and trust in AI technologies vary according to regions and demographic groups. AI development in Africa has primarily been driven by technological innovations tailored to local challenges. AI-based diagnostic tools for healthcare, predictive models for agricultural

yields, and natural language processing for indigenous languages have demonstrated AI's potential to improve the quality of life [Cisse et al., 2020]. South Africa, Kenya, Nigeria, and Rwanda are emerging as leaders in AI adoption, supported by investments in innovation hubs and partnerships with international tech firms [World Bank, 2022]. However, the continent of Africa still faces challenges that include inadequate digital infrastructure, limited access to high-quality data, and a lack of skilled AI professionals. These factors have slowed down the pace of AI adoption compared to other regions of the world [Bright and Hruby, 2020].

The acceptability of AI in Africa is influenced by its relevance to local contexts. AI solutions that address pressing socio-economic issues have garnered support in areas of healthcare access and agricultural productivity. For instance, in Rwanda, the use of AI-powered drones for delivering medical supplies has been widely praised for improving access to essential services in remote areas [Zipline, 2021]. AI-driven mobile applications for diagnosing plant diseases have been readily accepted by smallholder farmers in Kenya and Uganda, demonstrating the technology's utility in agriculture [AGRA, 2020]. However, the lack of public awareness and understanding of AI remains a barrier. Many people are unfamiliar with how AI works and its possible benefits, leading to scepticism in some communities [Adebayo et al., 2021].

Public perceptions of AI in Africa have been shaped by a mix of optimism, apprehension, and curiosity. Most people in Africa view AI as a tool for leapfrogging developmental gaps. AI's ability to provide cost-effective, scalable solutions for healthcare, education, and agriculture is widely appreciated [Bright and Hruby, 2020]. There have been concerns about job displacement, data privacy, and ethical issues that have tempered this optimism. For example, the automation of tasks in the financial sector has raised fears of unemployment, particularly among young people. The growing interest in AI is evident among Africa's youth, with an increasing number of young people participating in AI-focused hackathons, coding boot camps, and innovation hubs [World Economic Forum, 2021].

Trust in AI technologies is a critical factor for adoption in Africa. There is growing trust in AI solutions that demonstrate tangible benefits, but there are concerns about transparency and accountability, with many users unsure about how AI systems make decisions, especially in critical areas such as loan approvals and medical diagnoses [Adebayo et al., 2021]. Users are also concerned with data sovereignty, questioning the storage and use of African data by international companies, raising issues about data privacy and security [Makulilo, 2019]. Cultural relevance is also a concern because AI systems that fail to account for cultural and linguistic diversity are less trusted, particularly in rural areas where traditional practices still dominate [Cisse et al., 2020].

To enhance trust and acceptability, African governments, organisations, and developers must prioritise public education by raising awareness about AI technologies and their benefits through community engagement and educational campaigns, developing frameworks to ensure transparency, accountability, and fairness in AI systems, and creating AI systems tailored to African languages, cultures, and socio-economic contexts to increase relevance and usability. AI has immense potential to drive sustainable development in Africa, but its acceptability, public perception, and trust are contingent on how well technology aligns with local needs and values. Addressing barriers such as public awareness, ethical concerns, and infrastructure gaps will be crucial for maximising AI's impact on the continent.

There has been a gradual uptake of AI in Zimbabwe, particularly in sectors like healthcare, agriculture, and finance. Key developments in healthcare have seen AI-powered tools being used to enhance diagnostics and streamline healthcare delivery. For example, mobile health applications are leveraging AI to provide health information and connect patients to medical professionals, such as Plus263Health and Period Tracker [Mutambara et al., 2023]. In agriculture, AI-driven solutions are being introduced to improve farming practices. These include predictive analytics for weather forecasting and crop management tools that help farmers optimise yields in the face of climate change [FAO, 2022]. In financial services, Fintech companies in Zimbabwe (Ecocash, Sasai, Onemoney, Telecash) are adopting AI for credit scoring, fraud detection, and personalised financial solutions. This has improved access to financial services for previously underserved populations [Reserve Bank of Zimbabwe, 2022]. Despite these advancements, the lack of vigorous digital infrastructure, limited AI expertise, and insufficient government policies remain significant barriers to AI development in Zimbabwe [Mawere, 2021].

The acceptability of AI in Zimbabwe is closely tied to its perceived relevance to the country's challenges, where AI solutions addressing healthcare and agriculture have seen relatively high levels of acceptance due to their direct impact on livelihoods. For instance, AI-driven chatbots providing farming advice are widely used by small-scale farmers [FAO, 2022]. In contrast, AI adoption in other areas is slower due to low levels of digital literacy and public awareness about technology. Many Zimbabweans remain unaware or do not have enough information about what AI entails, which limits its acceptance beyond niche applications [Mawere, 2021].

Public perceptions of AI in Zimbabwe are shaped by a mix of optimism and scepticism, with many Zimbabweans viewing AI as a probable tool for solving developmental challenges. Young people, particularly in urban areas, are enthusiastic about the opportunities AI could create in education, entrepreneurship, and job markets [TechZim, 2023]. However, there is widespread scepticism in Zimbabwe, where the benefits of AI are not immediately apparent. Concerns include fear of job losses due to automation and a lack of trust in AI systems that are perceived as opaque or biased [Mutambara et al., 2023]. Zimbabwean society, particularly in rural areas, is deeply rooted in traditional practices. This cultural orientation sometimes leads to resistance to adopting technologies like AI that are seen as foreign or incompatible with local customs [Mawere, 2021].

Trust in AI systems in Zimbabwe is influenced by the availability of transparency and accountability, where many users are hesitant to trust AI systems due to a limited understanding of how they work. The lack of clear guidelines on the ethical use of AI exacerbates this issue [Reserve Bank of Zimbabwe, 2022]. Concerns about data protection and misuse are significant, particularly in the financial and health sectors. The absence of strong data protection laws undermines public trust in AI applications [Mawere, 2021]. AI systems tailored to local languages and contexts are more trusted. Efforts to develop AI tools in indigenous languages, such as Shona and Ndebele, have improved acceptance among users [Mutambara et al., 2023].

To improve public trust and the acceptability of AI in Zimbabwe, stakeholders must enhance public awareness through education campaigns and community engagement initiatives that can demystify AI and highlight its benefits. They should also develop ethical AI policies by establishing regulations that promote transparency, fairness, and accountability in AI systems, and foster local innovation by encouraging local developers to create AI solutions tailored to Zimbabwe's socio-economic and cultural contexts, which will enhance relevance and trust.

As AI technologies continue to gain prominence globally, there remains a limited understanding of how populations in developing contexts, such as Zimbabwe, perceive and engage with these technologies. This study thus becomes significant, as AI development in Zimbabwe holds immense potential to address pressing developmental challenges, but its acceptability and trust depend on how well the technology is integrated into local contexts. Building public awareness, addressing ethical concerns, and creating locally relevant solutions are critical steps toward maximising AI's impact in Zimbabwe.

Technology Acceptance Model (TAM)

The study is guided by the Technology Acceptance Model (TAM), which explains how users come to accept and use technology [Davis, 1989]. TAM posits that perceived usefulness and perceived ease of use are the two main factors influencing users' attitudes toward technologies such as AI. For this study, public perception of AI aligns with perceived usefulness, while awareness of AI technologies corresponds to perceived ease of use. This framework helps contextualise how awareness and perceptions influence trust and adoption.

The Technology Acceptance Model (TAM), introduced by Davis [1989], is a widely recognised framework for understanding user acceptance of technology. When Fred Davis developed the framework, "the main aim was to predict and explain the attitude and behaviour of individuals towards new and emerging technologies in organisational settings" [Mutelo 2025:5731]

TAM posits that two key factors influence an individual's decision to accept and use technology: Perceived Usefulness (PU)—the degree to which a person believes that using the technology will enhance their performance or provide benefits; and Perceived Ease of Use (PEOU)—the degree to which a person believes that using the technology will be free from effort. These factors influence attitude towards use, which in turn impacts behavioural intention to use and ultimately the actual usage of the technology. TAM is particularly relevant in examining public perception of AI, as it helps explain how awareness and trust shape AI adoption. Mutelo [2025:5732] maintains that:

"From the perspective of user acceptance, TAM can be used to explain the extent to which PU and PEOU influence an individual's attitude, intention to use, and eventually, actual system use. The framework is often used due to its clarity, predictive power, and ease of application across different technologies and settings. The approach emphasises individual perceptions over technical features. This makes the framework a key model in human-computer interaction and technology adoption research generally."

The Technology Acceptance Model provides a robust framework for understanding how public awareness and trust influence AI adoption. By addressing factors such as perceived usefulness, ease of use, and trust, stakeholders can enhance public perceptions of AI, fostering greater acceptance and integration of AI technologies into everyday life.

Methodology

Given the rising importance of digital platforms in shaping public opinion, online ethnography offered a rich, unobtrusive method for capturing real-time public discourses on AI. The study made use of a qualitative research approach, employing online ethnography, which creates data through computer-mediated social interaction like X, formerly known as Twitter; Facebook, YouTube, Snapchat, Instagram, and WhatsApp [Ward, 1999]. The data were collected from September 2025 to December 2025. The researchers sought and joined eight relevant groups on computer-mediated social interaction over mobile phones to discuss issues of AI. As for YouTube, Instagram, and Snapchat, the researchers depended on the comments that were posted by subscribers/followers of the researchers' accounts. Data were analysed thematically using NVivo. The following ethical issues were observed: online safety, digital well-being, cyber protection, voluntary participation, anonymity, confidentiality, and the right to withdraw.

Findings

Awareness of AI

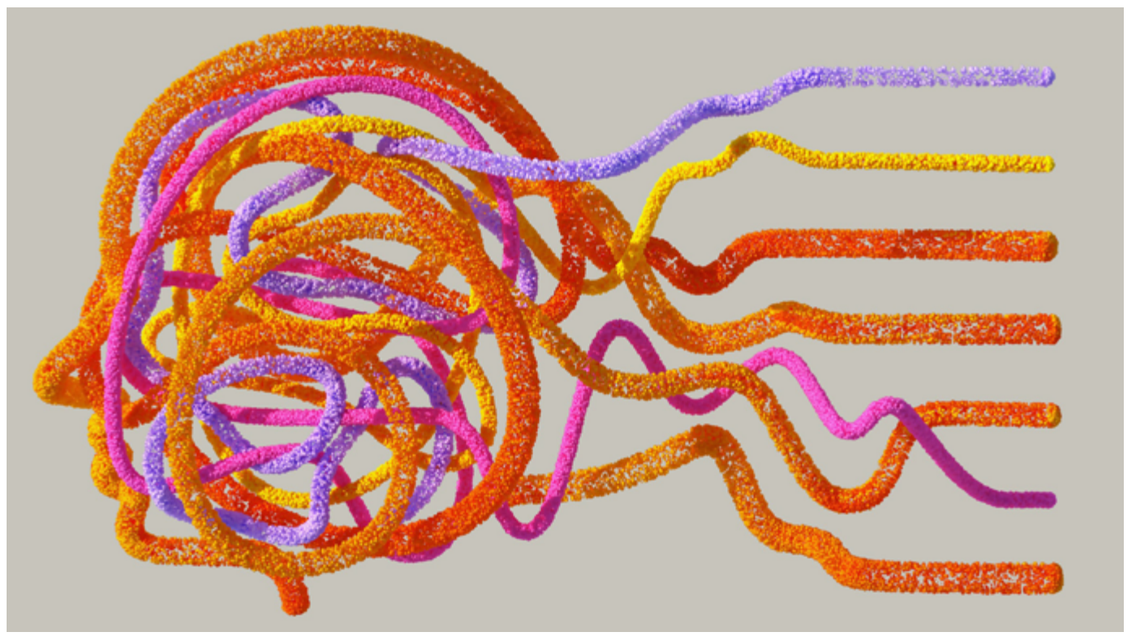
The study revealed that most participants had some familiarity with AI, primarily through applications such as virtual assistants on smartphones and chatbots. However, some participants expressed uncertainty about what AI entails, indicating gaps in basic awareness. The findings highlight a disparity between familiarity with AI applications and understanding of its broader implications. This aligns with previous studies suggesting that public knowledge of AI is often superficial [Shin, 2020]. The depth of understanding of AI differed among the respondents, with the use of AI on social media (WhatsApp) and chatbots being very high compared to other platforms that are more technical, like productivity tools and finance.

Perceptions of AI

Participants expressed mixed feelings about AI. While some viewed AI as beneficial, particularly in healthcare and in improving diagnostics and patient outcomes, others expressed concerns about the potential for AI to replace human practitioners, particularly in industries like manufacturing, customer service, and transportation. The concern is that automation will lead to economic hardship for those unable to find new roles that require different skills. Most social media platforms revealed a significant influence of worry about privacy and data security. Scholars like Fast and Horvitz [2017] and Brynjolfsson and McAfee [2017] describe AI as offering significant benefits while raising concerns about ethics, privacy, and job displacement. Mutambara et al. [2023] further note the need for AI systems tailored to local languages and contexts to be more trusted and improve acceptance among users. One commentator from Instagram reported that "AI will soon surpass human control, threatening humanity if not properly managed."

The study found that perceptions of AI are largely influenced by demographics like age and geographical location. Most social media platforms reported that the younger age group is familiar with AI, reporting its personal benefit to their education, in contrast to the older generations, who showed a lack of familiarity. The findings point to generational and educational differences in awareness, suggesting that targe-

An artist's illustration of artificial intelligence (AI). This image depicts how AI can help humans to understand the complexity of biology. It was created by artist Khyati Trehan as part of the Visualising AI project launched by Google DeepMind. On Unsplash



ted educational initiatives could bridge the knowledge gap in AI. In support, Shin [2020] points out that awareness can improve when people understand how AI works and perceive it as being transparent. Shin [2020] and West [2018] further point out that media portrayals also need to be addressed, as they exaggerate their capabilities or potential risks. One respondent had this to say: "The young generation is quick to adopt new AI tools and technological advancements as they continuously integrate AI with their daily lives and work."

The research also noted that perceptions were influenced by geographical location in Zimbabwe, with most urban residents reporting high levels of familiarity with AI compared to their rural counterparts. Young urban residents perceive AI as beneficial and accessible, reflecting the TAM proposition that higher perceived usefulness and ease of use contribute to more positive attitudes towards technology. Upon further probing, the study also found that rural residents were not familiar with AI due to unstable or unavailable internet connectivity. One commentator from Facebook remarked: "In rural Zimbabwe, there are infrastructure challenges, with most rural areas having no electricity, let alone WiFi."

Perceptions were also reported to be influenced by the media, which is a powerful lens through which individuals view and interpret the world. From traditional news outlets to social media, the content people consume shapes their beliefs, attitudes, values, and even their understanding of reality. The research further noted that in most rural areas, people had access to radios compared to their urban counterparts, who were more exposed to multimedia access. In agreement, one commentator from Facebook made this remark: "Media has more influence than explicitly what it tells people, but also how it frames information, what it chooses to highlight, and what it omits."

Trust in AI

Trust levels were moderate, with participants citing transparency, reliability, and ethical alignment as key factors influencing their trust in AI systems. Younger participants showed higher trust levels compared to older individuals, possibly due to greater exposure to technology. The study further noted that many people are sceptical of AI systems that make decisions impacting their lives, especially when they cannot fully comprehend how the decisions are being made. Trust in AI is shaped by perceptions of its reliability and ethical use, consistent with the TAM framework. One respondent from Snapchat indicated that: "There is general fear over the storage of personal data, which raises a lot of questions about privacy and security."

There were mixed feelings towards familiarity with how AI works or its potential benefits and risks, leading to either exaggerated fears or misplaced trust. The respondents felt there was a knowledge gap between the reality of AI and public understanding. Most people don't understand how AI works; their imaginations often fill in the blanks with narratives drawn from science fiction, sensationalised media reports, or worst-case scenarios. One respondent from X alluded: "For an average person, who may not have a background in computer science, statistics, or machine learning, comprehending the intricacies of algorithms, neural networks, and data processing can be daunting."

Lack of understanding of how AI processes data can lead to mistrust issues. Most comments from social media reflected the view that interaction with technology is seen as a malicious attempt to track and control individuals. This creates scepticism and fear about the reliability of AI. One respondent indicated: "...even experts may find it difficult to fully explain how certain outcomes are achieved."

The respondents expressed concern over errors that can be made by AI due to biased data. Some of the respondents viewed this as potentially leading to the belief that AI is inherently unreliable or prone to catastrophic failures, undermining trust even in beneficial applications. While some of the respondents were concerned about who would be held responsible if AI made a mistake or caused harm, this lack of clarity about accountability raised significant concerns. One respondent had this to say: "People are unsure who should be responsible for AI's ability to make decisions that could conflict with human values and ethics."

Recommendations

Taking into account the significant difference in the level of AI awareness among population groups—in particular, the difference between young, more educated people and other demographic categories—the research highly recommends the implementation of mass education programmes to increase the general awareness of artificial intelligence. Such efforts must not only explain what AI is and how it works but also discuss the implications of AI in society, such as the benefits that may arise, the ethical issues that may come about, and the truth about the existence of algorithmic bias. Such educational activities would decrease unjustified distrust and increase constructive engagement with AI technologies.

To overcome the transparency issue raised by the population regarding AI decision-making, the paper suggests that developers and organisations should use transparent AI development methods. This involves open access explanations of AI systems' functioning, the information they are based on, and output creation, particularly in high-impact areas such as healthcare, finance, and law enforcement. Moreover, the more users believe that AI systems are comprehensible and that their logic can be explained, the more they feel in control, with perceived ease of use and perceived usefulness being directly supported. This kind of openness is not only an ethical mandate but a commendable means of developing trust and reducing resistance based on doubt or fear of the unknown.

Given that global AI systems are often unsuccessful at capturing local contexts, the study also suggests that local AI technologies, which are culturally and linguistically sensitive to African populations, should be built. AI tools that consider local languages, norms, values, and user expectations in their design will be less likely to be viewed as irrelevant, unusable, and unhelpful. This localisation can increase perceived usefulness and ease of use, which are major factors in the Technology Acceptance Model, as, instead of imposing alien systems on users, AI applications are more sensitive to the realities of users in their daily lives. Such cultural congruence can, in turn, promote enhanced acceptance and long-term interaction among different populations in Africa.

Lastly, the paper also recommends that a strong ethical governance framework for AI should be established that is inclusive and context-dependent. This framework must entail multi-stakeholder cooperation—for example, governmental agencies, civil society, technologists, and the general population—to establish guidelines on fairness, accountability, data security, and bias reduction. Notably, this governmental framework should be sensitive to local demands and based on the actual experiences of local users. As ethical oversight is part of the AI lifecycle, societies would be able to anticipate issues of accountability and transparency introduced by AI at the most fundamental levels, which would help them enhance trust and build an environment where AI is not merely a technologically advanced device but a socially acceptable and valued idea.

Conclusion

The study concludes that while public awareness of AI technologies is growing, significant gaps remain in understanding its full scope and potential. Perceptions of AI are shaped by a combination of personal experience, media influence, and societal narratives, with trust being a pivotal factor for its adoption. The findings highlight a disparity between familiarity with AI applications and an understanding of their broader implications. To address these issues, stakeholders must prioritise education, transparency, and ethical considerations in AI development and deployment. The study recommends public education initiatives to enhance public understanding of AI technologies, transparent AI development practices, and the development of AI systems tailored to local languages and cultures to increase relevance and usability. Future studies could explore longitudinal changes in public perception as AI becomes more embedded in Zimbabwe's economy and public services.

References

Adebayo, A.D., Olayemi, A., and Oyinlola, M., 2021. Public attitudes towards Artificial Intelligence in sub-Saharan Africa, African Journal of Technology and Development 8/2: 45–58.

AGRA, 2020. The potential of AI to transform agriculture in Africa, Alliance for a Green Revolution in Africa.

Bates, D.W., 2024. An Artificial History of Natural Intelligence: Thinking with Machines from Descartes to the Digital Age, Chicago: University of Chicago Press.

Bright, J. and Hruby, A., 2020. The promise and peril of artificial intelligence in Africa, Harvard International Review 42/3: 40–44.

Brynjolfsson, E. and McAfee, A., 2017. The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies, New York: W.W. Norton & Company.

Camilleri, M. A., 2024. Artificial intelligence governance: Ethical considerations and implications for social responsibility, Expert Systems 41/7: e13406.

Cisse, M., Sanou, J., and Diop, A., 2020. Addressing Africa's AI challenges: Building data infrastructure and capacity, Journal of AI Research for Development 15/1: 10–22.

Davis, F. D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology, MIS Quarterly 13/3: 319–340.

Daylight, E. G., 2015. Towards a historical notion of 'Turing—the father of Computer Science', History and Philosophy of Logic 36/3: 205–228.

Deng, L., 2018. Artificial intelligence in the rising wave of deep learning: The historical path and future outlook [perspectives], IEEE Signal Processing Magazine 35/1: 180–177.

Ensmenger, N., 2012. Is chess the Drosophila of artificial intelligence? A social history of an algorithm, Social Studies of Science 42/1: 5–30.

FAO, 2022. The use of Artificial Intelligence in African agriculture: Zimbabwe case study, Food and Agriculture Organisation of the United Nations.

Fast, E. and Horvitz, E., 2017. Long-term trends in the public perception of artificial intelligence, in Proceedings of the AAAI Conference on Artificial Intelligence 31/1.

Fleck, J., 2018. Development and establishment in artificial intelligence, in The Question of Artificial Intelligence, ed. J. Fleck, London: Routledge: 106–164.

Hou, J., Zheng, B., Li, H., and Li, W., 2025. Evolution and impact of the science of science: from theoretical analysis to digital-AI driven research, Humanities and Social Sciences Communications 12/1: 1–9.

Makulilo, A., 2019. Data protection and AI in Africa: Sovereignty in the digital age, Journal of Law, Technology & Society 16/4: 567–585.

Mawere, M., 2021. Challenges and opportunities of AI adoption in Zimbabwe, Journal of African Technological Progress 10/1: 23–35.

McCarthy, J., Minsky, M.L., Rochester, N., and Shannon, C.E., 1956. A proposal for the Dartmouth Summer Research Project on Artificial Intelligence.

Minsky, M., 1991. Logical versus analogical or symbolic versus connectionist AI, AI Magazine 12/2: 34–51.

Mutambara, E., Moyo, T., and Sibanda, N., 2023. Public perceptions and use of AI in healthcare and agriculture in Zimbabwe, African Journal of Innovation Studies 7/2: 45–58.

Mutelo, I., 2025. Understanding the Generative Artificial Intelligence Revolution in Zambian Higher Education Research: Adoption, Challenges, and Strategies for Responsible Integration. International Journal of Research and Innovation in Social Science IX/IIIS: 5731–5737.

Pew Research Centre, 2018. Public attitudes toward artificial intelligence and robotics.

Reserve Bank of Zimbabwe, 2022. AI in financial services: Opportunities and risks in Zimbabwe.

Shin, D., 2020. User perceptions of algorithmic decisions in the personalised AI system: Perceptual evaluation of fairness, accountability, and transparency, Computers in Human Behaviour 108: 106–203.

TechZim, 2023. The rise of Artificial Intelligence in Zimbabwe: A youth perspective.

Van Assen, M., Muscogiuri, E., Tessarin, G., and De Cecco, C.N., 2022. Artificial intelligence: A century-old story, in Artificial Intelligence in Cardiothoracic Imaging, ed. M. van Assen, Cham: Springer International Publishing: 3–13.

Van de Sande, D., Van Genderen, M.E., Smit, J.M., Huiskens, J., Visser, J.J., Veen, R.E., and Van Bommel, J., 2022. Developing, implementing and governing artificial intelligence in medicine: a step-by-step approach to prevent an artificial intelligence winter, BMJ Health & Care Informatics 29/1: e100495.

Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., and Dignum, V., 2020. The role of Artificial Intelligence in achieving the Sustainable Development Goals, Nature Communications 11/1: 233.

West, D.M., 2018. The Future of Work: Robots, AI, and Automation, Washington, D.C.: Brookings Institution Press.

World Bank, 2022. The rise of Artificial Intelligence in Africa: Opportunities and challenges.

World Economic Forum, 2021. Artificial Intelligence and the future of work in Africa.

Zipline, 2021. Transforming healthcare delivery in Africa through drone technology, Zipline Africa Annual Report.

Ubuntu in Artificial Intelligence (AI) Governance: Towards an Inclusive and Democratic Technological Future

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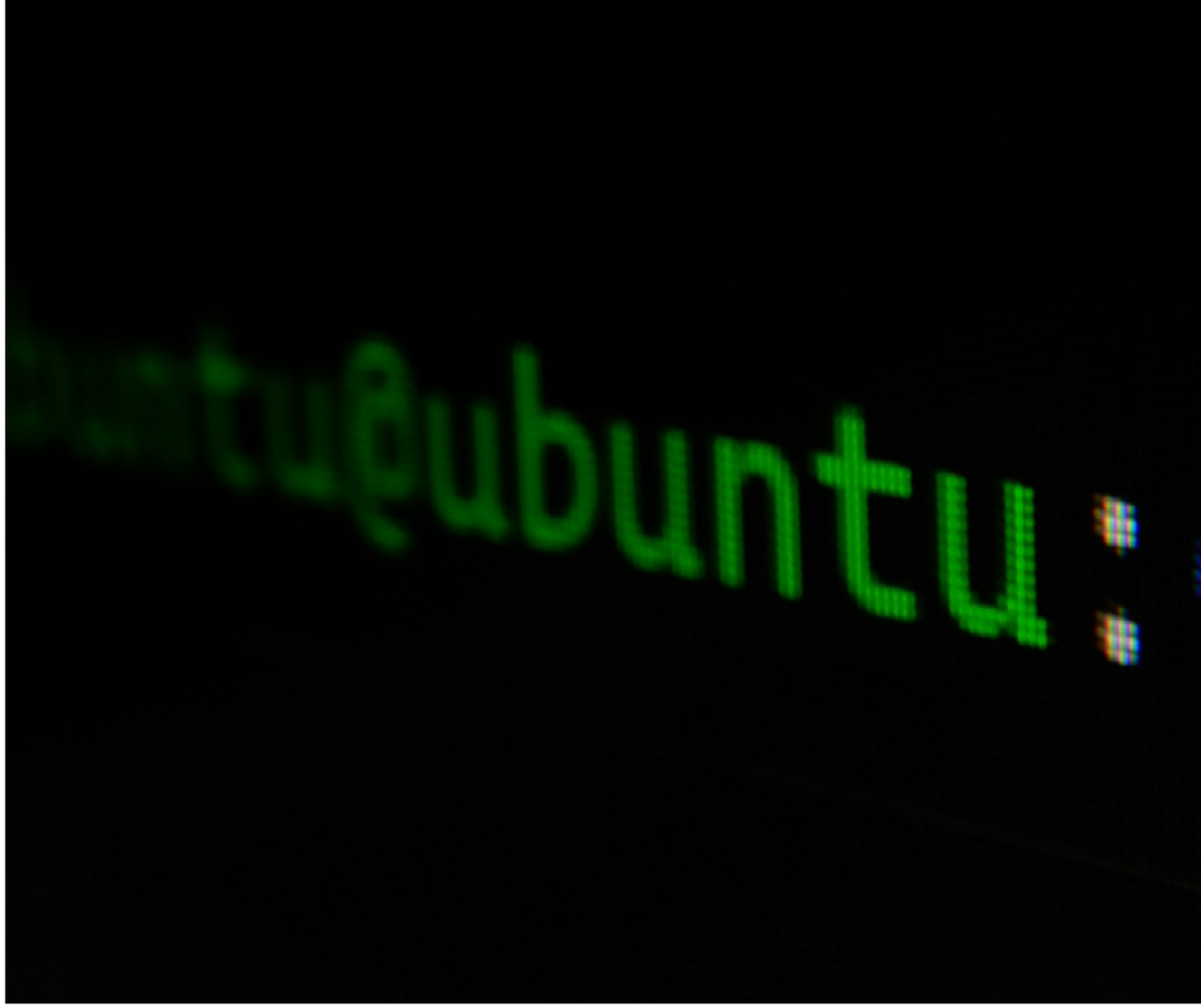
Abstract

The rapid development of artificial intelligence (AI) presents new opportunities, but at the same time, it poses significant ethical challenges. In this paper, I explore the potential for Ubuntu—a Southern African philosophy that emphasises community, interconnectedness, and mutual care—to guide AI governance. Ubuntu offers a critical lens through which one can comment on the effect of AI on society, underscoring values such as inclusivity, empathy, and collective well-being. In the future, infusing principles of Ubuntu within the governance of AI will supply a more holistic approach with prime human dignity and social justice at the forefront. I argue that the inclusion of Ubuntu in AI policy and regulation can help lower biases, increase accountability, and ensure transparency in AI systems. By a normative critical approach, I unpack the philosophical underpinnings of Ubuntu, its bearings on contemporary ethical debates in AI, and the potential to transform AI governance. Comparative analyses with existing ethical frameworks underline what is peculiar about the contribution that Ubuntu can make toward democratic engagement and inclusivity in AI development and deployment. I conclude by putting forward some concrete actions for policy decision-makers, technologists, and scholars in taking Ubuntu principles into AI governance, underscoring the fact that global collaboration plays a very integral part in shaping good ethical futures for AI. I thus call for a paradigm shift in this all-inclusive AI ecosystem where technology remains only a means to better human flourishing and social cohesion.

Keywords: artificial intelligence, Ubuntu, AI governance, ethical AI, social justice, human dignity, collective responsibility.



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Introduction

In the last few years, artificial intelligence (AI) has changed industries and societies all over the world. From healthcare to finance, education, and entertainment, the idea of AI being able to learn from data, make decisions based on that learning, and even outperform humans at some tasks makes it easy to understand why technologists and society alike are so excited about it. However, this unprecedented progress in AI capabilities has been paralleled by a series of urgent ethical challenges that today's society must overcome if it is to responsibly harvest its full potential. Some of these ethical challenges include privacy invasion, algorithmic bias, accountability and transparency, and the threat of work displacement—among others that require urgent attention [Kearns and Aaron, 2019]. These challenges drive home the importance of governance frameworks that will guide the development and deployment of AI technologies that promote human dignity and social justice above anything else, rather than exacerbating existing inequalities. Current approaches to AI ethics, while essential, tend to reflect predominantly Western individualistic paradigms, which may overlook the relational and communal dimensions of human life. This gap calls for alternative perspectives that prioritise inclusion, empathy, and social cohesion. This paper, therefore, introduces 'Ubuntu,' an African-rooted philosophical theory that is grounded in the maxim "I am because we are," as an alternative framework for AI governance. Ubuntu's focus on community, interconnectedness, mutual care, and group well-being, along with the acknowledgement of each individual's intrinsic value, provides a comprehensive framework for tackling the ethical dilemmas presented by AI. By applying the concepts of Ubuntu to the design, policy formulation, and regulatory control of artificial intelligence, we can develop governance frameworks that are culturally sensitive, participatory, and clearly geared toward human dignity and social justice.

This paper adopts a normative ethical approach, with references to African communitarian philosophy, to criticise and rebuild modern artificial intelligence governance. At the same time, it takes an applied philosophical approach that translates the moral principles of Ubuntu into policy suggestions. The analysis is placed at the intersection of ethics, technology, and political philosophy, aimed at enhancing a pluralistic and globally informed discourse on artificial intelligence ethics. The discussion follows an order of presenting the ethical issues involved in artificial intelligence, then examining the design principles and philosophies of Ubuntu, exploring how Ubuntu can be operationalised in the context of AI governance, and finally discussing future controversies, followed by providing policy-technological and academic guidance.

Artificial Intelligence (AI) and Ethics

The growth in AI technologies has been so rapid that it has raised a number of serious philosophical debates regarding the ethical implications and impact of such technologies on society. Artificial intelligence entails technologies like machine learning, natural language processing, computer vision, and robotics that permit machines to perform tasks associated with human intelligence. Such technologies have huge potential for many industries by providing efficiency and innovative solutions. They also raise critical ethical challenges that must be addressed for their development and use to be responsible.

One of the most important ethical issues within AI is bias. AI is trained using data, and if the data is biased, the AI picks it up and amplifies it. This is of particular concern in applications such as hiring and law enforcement, where biased AI systems can lead to discrimination against certain groups. One of the challenges posed by bias in AI is that it brings out the need for careful consideration of training data and the implementation of strategies that can mitigate bias, ensuring AI systems are fair and equitable. As Russell and Norvig explain, "algorithms can only be as good as the data they are trained on, and if that data reflects existing biases, the AI system will, too" [Russell and Norvig, 2016: 568].

Accountability is yet another critical ethical issue. The more autonomous an AI system becomes, the more difficult it is to pinpoint accountability for its actions. Especially in applications like autonomous vehicles or AI-driven medical diagnosis, where mistakes could involve very grave consequences, clear accountability frameworks are essential to establish the liability of outcomes on the part of individuals or organisations. Bostrom argues that the development of superintelligent AI presents special challenges of accountability since "the actions of a superintelligent AI could be unpredictable and potentially beyond human control" [Bostrom, 2024: 211].

Another important theme in the ethical discourse around AI is transparency. Many AI systems, especially those based on deep learning, are "black boxes," making it challenging to understand why they make certain decisions. A lack of transparency might impede understanding, trust, and verification of AI decisions. Improvement in transparency translates to developing methods for interpreting and explaining AI decisions that build trust among users and stakeholders in general, better positioning them to make informed decisions. Russell and Norvig contend that the importance of transparency is underscored by the fact that "interpretable AI systems are essential for ensuring that decisions made by AI are understandable and justifiable" [2016: 603]. These ethical challenges must be addressed as AI technologies evolve in order for their benefits to be reaped with reduced potential harm. This is an interdisciplinary task, one that calls for cooperation among technologists, ethicists, policymakers, and society at large in the development of guidelines and frameworks encouraging the responsible development and use of AI. By doing so, AI will be harnessed to improve lives without compromising ethical principles.

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Ubuntu Philosophy: Foundations and Principles

Ubuntu is a Nguni Bantu expression derived from Southern Africa, which carries immense philosophical depth, often translated as "I am because we are" or "humanity towards others" [Ramose, 2002]. This philosophy highlights the nature of human beings as interdependent parts of the community, whereby one's identity, life, and well-being are fundamentally tied to other people's well-being. It is not only a cultural expression but one that has actively moulded social relations, government, and conflict management in different African societies for ages [Tutu, 1999]. Over the years, Ubuntu has served as an essential pillar for social unity and shared responsibility. In pre-colonial African societies, Ubuntu helped create social peace and constructive collaboration among the people. It steered social behaviour by ensuring that conduct always had a social dimension and rationale [Letseka, 2012]. Its prominence escalated globally during the South African apartheid era, when it served as part of the reconciliation framework post-apartheid. One of the strongest proponents of Ubuntu, Archbishop Desmond Tutu, emphasised its role in mending societal divisions, advocating for the choice to forgive instead of seek vengeance [Tutu, 1999].

Culturally, various proverbs and sayings in Africa capture, embody, and communicate the value of Ubuntu. For example, the Nguni proverb Umuntu ngumuntu ngabantu translates to "A person is a person through other people." This emphasises that one's identity and being are shaped by social links, which supports the notion of communal relationships [Ramose, 2002]. This communal focus stands in stark contrast to the Western philosophy of individualism, serving as yet another perspective on humanity and society. Social discourse on ethics and governance has increasingly recognised Ubuntu values as important for inclusivity, empathy, and respect. The Ubuntu approach also helps respond to contemporary issues such as social disparities, violence, and irreparable damage to the environment [Smith & Neupane, 2018]. There is a need to embrace Ubuntu today so that societies can nurture respect for individuality and enhance well-being among their members.

The philosophy of Ubuntu is also underpinned by principles that foster a balanced and just society. Some of the more distinctive ones include communalism, participative decision-making, and consensus building, which dictate social relationships and structures. People tend to achieve their maximum potential in Ubuntu through active participation and contribution to a particular community, instead of setting individualistic goals. Therefore, communalism is the principle of achieving one's full potential through community [Ramose, 2002]. In addition, communalism allows individuals to build a sense of belonging and responsibility towards each other, whereby everyone works towards shared goals. The philosophy of communalism can also be seen in the various cooperative practices exercised in Africa. Families and communities work together, strengthening and supporting one another. Furthermore, communalism contributes to more just governance; through its advocates, policies are made to ensure equity of resources and address social disparities [Letseka, 2012]. The proportional representation of particular groups requires strengthening socially and politically

distributive justice. The expected positive effects of enhanced communalism to a greater extent involve moderation in the misuse or overuse of authority. Thus, communalism expects leaders to act more like trustees of the community. This differs from hierarchical and authoritarian frameworks, advocating for a horizontal and participatory system of governance [Ramose, 2002].

Participatory decision-making as an integral aspect of Ubuntu articulates respect for collective opinion and inclusiveness at all levels. This pillar guarantees that every member of the community impacts decisions regarding their lives, which improves accountability and transparency [Smith & Neupane, 2018]. As it is commonly accepted, participatory decision-making means that all relevant groups are invited to discuss and deliberate. This approach improves the decision-making process and cultivates a sense of pride and commitment from the local community. It reduces marginalisation and exclusion risks, ensuring that policies or actions are developed according to the diverse needs and aspirations of the people [Tutu, 1999]. Regarding organisational and governance matters, participatory decision-making can be achieved through community forums, public hearings, and other consulting arrangements that allow direct interaction between decision-makers and the community. These approaches stimulate discussions and negotiations, allowing societies to make decisions that are acceptable and advantageous to all [Letseka, 2012]. In addition, this model of participatory decision-making expands on democratic values by enhancing fairness, equity, and social justice within society. Ramose [2002] asserts that Ubuntu drives individuals to value others, which in turn enhances collective intelligence and collaboration toward better and more sustainable results.

Furthermore, the concept of consensus-building is directly associated with participatory decision-making under the Ubuntu framework. This approach aims to arrive at agreements that are acceptable to everyone involved, prioritising the group's welfare over individual needs and majority domination [Smith & Neupane, 2018]. It fosters dialogue among the involved parties as they debate and negotiate with each other to identify the best strategies to reach a compromise. These strategies create respect and limit rampant disagreements since decisions are made collaboratively [Letseka, 2012]. In regard to resolving disputes, consensus-building focuses on practices that seek to restore relationships and re-establish structured social orders. It emphasises building trust rather than focusing on punitive actions intended to offer punishment as a means of establishing order among community members [Tutu, 1999]. This strategy resonates well with the focus of Ubuntu, which is centred on forgiving and healing collectively, making it a humane approach instead of the adversarial setting that justice systems operate in. In governance, consensus-building improves the acceptability and support of policies and initiatives, thereby enhancing their usefulness as well as legitimacy. It fosters ongoing conversations and participation, leading to governance that is flexible and proactive in addressing new issues as they arise [Ramose, 2002]. In addition, consensus is rooted in Ubuntu as a basis for fostering cohesion and long-term stability because decisions stem from shared values and principles accepted by all. This glorifies a cohesive community that can withstand complexities and changes with collective reliance [Smith & Neupane, 2018].

Ubuntu has a very appealing array of humanity to reward us with, based on community development and nurturing through solidarity. The principles of social well-being and harmony are achieved through communalism, participatory decision-making, and consensus-building. Individuals and communities are motivated to act cooperatively as morally guided principles foster dialogue and care beyond self-interest. The interdependence and social responsibility are informed by Ubuntu as a critique of Western individualism. It provides an ethical approach to some of the world's problems, like inequality, climate change, and social fragmentation. Ubuntu is still a philosophy that fortifies Africa and the globe because it aims toward the collective good, and its inclusion in AI governance is not just good but imperative.

AI Governance: Current Challenges and Ethical Imperatives

The healthcare, financial, and educational sectors are being transformed by the recent evolutions made in artificial intelligence over the past few decades. However, the advancements in the usability of AI technologies bring their own sets of problems regarding system governance, particularly in relation to bias, transparency, and accountability. These are only some of the myriad problems that are AI system-specific and require immediate solutions for the creation and application of AI technologies that are beneficial for human society.

The instability of governance with AI systems poses one of the greatest problems to contemporary society: bias. Machine learning models are built using sophisticated algorithms that undergo 'training' using large datasets that often exhibit glaring biases, such as those based on gender, race, and even socioeconomic class. As a result, when applied in the real world, these systems are highly likely to yield biased results. A case in point is the discriminatory error rates found in facial recognition technologies, where some populations, mainly Black people, perform worse than White people [Buolamwini and Gebru, 2018]. Biased algorithms for hiring also tend to work against women and minority candidates, thus worsening existing discrimination in the workplace [O'Neil, 2016].

Bias is just one aspect of the issue that AI system producers have to deal with. Another dimension that poses a myriad of challenges to developers, users, and regulators is the so-called "black box" configuration of numerous AI systems, which makes understanding the decision-making processes and the tools used for enabling those resolutions nearly impossible. This system's lack of transparency makes it difficult to identify and resolve any biases. Users may not completely understand how the algorithm is reaching its conclusions. Thus, the problem of bias mitigation needs to be addressed in a more comprehensive manner, which includes advanced technological approaches like algorithmic fairness methodologies alongside ethical considerations [Angwin et al., 2022].

Another important concern regarding AI governance is the attention paid to transparency issues. The vast majority of AI systems are built in a manner that is incomprehensible to end users, and decision-making processes are cleverly disguised even to those who are tasked with building the system. This opacity needs to give way to a greater level of responsibility for AI systems, especially for life-or-death decisions in fields like criminal justice or healthcare. For example, AI-based predictive policing systems use historical crime data to predict where crimes are likely to be committed in the future. These systems often fail to provide sufficient transparency regarding the algorithms driving these predictions.

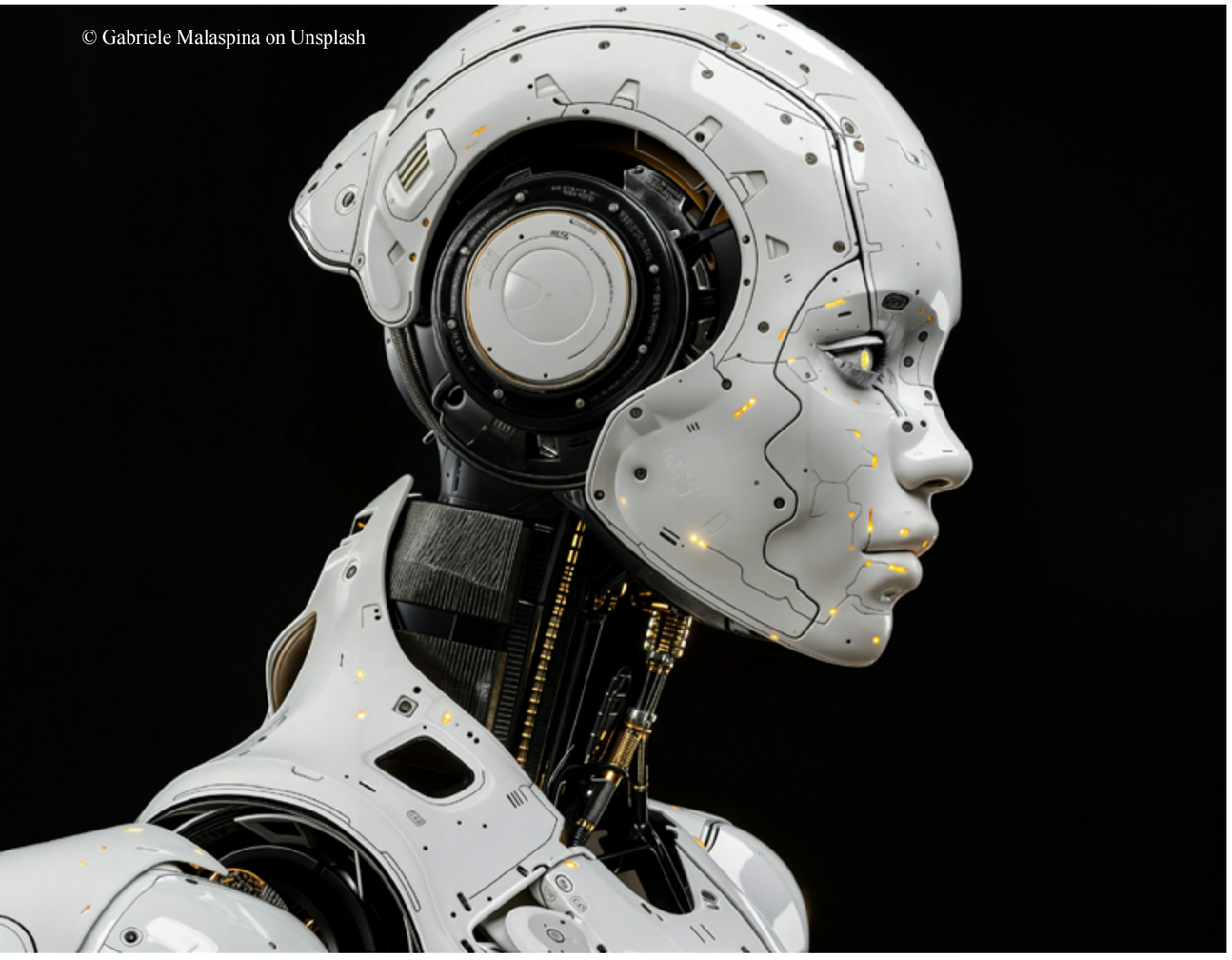
The lack of system transparency makes it difficult to tell if there is bias in the prediction systems and whether they really do predict trends in crime [Ferguson, 2017]. Likewise, trust and reliance are often eroded by AI applications in healthcare, such as diagnostic tools or algorithms for drug discovery, which make decisions without providing insight into their reasoning [Shah et al., 2019]. The claim of a need for an explanation concerning the workings of AI technology is not just a solely technical issue; it raises fundamental ethical questions regarding the ability of the systems to be assessed, controlled, and entrusted with responsibility. Clearly defined parameters for AI algorithms must be established to maintain public confidence and safeguard against harm that may be caused by suboptimal algorithms.

Responsibility within AI governance is arguably the most disputable concern. If there are errors or even damage caused by AI systems, whether through unintentional bias or failure to deliver accurately, who is deemed responsible? This inquiry has become particularly acute for autonomous vehicles, AI in healthcare, and military systems. A responsible institution such as Calo [2015] captures the impact of AI on decision-making succinctly: "which of the developers, users, or the AI itself is to bear the responsibility," as it creates a legal and moral sense of vacuum. This suggests that giving AI systems the autonomy to perform decision-making tasks generates intricate problems of responsibility and accountability—more so in legal spheres. If an autonomous vehicle causes an accident, determining liability is not straightforward. Should the driver, who retains control over the vehicle, be held subordinate to the law? Is the developer of the AI system responsible for programming the vehicle's decision-making processes? Thus, there exists a plethora of scenarios where responsibility can be evaded. Judges relying on problematic algorithms for sentencing may grant unjust sentences, yet the absence of an opposing will renders banal claims of fairness and due process irrelevant.

Integrating Ubuntu Philosophy into AI Governance

With the integration of AI systems into society, legal frameworks must be adjusted accordingly in order to set clear delineations of responsibilities to mitigate danger to society. Forward-thinking scholars devote their time and intellect to examining harm that indisputably exists: Goodmans and Flaxman [2017] base their research on liability depending on the extent of foreseeability, human interaction, and evidential clarity of the system. While computer science policy allows for the perfecting of the integration of AI into society, moral and ethical boundaries must always exist to maintain a healthy balance.

Ubuntu is an African philosophy that contests the idea of individualism in Western philosophy and promotes the essence of being human in community with others. From the Southern African perspective, individualism is not in tune with humanity, and this is where Ubuntu comes in. In contrast to individualism, which promotes self-interest, Ubuntu promotes the interests of the community. The intention of this paper is to introduce the philosophy of Ubuntu as a potential paradigm for AI ethics and governance. In particular, we are concerned with the dual problem of fair treatment of individuals and groups and ensuring that AI technology serves the interests and well-being of humanity as a whole. The philosophical tenets of Ubuntu resonate profoundly with the individual, the community, and society; they explain how one becomes or lives and grows through the community. When applied to AI governance, the concept of Ubuntu offers a fresh perspective on how AI systems should be developed, implemented, and governed. An Ubuntu-inspired perspective is neither seriously naive nor too pessimistic about human nature. It focuses not only on technical efficiency but also on the ethical and social responsibilities of AI developers and users.



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AI ethics, as informed by Ubuntu, requires a fundamental rethinking of not just how AI systems are designed, but also how they are deployed and overseen in society. The individualism, profit motive, and absence of community typically associated with technological development are directly at odds with the Ubuntu ethos. Advancing AI governance in a way that's even partially Ubuntu-informed means embracing many of the key principles associated with that African philosophy. These include, but are by no means limited to three core aspects. Firstly, communalism, as opposed to individualism which is a model that's common in many parts of the world, but which is also directly at odds with what happens inside a typical AI system, with its individual instead of collective models of understanding and generating human language. Secondly, respect for human dignity, which is classically associated with Kant and also found in Ubuntu. Finally, making decisions in an inclusive and participatory way, as opposed to top-down decision-making.

To understand how to harness Ubuntu for AI governance, we must first understand its core tenets. For a start, the governance of AI by Ubuntu would require a monumental shift in our thinking. Most modern societies view artificial intelligence predominantly as a means to achieve greater efficiency and profitability. Those societies are, in turn, governed by frameworks that somewhat pay lip service to the notion of these technologies having "positive social impact" - whatever that means. Fairness, transparency, and accountability are terms that pop up all too often in these ostensibly progressive frameworks.

In addition, the emphasis placed by Ubuntu on human dignity and interconnectedness demands that AI systems respect the inherent worth of all people, fostering inclusivity and eschewing anything that would dehumanise or marginalise any population. If AI development is infused with the ethical imperatives of Ubuntu, it will enhance the social responsibility and governance of AI and thereby improve the capacity of AI to serve the people. A key element that distinguishes Ubuntu is its emphasis on inclusive decision-making. In typical African societies, decisions are made in a way that ensures all members have a say. This is not only a moral imperative but also a recipe for creating governance structures that are fair, transparent, and accountable. Why not apply these same principles to AI governance? Issues like bias, transparency, and accountability in AI could use a dose of the good governance principles that Ubuntu advocates.

Implementing Ubuntu in AI governance could lead to the establishment of inclusive governance frameworks that would actively involve all stakeholders in the decision-making processes surrounding AI. With these frameworks in place, it isn't just the developers and policymakers who would have a say; the frameworks would also welcome the wider public into the conversation, including those often marginalized communities who are the first to feel the impact of AI technologies. Creating societies of people who know better is one approach to participatory governance in AI. This could take the form of panels or councils that are semi-deliberative or fully deliberative. A council of this sort, if populated with a broad cross-section of society, could serve as an advisory panel or even a regulatory panel, providing a level of oversight to the development and deployment of AI technologies. Whatever the governance structure, the assurance that ethical principles are guiding AI technologies requires a level of dialogue with diverse groups that is far beyond what AI and its societal implications could command even a few years ago. Engaging in this dialogue is itself a societal implication of AI.

Dialoguing ensures that principles rooted in Ubuntu, like those mentioned above, inform the development and deployment of AI systems. In addition, it is possible to structure participatory decision-making in AI governance through open public consultations and feedback mechanisms. These would enable individuals and communities to express concerns and provide perspectives on the social implications of AI systems to be deployed at scale. Public engagement like this not only bolsters trust in AI technologies but also guarantees that their design reflects the sorts of values and needs individuals and communities expect of them.

At the heart of Ubuntu lies the principle of consensus-building. African traditional communities often have lengthy discussions and negotiations to make a decision that involves mutual understanding—that is, an understanding that serves the whole group in a way that benefits them as a community. This reaching of a decision ensures that all perspectives have been considered; it guarantees that the decision is a group decision, not one made by some individual with authority (such as a chief). By using this principle in a computer science context, we

are building a system that behaves more like a community than like a dictatorship. AI governance might find a path to addressing the ethical problems of AI by building consensus. That path would not be straight. It could take a long time. But if it went anywhere, it would go to the kinds of decisions that many people find acceptable and that many different types of stakeholders have had the opportunity to weigh and consider.

Building consensus among stakeholders may be crucial to achieving the design and operation of advanced AI systems in a way that produces good outcomes and avoids harmful ones. Through processes of multi-stakeholder engagement, it is possible to build an institutionalised consensus within AI governance structures. These processes involve working with diverse sets of stakeholders that together form the kinds of dialogue needed for consensus-building and also help identify a more socially inclusive set of governance mechanisms for AI. The inclusion of Ubuntu's principles of governance could help ensure a balance between technological innovation and ethical considerations. Ubuntu stresses not just the importance of local communities, but the principle that underpins local empowerment: governance. And that's an area where AI lags. Ensuring that communities have a real say in how local, potentially life-altering AI systems are designed and deployed is critical. If we don't, then what will likely happen is that some powerful interests will impose an external technology on a community. And it might be a really powerful technology—like a powerful AI system.

But if the AI system is designed without input from the community, then what's to stop designers from programming in all kinds of biases, just as has happened with some (not all) powerful technologies that came before AI? Equipping local communities to govern AI technologies also means furnishing them with the tools and know-how to understand and engage with AI. This might involve training programs and other educational initiatives that help make the technology and the decision-making around it transparent and understandable to the average community member and local elected official. It's hard to see how a community can participate meaningfully in the decision-making processes governing the use of powerful technologies like AI if it does not comprehend how the technology works at some basic level.

Applying Ubuntu to AI governance creates a profoundly different kind of framework, one that prioritises community well-being, participatory decision-making, and collective responsibility. It is an opportunity to engage with principles that Ubuntu embodies - fairness, transparency, and respect for human dignity - and to consider how these might be integrated into the AI systems being developed today. The 'ubuntification' of AI governance, then, is as much about kindling a discourse on the Earth that could inclusively involve all as it is about any specific recommendations one might make (for instance, to build governance structures around participatory decision-making, to ensure local communities are empowered, etc.). Though we can't be together with our brothers and sisters in various kinds of communities that AI might affect (or so we hope), we can collectively and communally use their actions and voices to help us make good decisions for all.

Controversies of Ubuntu Philosophy in AI Governance

Ubuntu has become an influential way of re-imagining artificial intelligence (AI) governance. Yet several objections keep arising that question its global applicability, conceptual precision, and practical enforceability. Critics argue that Ubuntu cannot serve as the basis for a transnational AI regime because it is embedded in the communitarian cultures of sub-Saharan Africa and cannot rightfully impose on cultures that value individual autonomy a morality derived from what might be seen as a tribal ethic [Appiah, 1998; Sen, 1999]. However, comparative moral philosophers reject a strict dichotomy between "collectivist Africa" and "individualist West." Instead, they uncover overlapping relational values across global traditions—Confucian ren, Indigenous North American minobimaatisiiwin, and Catholic social teaching's principle of solidarity [Metz, 2011; Harding, 2020]. Empirical studies of global AI ethics consultations show broad support for principles such as relational accountability and community benefit, even in liberal democracies [Floridi & Cowls, 2019]. Thus, Ubuntu need not supplant local ethics; it can supply a complementary relational vocabulary that enriches pluralist governance frameworks [Ramose, 2002].

In addition, the qualitative aspirations of Ubuntu—togetherness and humaneness—seem far too indeterminate to yield enforceable guidelines for the algorithmic trifecta of fairness, transparency, and accountability in human-computer interaction [Gyekye, 1997; Gordon, 2013]. But the accusation of vagueness overlook recent jurisprudence and policy instruments that already operationalise Ubuntu-style principles. South Africa's Constitutional Court has used Ubuntu to mould doctrines of restorative justice, data privacy damages, and administrative fairness [Mokgoro, 2015]. On that basis, the African Union's 2022 "Data Policy Framework" translates the kinds of community-centred relational duties emphasised by Ubuntu into concrete safeguards: community-centred impact assessments, collective redress, and algorithmic auditing. Legal scholars thus argue that Ubuntu offers not just principles but resources that can be rendered into statutory language.

Furthermore, others argue that rhetorics of "human dignity" may be co-opted by corporations or states to justify the extraction of data from people, all the while giving the appearance that they respect individuals and are not exercising undue control over them—an appearance that masks the power asymmetries involved. Any normative framework can be captured; the way to prevent that is to have strong procedures and clear accountability. Ubuntu's insistence on participatory deliberation provides a measure of protection. Aspects of its vision have been tested in two very different settings: multi-stakeholder forums in Kenya's biometric ID review process and the Ghana Agricultural Consortium, and two public-interest data trusts in the USA. These are ways Ubuntu has been tried out in practice. Kenya and Ghana, however, are not the USA or Europe, and even if the level of technology proved sufficient for the trials in these settings, the context in which those trials took place was a very different one. Translating Ubuntu into contexts where privacy, consent, and the public good are understood very differently poses a real risk of creating normative conflicts [Beetham, 2018]. Polycentric governance theory [Ostrom, 2010] counsels that global baseline standards should be layered with protocols that are specific to local contexts. This governance structure is reflected in UNESCO's 2021 "Recommendation on the Ethics of AI." Thus, layering global baseline rights with local context—by what is called "subsidiarity" in governance—makes it possible for rights to influence local contexts. At this level, Ecodharma can guide local impact assessments in the use of AI, while coexisting with global rights instruments such as the ICCPR. The plug-and-play simplicity of commercial generative AI systems may seem remarkably incompatible with Ubuntu's widely praised consensus-driven procedures, which favour slow but sure decision-making [Sullivan, 2022].

Digital governance is being tested in Latin America and Europe, and what they show is that the best way to achieve both inclusiveness and speed is to use nested deliberation. This means using small, carefully tuned citizen deliberations to feed recommendations into regulatory processes that are set up to work quickly—what some are now calling regulatory sandboxes. (In these sandboxes, regulatory staff work with businesses and other stakeholders to figure out how best to govern new types of digital services.). Neither narrow-minded nor unclear, Ubuntu offers a worldwide relational framework that is increasingly reflected in comparative ethical discourses in artificial intelligence. Criticisms of particular cultures (or lack thereof), insufficiently clear concepts, and apparent ease of capture are significant but do not seem to be fatal to the framework. Accountable artificial intelligence increasingly seems to be something that can be enforced both operationally and in a way that is internationally resonant.

Conclusions

The rapid and transformative rise of artificial intelligence (AI) presents both tremendous opportunities and complex ethical dilemmas. As AI becomes an ever-increasing part of the fabric of modern society, its governance demands an approach that not only prioritises technological efficiency but also nurtures human dignity, fairness, and collective well-being. The integration of Ubuntu - a Southern African philosophy that emphasises interconnectedness, community, and mutual care - into AI governance offers a crucial new avenue for addressing these challenges.

The core philosophy of Ubuntu, which emphasises the interconnectedness of all human beings and the importance of community in shaping individual identity, offers a lens through which to critique AI's impact on society. Ubuntu focuses on inclusivity, empathy, and collective responsibility. Consequently, it challenges the individualistic tendencies that often seem to characterise the development and deployment of technologies, including AI. In counterbalancing those individualistic tendencies, Ubuntu asks us to consider, first and foremost, societal values. As increasingly influential decision-making tools, AI systems must either align with those societal values or be seen as a threat to them. Yet AI is inherently value-neutral. Thus, while Ubuntu's influence may counterbalance AI's individualistic biases—which could perpetuate societal and in-group biases—unlike ethical frameworks that focus on individualism, the Ubuntu framework focuses on the community. Its emphasis on the local community encourages a shift in AI governance toward a much more inclusive model. In the Ubuntu framework, decisions are made with the participation of all affected parties, and there is a strong push toward consensus—even with the many difficult decisions that involve the creation and regulation of AI technologies.

With all these voices in the mix, especially those from marginalised communities, it seems likely that the kinds of insensitivity that have led to the creation of many biased AI systems could be reduced significantly. Adopting the principles of Ubuntu in AI policy and regulation is not without its difficulties. The critiques mentioned throughout this paper - such as the philosophy's cultural specificity, its North-South divide, and the apparent contradiction between its prescribed practices of decentralisation and the centralisation required for coherent global AI governance - must be taken into account. Yet these challenges are not insurmountable. They provide us an opportunity to rethink and fortify, from different cultural standpoints, the principles and practices that are necessary in the AI local global beta. Ubuntu not only offers a framework for ensuring ethics are built into global AI governance but also encourages different stakeholders to engage collaboratively across cultural divides.

In the face of these challenges, I put forward specific actions I would like to see taken by policymakers, technologists, and scholars. First, there should be a serious move afoot to develop AI governance frameworks that incorporate the core principles of Ubuntu, which is, after all, the African equivalent of a carbon-based life form. And what do those core principles emphasise? Why, transparency, accountability, and fairness, for starters. Second, and this may strike some as a bit too cute, the AI developers and regulators of the future should be encouraged to engage in regular dialogue with a broad range of stakeholders, especially those communities most impacted by AI decisions. Ubuntu, remember, mandates not only consultation but also active involvement in the decision-making process. Third, educational and research initiatives that promote the values of Ubuntu in the design of our technologies and the development of ethical AI should be expanded.

This paper advocates for a paradigm shift in the governance of artificial intelligence, not only in its technical aspects, but broader still in the role technology ought to play.

To conclude, Ubuntu's integration into AI governance presents an excellent opportunity to reshape the discourse concerning technology and society. With its focus on community, fairness, and human dignity, Ubuntu furnishes an ethical foundation that can steer AI systems toward serving the collective good. Implementing this vision is not without its challenges, but with help from around the world and a commitment to inclusivity, we can surely construct an AI ecosystem that reflects, in all its parts and as a whole, the just and equitable society we aspire to. This is a shift whose benefits promise not only a more ethical future for AI but also a more compassionate, socially responsible technological landscape.

References

Angwin, J., Larson J., Mattu S., and Kirchner L., 2022. Machine Bias. In Ethics of Data and Analytics, 1st ed. Auerbach Publications: 254-264.

Appiah, K. A., 1998. The ethics of identity. Harvard University Press.

Bostrom, N., 2014. Superintelligence: Paths, Dangers, Strategies. Oxford University Press.

Buolamwini, J. and Gebru T., 2018. Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification. Proceedings of the 1st Conference on Fairness, Accountability, and Transparency: 77-91.

Calo, R., 2015. Robotics and the Lessons of Cyberlaw. Calif. L. Rev. 103: 513.

Chilisa, B., 2012. Research Methodologies from an Indigenous Perspective. SAGE Publications.

Cowls, J., et al. 2019. Designing AI for social good: Seven essential factors.

Ferguson, T. S., 2017. A course in large sample theory. Routledge.

Goodman, B., and Flaxman S., 2017. European Union regulations on algorithmic decision-making and a 'right to explanation'. AI magazine 38.3: 50-57.

Gyekye, K., 1996. Values of African Culture: An Introduction. Sankofa Publishing.

Gyekye, K., 1997. Tradition and modernity: Philosophical reflections on the African experience. Oxford University Press.

Kearns, M., and Roth A., 2019. The ethical algorithm: The science of socially aware algorithm design. Oxford University Press.

Letseka, M., 2012. In defence of Ubuntu. Studies in Philosophy and Education 31: 47-60.

Metz, T., 2011. Ubuntu as a moral theory and human rights in South Africa. African Human Rights Law Journal 11.2: 532-559.

Mokgoro, Y., 2015. Constitutional jurisprudence: Ubuntu and the law. South African Journal on Human Rights 31(3).

Nussbaum, M. C., 2011. Creating Capabilities: The Human Development Approach. Harvard University Press.

O'Neil, C., 2016. Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown Publishing Group.

Ramose, M., 2002. Ubuntu as African Philosophy. Mond Books.

Russell, S. J., and Norvig P., 2020. Artificial Intelligence: A Modern Approach. Pearson.

Sen, A., 1999. Freedom as development. Oxford University Press.

Shah, P., et al., 2019. Artificial intelligence and machine learning in clinical development: a translational perspective. NPJ Digital Medicine 2.1: 69.

Smith, M. and Neupane S., 2018. Artificial intelligence and human development: toward a research agenda.

Taylor, L., Floridi L., and Van der Sloot B., 2021. Group privacy. Journal of Political Philosophy 29(1): 68–90.

Tutu, D., 1999. No future without forgiveness.

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