Artificial Intelligence (AI) and children in Africa: A sandboxed childhood and a normative ethics point of view

Eddie Liywalii[1,2] [0000-0002-9528-8021]

[1]University of Pretoria (UP), Faculty of Humanities, Department of Philosophy, Pretoria, SOUTH AFRICA
[2]Center for Artificial Intelligence Research (CAIR), Ethics of AI Research Group, Pretoria, SOUTH AFRICA

u22781197@tuks.co.za

Abstract. Artificial Intelligence (AI) poses many opportunities for current and future generations, as well as a host of risks. Children in Africa are not spared from these risks. African culture puts children at the centre of activities, nonetheless African children frequently are victims of both natural and man-made calamities such as, inter alia, famine and human trafficking, respectively. Now AI brings new threats to this vulnerable population. As countries struggle with formulation of appropriate governance frameworks they resort to the creation of regulatory sandboxes. However, regulatory sandboxes do not necessarily assure safe AI for children in particular and humans in general. African children are exposed to AI technology in these experimental and imperfect regulatory environments thereby exposing the children to unknown risks, and in fact making African children part of the testbed for AI technologies, such that they experience a technological 'sandboxed' childhood. I review literature to establish these risks, and efforts being made to protect the children in Africa. Using the UNICEF's policy guidance on AI for children's recommendations and a normative ethics point of view, I attempt to make a case for value sensitive design of AI that will preserve the African culture through children as the future by protecting them from harmful effects of AI. Eminent among the normative ethics is Ubuntu which I discuss to demonstrate how Africa could employ it for cultural identity and preservation.

Keywords: AI, children, sandboxed childhood, normative ethics, African culture.

1   Introduction

African culture puts children at the centre of activities and African society across the continent is structured largely around the lives of its children [1]. The Preamble of the African Charter on the Rights and Welfare of the Child states that "RECOGNIZING that the child occupies a unique and privileged position in the African society and that for the full and harmonious development of his personality, the child should grow up in a family environment in an atmosphere of happiness, love and understanding".[1]

---

[1] African Charter on the Rights and Welfare of the Child https://www.acerwc.africa/en/acrwc/acrwc

Children represent continuity with rituals and contemporary institutions designed to ensure children's survival and prosperity.[2] An African adage in the Bemba language "*Imiti Ikula Empanga*" (translated as, *small shrubs are the future forests*: figuratively meaning, children are the future), adopted by Salome Temba in her thesis, "*The Position of Early Childhood care and development in Central Zambia*", also confirms how much regard African society has for its children [2].

The Zambia national child policy recognizes anyone under the age of 18 as a child.[3] Presently, in Zambia children represent more than 50% of the country's population.[4] Overall on the African continent, children (under the age of 18) account for close to half (47%) of the total population.[5] Africa's child population will be the largest among all continents in the latter half of this century, topping 1 billion by 2055.[6]

Apart from natural calamities such as famine, disease and now effects of climate change such as floods [3], over the years, children in Africa have been victims of human made catastrophes ranging from war, slavery, human trafficking and abuse, to addiction [4]. The boom of AI joins a list of man-made threats or opportunities to the wellbeing of children and UNICEF reports that African children are already interacting with AI technologies in many different ways, directly and indirectly, affecting present and future generations of children [5].

In other words, while AI is a force for innovation and can support the achievement of the Sustainable Development Goals (SDGs), it also poses risks for children [5]. Therefore, despite the opportunities AI provides, without adequate regulatory frameworks for ethical and child-centric AI[7] and, I suggest here, a value-sensitive design (VSD) approach for value aligned AI based on relevant normative ethics, Africa's valued future generations are vulnerable to the dangers of AI. This is because so far is VSD is the most reviewed approach in ethics and technology for the purpose of integrating of moral values into the conception, design, and development of emerging IT [6].

Technological artifacts have an effect on how human beings interact (perceive, experience) with their world thereby shaping the human culture [7]. For Africa to preserve her identity, the future of AI in Africa should be African, thereby benefiting the future population which is expected to double in the next three decades [8]. How can we ensure that African children are protected from the risks of AI technology, and that they grow up in an African culture in the face of technology mostly designed and developed in the Northern hemisphere?

Few jurisdictions around the world, particularly Africa, have put in place policies to specifically deal with AI and children.[8] Some multilateral institutions (UNESCO[9],

---

[2] Steve Howard (2016), Children and childhood, 10.1093/OBO/9780199846733-0045 https://www.oxford-bibliographies.com/display/document/obo-9780199846733/obo-9780199846733-0045.xml

[3] Source: Government of the Republic of Zambia, National Child Policy

[4] Source: Central Statistical Office, Demographic and Population Projections 2011-2035

[5] UNICEF/UN0226463/Bongyereirwe, Children in Africa, Key statistics on child survival and population

[6] UNICEF/UN0226463/Bongyereirwe, Children in Africa, Key statistics on child survival and population

[7] https://www.unicef.org/globalinsight/media/871/file

[8] https://news.un.org/en/story/2021/11/1106002

[9] https://www.unesco.org/en/articles/recommendation-ethics-artificial-intelligence?hub=32618

OECD[10], AU[11]) are making efforts to help member states or have published policy guidance documents to guide governments and private sector companies on how to design, develop, deploy and use responsible AI systems and actualizable AI policies. UNICEF gives particular attention to child-centric AI which they describe as human centric AI that upholds children's rights founded on the requirements in their policy guidance document [5].

Africa which espouses a normative ethics known as Ubuntu coupled with the cultural practice of prioritizing children welfare should be the flag bearer in advocating and implementing human centric AI in tandem with Ubuntu theory which promulgates "butu" equivalently meaning humanity [9, 10], which also encompasses child centric AI, for children welfare, cultural preservation human wellbeing in general.

Ethical AI, sometimes referred to as value aligned, value sensitive, or ethically aligned AI, or simply responsible AI, is focused on building AI systems to comply with the ethical expectations of stakeholders such as fairness, accountability, and transparency such that AI systems are developed "along fundamental human principles and values, to ensure human flourishing and well-being in a sustainable world" [11-14].

In this paper, I use the phrase 'sandboxed childhood' to refer to a situation of children growing up in an environment where they are exposed to technology that is being tried out, not (fully) regulated as governments do not yet understand how to regulate them, and I point to the full extent of the risks involved (section 2). Then, consider AI threats affecting children (section 3). In 3.1, I base my discussion on UNICEF requirements for child-centred AI in their policy guidance on AI for children of 2021 which I sum into four thematic areas (3.2). I then match each one of them against a normative ethical theory and make a case on how ethical AI through a VSD approach could protect African children growing up in the not yet regulated AI sandbox environment while also preserving African culture (section 4). I then conclude in section 5.

2   Sand boxed childhood and regulatory sandbox for AI

Etymologically, the word 'sandbox' was commonly used to describe a shallow box or hollow in the ground partly filled with sand for children to play in; a sandpit.[12] In computing, the concept is particularly utilized in the areas of financial innovation and fintech, where a regulator enables experimental innovation within a framework of controlled risks and supervision [15, 16]. The International Telecommunications Union (ITU) and the World Bank[13] jointly defines a regulatory sandbox as a controlled regulatory environment for conducting live tests of innovative products, solutions, and services with the potential to deepen and develop certain markets.[14] In the AI technology domain, digital innovators, researchers, and digital developers are developing new

---

[10] https://www.oecd.org/digital/artificialintell
gence/#:~:text=The%20OECD%20Principles%20on%20Artificial,Council%20Recommendation%20on%2
0Artificial%20Intelligence.

[11] https://achpr.au.int/en/news/press-releases/2023-06-08/inception-workshop-and-experts-consultation-artificial-intelligence

[12] https://dictionary.cambridge.org/dictionary/english/sandbox

[13] https://digitalregulation.org/a-case-for-ict-regulatory-sandbox/

[14] https://digitalregulation.org/a-case-for-ict-regulatory-sandbox/

technologies, business models and bringing them to market at a rapid pace while policy makers and regulators need to not only keep abreast with the pace but also be able to anticipate shifts in the market [17, 18].

Sometimes, regulators fall short of keeping a close watch on these changes even as they are expected to anticipate the regulatory changes that may be required to facilitate a safe and conducive environment for the general public [19]. Therefore, policymakers and regulators are increasingly incorporating new and agile regulatory tools which facilitate a dynamic, evidence-based regulatory environment to test new products, services, and technologies for which existing regulatory framework across varied sectors need to be tested. One such a tool is regulatory sandboxes [16].

A regulatory sandbox is a way to connect innovators and regulators and provide a controlled environment for them to cooperate in [16]. Collaboration between regulators and innovators should facilitate the development, testing, and validation of innovative AI systems with a view to ensuring compliance with the requirements of AI Regulation.[15]

However, regulatory sandboxes cannot adequately provide a framework to protect children in an AI environment. This is because regulatory sandboxes also come with a risk of being misused or abused and need an appropriate legal framework to succeed [20]. The implementation of a regulatory sandbox inherently has some limitations and risks associated with it such as regulator's capacity.[16] Thus, we should start, as I endeavor in this study, looking at how AI ethics could supplement (experimental) regulatory sandboxes in protecting children against negative effects of AI technologies.

I make a case on this in the coming sections with the focus on AI ethics, particularly for protecting children in Africa. Emmanuel Goffi observes that AI ethics could not only serve as a temporal guide for ethical AI but also as bedrock for defining AI governance and a regulation framework that will reflect African culture and aspirations [21]. He further notes that this would avoid the West's efforts to impose rules applied to AI to the rest of the world [21]. However, ethics is not enough for regulating AI because it does not have provision for enforcement of sanctions [22, 23].

Goffi also notes that, although ethics is not enough, short of legal tools, ethics appears as a normative consolation solution to frame and regulate the development and use of AI systems [8]. In Africa, the overall absence of legal frameworks, non-active provision of regulatory sandboxes or at the very least, and the non-application of African ethical frameworks to the governance of AI, leave many people in Africa, especially children, vulnerable to the negative effects of AI. I will consider specific threats to children from AI technology in the next section, and then suggest a route to follow Goffi's views on the role of AI ethics to address some of these concerns.

3   AI and children in Africa

Over a period of years, the African child has been faced by a myriad of calamities [24]. Many a times they are the victims of the negative and exploitative effects of

---

[15] https://digital-strategy.ec.europa.eu/en/news/first-regulatory-sandbox-artificial-intelligence-presented
[16] https://digitalregulation.org/a-case-for-ict-regulatory-sandbox/

developmental milestones.[17] Some calamities are natural, such as pandemics, climate change and famine [25] inter alia; while others are man-made. Children in slavery, children in political struggles, children growing in war torn countries (enlisted in militias as child soldiers) [26], child labour (working in farm plantations such as tea, cocoa, tobacco, cotton to earn a livelihood or mining especially illegal mining of precious stones) [27]; the list is endless.

AI joins the list of threats and opportunities for African children; introducing new or exacerbating existing ones [28]. General factors in the AI domain potentially impacting children include the fact that online collated data may also be used to provide the raw material for AI systems [29]. AI systems can be (and are being) used to redefine work, replacing humans with smart technology in some work places. The loss of jobs is likely to become a major factor in what is now termed the "post-industrial society" [30]. These indirectly have an impact on children (as the future workforce) particularly where laws to protect them are not adequately in place [5].

In addition, policymakers, opinion leaders, researchers, and the general public have many questions such as, "How are biases (inherent in society and subsequently in the data) affecting automated decision-making? How is AI impacting jobs and the global economy? Can, and should, self-driving cars make moral decisions? What should be the ethical, legal and social position of robots?" [11].

In today's information age driven by AI, children some using mobile devices, have become targets for commercial messages (ads), thus exposed to AI-nudging[18] [31] and undermine their privacy [32]. For instance with the Internet revolutionized by AI and data mining [33], child threats have moved online [34] and now we have child online abuse through child pornography and sextrafficking, gaming and surfing addiction, online data harvesting, online behaviour tracking, profiling and targeting, misinformation, disinformation, and radicalization (through echo chambers and information bubbles) among others.

Against this background, UNICEF states that children are already interacting with AI technologies in many different ways, directly and indirectly [5]. For instance, in the direct way, AI technologies are embedded in toys, virtual assistants and video games, and are used to drive chatbots and adaptive learning software. Algorithms provide recommendations to children on what videos to watch next, what news to read, what music to listen to and who to be friends with. In addition to these direct interactions between children and AI, children's lives and well-being are also indirectly impacted by automated decision-making systems that determine issues as varied as improving the management of traffic flows for safer cities, welfare subsidies, quality of health care and education access, and their families' housing applications.

As demonstrated earlier, when there is a new technology, there is usually a tendency by governments to allow such technology to operate in a live environment without strict legal compliance requirements to allow for regulators to appreciate the technology and encourage innovation in an approach called regulatory sandboxes. While governments have been slow to respond to the increasingly urgent demand to govern AI, recent

---

[17] "A troubled decade for Africa's children": https://www.un.org/africarenewal/magazine/april-2002/troubled-decade-africas-children

[18] The term "nudges" is used to describe strategic tools designed to influence people's choices and behaviors, usually without subjects consciously recognizing that influence

legislative activity signals a growing effort to mitigate fears with a myriad of regulations intended to rein in the potential for risks and uncertainties posed by AI [15].

This has implications for all children, including those from developing countries who apart from interaction with AI may be equally impacted by lost opportunities as a result of not being able to enjoy the benefits of AI systems. Most cited benefits where AI has been proved very effective include, but are not limited to, sectors such as in healthcare, transportation, education, environment, agriculture, defense, and public services [35, 36].

African children are exposed to AI technology in experimental and imperfect regulatory environments thereby exposing the children to unknown risks, and in fact making African children part of the testbed for AI technologies, and in a sense then experience a technological 'sandboxed' childhood [37].

Although there are a number of regulations that have been developed in the past few years [38] with a number of publications dominated by the west [39], the slow pace is still unsatisfactory. It is hard to understand how governments could allow a technology of such power, "comparable to nukes"[19], to be a sphere of experiments with inadequate to no regulatory and governance frameworks in research and implementation. This is after even prominent industry leaders have joined the chorus to warn of the risks that AI poses to humanity[20]. Africa is still lagging even more behind [40], like in other developmental efforts [41]. Possibilities of countries coming up with AI strategies or policies in general, let alone those that will especially safeguard the children in the African cultural context, still remain far-fetched [8, 21].

Below I look at a number of frameworks at international, continental and national level meant to protect children from the negative effects of AI.

3.1 Literature on policies for child protection against AI technology threats

Existing literature shows that, despite many countries lacking specific policies for AI and children, a number of countries are putting in place measures to protect their people in general. Africa however, always comes last, like in many issues especially those to do with technology [40]. Many countries, including Zambia, are struggling to put national AI strategies in place, yet as already stated above, children in Africa are already at risk of being exposed to the diverse effects of AI such as online manipulation, discrimination, child profiling and privacy invasion among others.

In Zambia for instance, the National Child Policy of 2015 – 2021 only speaks to children's access to information and communications technology (ICT)[21] among other issues. It does not address child-centred AI. Equally, the ministry responsible for ICTs, working together with the regulator of ICTs (ZICTA),[22] International

---

[19] https://www.reuters.com/video/watch/idRCV004NTE

[20] https://www.nytimes.com/2023/05/30/technology/ai-threat-warning.html#:~:text=A.I.-,Poses%20'Risk%20of%20Extinction%2C'%20Industry%20Leaders%20Warn,as%20pandemics%20and%20nuclear%20weapons.

[21] https://www.mcdss.gov.zm/?page_id=2780#:~:text=NATIONAL%20CHILD%20POLICY%202015%20%2D%202021%20(NCP)&text=Additionally%2C%20the%20focus%20on%20maternal,for%20all%20children%20in%20Zambia.

[22] Zambia Information and Communication and Technology Authority

Telecommunication Union (ITU), International Multilateral Partnership Against Cyber Threats (ITU-IMPACT), UNICEF, and other Cooperating Partners organized a Child Online Protection (COP) Framework Workshop in 2019.[23] The primary objective was to develop a sustainable Action Plan to be implemented in the country to ensure a safe and secure cyberspace for users of Information and Communications Technologies (ICTs), especially children.

The product of the above undertaking was a National Child Online Protection Strategy of 2020. However, this strategy does not cover AI and children in particular as a concern, through its provision or lack of opportunity to the Zambian child. Generally too, there is a lack of debate among researchers, policy experts, civil society and general citizens on the need for ethical AI and the potential AI has to transform the cultural development of Africa especially through the exposure of this younger generation of users to this modern technological innovation [41].

Some multilateral institutions have published policy guidance documents to assist governments and the private sector to come up with AI, AI polices and AI systems that promote child wellbeing. Among these, the major ones being the Policy Guidance on AI for Children (UNICEF 2021)[24] and the Artificial Intelligence for Children Toolkit (WEF 2022).[25] Other than the above documents drafted to specifically tackle child rights and wellbeing, other high-level documents developed by supranational organizations include the UNESCO Recommendation on the Ethics of AI (COMEST 2021).[26]

At continental level, the African Union High-Level Panel on Emerging Technologies (APET) and the African Union Development Agency (AUDA-NEPAD) recently convened African Artificial Intelligence experts at a Writing Workshop in Kigali, Rwanda, from February 27 to March 3, 2023, to finalize the drafting of the African Union Artificial Intelligence (AU-AI) Continental Strategy for Africa. It is not clear yet what the focus on children will be. The overall goal was to develop a comprehensive strategy that will guide African countries on how to support inclusive and sustainable AI-enabled socio-economic transformation.[27]

Of specific interest to this study, UNICEF as an international multilateral organization mandated with protecting the rights of children, identifies nine requirements for child-centric AI. Below I summarise the requirements into four thematic areas by identifying common ethical concerns the requirements address. I match and discuss each of the thematic areas against four normative ethics theories [5]. One of these ethical theories is African, while the other three are the major western ones, often held by many scholars as universal moral theories.

The matching of the summarized requirements against the selected normative ethics is a novel approach that contributes to research efforts aimed at closing the gap between principles and practices by suggesting a framework that may help practically-minded developers apply ethics in right from the requirements analysis stage [42]. This novelty

is more pronounced by considering Ubuntu as an African normative ethic that intrinsically calls for human centred approach to all human works.

The discussion of the grouped requirements against the four normative ethics theories is not mutually exclusive but carefully matched based on the emphasized ethical concerns in the requirements. As Emmanuel Goffi notes, the consideration of other ethical theories in the discussion of ethics applied to AI bring about cultural diversity [21]. He further states that this obviously is not only a matter of respect for cultural particularisms but also a fundamental requirement to establish a long-lasting governance (globally) where all cultures are satisfied and allowed to promote their own interests based on their ethical stances [21]. I suggest my normative framework against this background to specifically provoke thinking in the protection of African children in regulatory sandboxes based on diverse ethical frameworks. In other words, I summarize the UNICEF requirements into a normative framework and categorize it in a novel way using the normative ethics in order to give guidance to policy-makers on how to develop frameworks for translating requirements into values, backed by ethical theories then, into value-aligned systems.

Table 1. Normative framework for combined requirements for child-centric AI.

Four thematic areas	UNICEF requirements for child-centric AI	Normative ethics perspective
Cultural identity and well-being	Support children's development and well-being	Ubuntu perspective
Equal opportunities	Ensure inclusion of and for children Prioritize fairness and non-discrimination for children	Deontologist perspective
Security, safety and privacy	Protect children's data and privacy Ensure safety for children Provide transparency, explainability, and accountability for children	Virtue ethics perspective
Economic opportunities	Empower governments and businesses with knowledge of AI and children's rights Create an enabling environment Prepare children for present and future developments in AI	Consequentialist perspective

3.2 From the four normative ethics point of view

Cultural identity and well-being/Ubuntu perspective

I consider cultural identity and well-being as a parallel to UNICEF's supporting children's development and well-being child-centric AI requirement. There is a strong correlation between UNICEF's first requirement and Africa's culture of putting children at the centre of cultural activities as the future of society.

Zambia's COP strategy interestingly mentions core cultural values and practices as one of the guiding principles upon which the strategy is founded among other principles. A clear indication that one of the aspects considered in the discussion of child (online) protection (and well-being) is to preserve culture through younger generation.

However, little information is available to the effect that technological products aligned to cultural values is a compulsory prerequisite or indeed hallmark approach for ICT products and services (including AI) for consumption in a sovereign Zambia as a deliberate policy to safeguard the nation's culture. Let alone, regulatory sandbox frameworks could increase the risks for children to be exposed to moral and social ill-effects of AI (like addiction, discrimination, radicalization through echo chambers[28] or filter bubbles,[29] etc.) that are not yet detected while the technology is still in its infancy [15].

Mohan [43] warns of modern technology as a new tool for neo-colonialism. Therefore, without protecting the children from the negative effects of modern technology such as AI targeting them, Africa might end up having no cultural identity and thus no sovereignty to talk about [44]. Africa which represents 16% of humanity on the globe must have a say in the design of AI and ethics applied to AI [8].

It is in this regard that Ubuntu, a moral theory that became an object of political interest during the struggle for political liberation, from minority white rule to majority black rule in Zimbabwe and South Africa (called humanism in Zambia [45]) must then all the more be the basis for demanding technology, such as AI, to align to human values. Based on this normative ethics, Africa must take a leading role to demand for human-centered AI (HCAI). HCAI calls for future technologies that value human rights, justice and dignity [46]. An African perspective on ethics applied to AI would not only shake our conviction and open a new path towards ethical AI regulations, but it would also offer the continent normative tools fitting its very needs to the benefit of its population [8].

Thus, Africa's cultural identity and wellbeing of its people will be achieved by supporting children's development and wellbeing as the future.

Equal opportunities/Deontologist perspective
I relate equal opportunities to UNICEF's two child-centric AI requirements; namely, ensuring inclusion of and for children, and prioritizing fairness and non-discrimination for children based on what the requirements intend to achieve. Through the formulation of laws and regulations to govern the research, design, development, deployment, and use of AI, equal opportunities for all children could be provided and thus protect children's rights. This gives a deontological perspective of upholding a moral obligation of equal opportunities for all children through governance frameworks put in place at global, continental, regional, and down to national level.

All children must be treated as an end in themselves, and no children must be treated as a means to an end. They must have equal access to child-centric AI and no child must irresponsibly be exposed to AI whose negative effects are unknown (not properly classified as unacceptable, high, limited or minimal risks) through regulatory sandbox loopholes [15]. From the deontologist perspective, all concerned stakeholders would feel duty bound to develop universal child-centric AI that would in turn provide equal opportunities for all children.

---

[28] An environment where a person only encounters information or opinions that reflect and reinforce their own

[29] Algorithmic bias that skews or limits the information an individual user sees online in search engines, social media sites etc.

UNICEF policy guidance on AI for children further advocates that when developing AI systems, design principles that address the widest possible range of users should be applied so that all children can use the AI product or service, regardless of their age, gender identities, abilities, or other characteristics. AI systems should not lead to discrimination against children on any basis, including age, ethnicity, race, gender identities, disability, rural or urban contexts, socioeconomic status, or location.

Security, safety and privacy/Virtue ethics perspective

Security, safety and privacy are paralleled with three UNICEF's requirements for child-centric AI based on the goals the requirements intend to achieve. These are protecting children's data privacy, ensuring safety for children, and providing transparency, explainability, and accountability for children.

The UNICEF policy guidance on AI for children encourages that AI policies and systems should recognize the value and unique vulnerability of children's data and their privacy in a protective and empowering way. This is because children are biologically and psychologically distinct from adults and will be impacted differently by AI systems. Children's safety within AI systems should be assured, both in the short and in the long term. Our actions should be inspired by desire for a better world for future generations.

Thus using a virtue ethics approach we can develop frameworks like one proposed here translating ethical principles in practical ethical AI [47]. AI ethics can put a stronger focus on virtues (as complementary to a principle based approach) or, in other words, on character dispositions in AI practitioners[30] in order to effectively put itself into practice [48].

Based on their objectives, regulatory sandbox frameworks could be used to prioritize the protection of children from any yet to be known dangers of AI. Using the complementary view to the ethical dilemmas of AI regulatory sandboxes discussed in the literature to point at an epistemological dilemma of true uncertainties (unknown unknowns), Undheim, Erikson [14] argue that regulatory sandboxes have the potential of supporting the development of a more ethical AI through not only reducing uncertainty, but also through nurturing moral imaginations. I equate moral imagination, to a virtue or character disposition of an AI practitioner [48].

In addition, General Comment (No. 25) from the Committee on the Rights of the Child calls for the rights of every child to be respected, protected, and fulfilled in today's digital world or digital environment.[31][32] Finally, the development of AI is often described in terms of human progress [49]. This must be the disposition of the developers to an extent of developing value-laden AI for benefit of the future generations or a better future [30].

---

[30] When using the term "AI practitioners" or "professionals", this includes AI or machine learning researchers, research project supervisors, data scientists, industry engineers and developers, as well as managers and other domain expert.

[31] Digital environment includes covering the impact of AI systems, robotics, automated systems, algorithms and data Analytics.

[32] https://www.ohchr.org/en/documents/general-comments-and-recommendations/general-comment-no-25-2021-childrens-rights-relation

Economic opportunities/Consequentialist perspective

The theme, economic opportunities is paralleled with the other remaining three UNICEF's requirements for child-centric AI. These are, empower governments and businesses with knowledge of AI and children's rights, create an enabling environment, and prepare children for present and future developments in AI.

B.C. Stahl mentions the three main purposes that drive the development and use of AI one of them is economic efficiency [30]. A consequentialist will work to profit from the utility of AI using a "windful clause" later distributed for the benefit of society [50].

Consequentialist theories focus on the *outcomes* of the action for this evaluation. These include various approaches to utilitarianism proposed by Jeremy Bentham (1789) and John Stuart Mill (1861) [30]. In theory, it is held that the net utility of the act of educating children is high as it translates to economic empowerment. Thus, equally investment in AI (child-centered) can have greater economic returns [51, 52].

Therefore, in a digital economy, empowerment of governments and businesses with the right knowledge (AI and children's right), and the creation of an enabling environment and preparing of children for present and future developments in AI will result in right outcomes of economic opportunities, which is one of the above three purposes identified by [30]. From the consequentialist perspective, it is the right thing to invest in the education of AI developers for child-centric AI as well as empowering children with AI skills for economic opportunities, starting from the time the regulatory sandbox is set and throughout its entire lifespan.

4 Value Sensitive Design (VSD) and cultural values inclusion

Value Sensitive Design (VSD) is a methodology that provides a principled approach to embedding common values into AI systems [53, 54]. The normative framework in Table 1, enables the coining of thematic areas which in turn enables appropriate matching of moral theories that underpin recommendation for value alignment of AI application. The normative framework can be used to classify AI regulatory sandbox risks by identifying threatened values or child-centric AI requirements and matching them with the appropriate thematic area and moral theory. The identified requirements/values from stakeholders could later feed into the VSD approach during the implementation of AI systems [55, 56]. It serves as a mechanism for moving from theory to practice.

For instance, picking the first thematic area in the framework; where 'cultural identity and well-being' are the values to safeguard because we agree that each child is entitled to a cultural identity for their well-being. The requirement 'supporting children's development and well-being' could be satisfied by first identifying the appropriate (human) values embedded in it. Second, the identified values would then be guiding principles or 'ingredients for moral imagination' in the VSD approach.

In a sense, the framework in the first thematic area puts in one place the work of Goffi as he encourages inclusion of African cultural values in AI and the use of a VSD approach for value aligned AI. In the former sense, Goffi calls for enriched ethics applied to AI by including perspectives from rich and diverse Africa and thus escaping what he calls western 'cosm-ethical' hegemony [8, 21]. Hence, the consideration of one of the African moral theories of Ubuntu. In the latter sense, Friedman et al. argue that technology is the result of human imagination and that all technologies to some degree

reflect, and reciprocally affect, human values. It is because of this deep-seated relationship that ignoring values in the design process is not a responsible option. At the same time, actively engaging with values in the design process offers creative opportunities for technical innovation as well as for improving the human condition [57]. Hence, protecting the children's lives and the African culture through the children as the future.

Based on the above, I reecho the claim that any recommendation for ethical or value aligned, and subsequently child-centric AI, is anchored on moral theories. Moral theories form the basis of the ethical review of AI systems [53]. In addition, VSD could be adopted to build AI systems that satisfy the stakeholder requirements/values [58] identified in the normative framework (Table 1).

5   Conclusion

In conclusion, African societies are structured largely around the lives of children who are considered the future. While it has its benefits, AI joins the list of threats for Africa's future if not designed to be aligned to the African culture and values. Despite the opportunities AI provides, without adequate regulatory framework for ethical and child-centric AI through value alignment using VSD approach based on relevant normative ethics, Africa's valued future generations, are vulnerable to the dangers of AI.

Children in Africa too are already interacting with AI, yet many of the negative effects of such interaction are not well grasped. Although there is a number of policies put in place by most countries to protect children in general, African countries are still struggling to develop AI governance frameworks that will among others protect children. This lack of policies and loose implementation of regulatory sandboxes for the purposes of studying the benefits and dangers of technologies entail a sandboxed childhood for an African child making them testbeds for AI technology.

There are a number of policy guidance tools developed by various organizations at international, regional, and continental levels, among them is the UNICEF's policy guidance on AI for children. I group UNICEF's nine recommendations for child-centric AI into four thematic areas namely cultural identity and wellbeing; equal opportunities; security, safety and privacy; and economic opportunities. These have been paralleled with four normative ethics theories namely ubuntu, deontologist, virtue ethics and consequentialist theories respectively, in order to recommend value aligned design of AI for culture and identity preservation in Africa through the protection of children and future generations.

Despite a growing call for Africa to now more than ever free itself from the Western universalist tropism to focus on its peoples' needs and ethical stances [8], failures by African leadership to rise to the occasion on time when needed always leaves their future generation exposed to risks, some of which perpetuate Africa's cultural and value extinction. An African perspective on ethics applied to AI would not only shake our conviction and open a new path towards AI ethical regulations, but it would also offer the continent normative tools fitting its very needs for the benefit of its population [8].

References

1. Lawal, M.O., *Educational Challenges Facing Children in Cocoa Plantations in Ondo State, Nigeria.* Children's Agency and Development in African Societies, Dakar: CODESRIA, 2017: p. 49-63.
2. Temba, S., *Imiti Ikula Empanga.* The position of Early Childhood Care and Development in Central Zambia, 2014.
3. Hanna, R. and P. Oliva, *Implications of climate change for children in developing countries.* The Future of Children, 2016: p. 115-132.
4. Peek, L., *Children and disasters: Understanding vulnerability, developing capacities, and promoting resilience—An introduction.* Children Youth and Environments, 2008. **18**(1): p. 1-29.
5. Unicef, *Policy guidance on AI for children.* The United Nations Educational, Scientific and Cultural Organization: London, UK, 2020.
6. Manders-Huits, N., *What values in design? The challenge of incorporating moral values into design.* Science and engineering ethics, 2011. **17**(2): p. 271-287.
7. Verbeek, P.-P., *Don Ihde: the technological lifeworld.* American philosophy of technology: The empirical turn, 2001: p. 119-146.
8. Goffi, E.R., *Teaching Ethics Applied to AI from a Cultural Standpoint: What African "AI Ethics" for Africa?*, in *AI Ethics in Higher Education: Insights from Africa and Beyond*. 2023, Springer. p. 13-26.
9. Metz, T., *Ubuntu as a Moral Theory and Human Rights in South Africa (Repr.).* 2016.
10. Walmsley, G., *African philosophy and the future of Africa*. 2011: Council for Research in Values and Philosophy.
11. Dignum, V., *Responsible artificial intelligence: how to develop and use AI in a responsible way*. 2019: Springer.
12. Eitel-Porter, R., *Beyond the promise: implementing ethical AI.* AI and Ethics, 2021. **1**(1): p. 73-80.
13. Agarwal, S. and S. Mishra, *Responsible AI: Implementing Ethical and Unbiased Algorithms*. 2021: Springer.
14. Undheim, K., T. Erikson, and B. Timmermans, *True uncertainty and ethical AI: regulatory sandboxes as a policy tool for moral imagination.* AI and Ethics, 2022: p. 1-6.
15. Truby, J., et al., *A sandbox approach to regulating high-risk artificial intelligence applications.* European Journal of Risk Regulation, 2022. **13**(2): p. 270-294.
16. Goo, J.J. and J.-Y. Heo, *The impact of the regulatory sandbox on the fintech industry, with a discussion on the relation between regulatory sandboxes and open innovation.* Journal of Open Innovation: Technology, Market, and Complexity, 2020. **6**(2): p. 43.
17. Ranchordas, S., *Experimental lawmaking in the EU: Regulatory Sandboxes.* EU Law Live [Weekend Edition, 22 October 2021], University of Groningen Faculty of Law Research Paper, 2021(12).
18. Ranchordas, S., *Experimental regulations for AI: sandboxes for morals and mores.* University of Groningen Faculty of Law Research Paper, 2021(7).
19. Pop, F. and L. Adomavicius, *Sandboxes for Responsible Artificial Intelligence. EIPA Briefing September 2021.* 2021.

20. Ranchordás, S., *Experimental regulations and regulatory sandboxes: Law without order?* University of Groningen Faculty of Law Research Paper, 2021(10).

21. Goffi, E.R., *Escaping the Western Cosm-Ethical Hegemony: The Importance of Cultural Diversity in the Ethical Assessment of Artificial Intelligence.* AI Ethics Journal, 2021. **2**(2): p. 1-11.

22. Carrillo, M.R., *Artificial intelligence: From ethics to law.* Telecommunications Policy, 2020. **44**(6): p. 101937.

23. Horner, J. *Morality, ethics, and law: Introductory concepts.* in *Seminars in speech and language.* 2003. Copyright© 2003 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New ….

24. Agere, L.M. and A.K. Agere, *Exploring the efficacy of child protection interventions post Cyclone Idai: a case of Chipinge, Zimbabwe.* Child abuse research in South Africa, 2020. **21**(2): p. 39-50.

25. Bain, L.E., et al., *Malnutrition in Sub–Saharan Africa: burden, causes and prospects.* Pan African Medical Journal, 2013. **15**(1).

26. Albertyn, R., et al., *The effects of war on children in Africa.* Pediatric surgery international, 2003. **19**: p. 227-232.

27. Bonnet, M., *Child labour in Africa.* Int'l Lab. Rev., 1993. **132**: p. 371.

28. Brown, J., *Online risk to children: Impact, protection and prevention.* 2017: John Wiley & Sons.

29. Liao, S.M., *Ethics of artificial intelligence.* 2020: Oxford University Press.

30. Stahl, B.C., *Artificial intelligence for a better future: an ecosystem perspective on the ethics of AI and emerging digital technologies.* 2021: Springer Nature.

31. Ganapini, M. and E. Panai, *An Audit Framework for Adopting AI-Nudging on Children.* arXiv preprint arXiv:2304.14338, 2023.

32. Gulmezoglu, B., et al. *Undermining user privacy on mobile devices using AI.* in *Proceedings of the 2019 ACM Asia Conference on Computer and Communications Security.* 2019.

33. Callanan, G.A., D.F. Perri, and S.M. Tomkowicz, *Targeting vulnerable populations: The ethical implications of data mining, automated prediction, and focused marketing.* Business and Society Review, 2021. **126**(2): p. 155-167.

34. Andrews, D., S. Alathur, and N. Chetty, *International efforts for children online safety: A survey.* International Journal of Web Based Communities, 2020. **16**(2): p. 123-133.

35. Ahmad, K., et al., *Developing future human-centered smart cities: Critical analysis of smart city security, Data management, and Ethical challenges.* Computer Science Review, 2022. **43**: p. 100452.

36. Gwagwa, A., et al., *Artificial Intelligence (AI) deployments in Africa: benefits, challenges and policy dimensions.* The African Journal of Information and Communication, 2020. **26**: p. 1-28.

37. Werthner, H., et al., *Perspectives on Digital Humanism.* 2022: Springer Nature.

38. Jobin, A., M. Ienca, and E. Vayena, *The global landscape of AI ethics guidelines.* Nature machine intelligence, 2019. **1**(9): p. 389-399.

39. Hagerty, A. and I. Rubinov, *Global AI ethics: a review of the social impacts and ethical implications of artificial intelligence.* arXiv preprint arXiv:1907.07892, 2019.

40. Eke, D.O., K. Wakunuma, and S. Akintoye, *Responsible AI in Africa: Challenges and Opportunities.* 2023.

41. Okyere-Manu, B.D., *African Values, Ethics, and Technology.* 2021: Springer.

42. Morley, J., et al., *From what to how: an initial review of publicly available AI ethics tools, methods and research to translate principles into practices.* Science and engineering ethics, 2020. **26**(4): p. 2141-2168.

43. Mohan, D., *Promotion of'Modern'Technology: A New Tool for Neo-Colonialism.* Economic and Political Weekly, 1989: p. 1815-1818.

44. Sahbaz, U., *Artificial intelligence and the risk of new colonialism.* Horizons: Journal of International Relations and Sustainable Development, 2019(14): p. 58-71.

45. Kaunda, K.D., *Humanism in Zambia and a Guide to its Implementation.* 1974: Division of National Guidance.

46. Shneiderman, B., *Human-centered AI.* Issues in Science and Technology, 2021. **37**(2): p. 56-61.

47. Cuellar, M., *A virtue ethical approach to the use of artificial intelligence.* Data and Information Management, 2023: p. 100037.

48. Hagendorff, T., *A virtue-based framework to support putting AI ethics into practice.* Philosophy & Technology, 2022. **35**(3): p. 55.

49. Stahl, B.C., et al., *Artificial intelligence for human flourishing–Beyond principles for machine learning.* Journal of Business Research, 2021. **124**: p. 374-388.

50. O'Keefe, C., et al. *The windfall clause: Distributing the benefits of AI for the common good.* in *Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society.* 2020.

51. Rao, A.S., G. Verweij, and E. Cameron, *Sizing the prize: what's the real value of AI for your business and how can you capitalise? PwC.* 2017.

52. Szczepanski, M., *Economic impacts of artificial intelligence (AI).* 2019.

53. Bartneck, C., et al., *An introduction to ethics in robotics and AI.* 2021: Springer Nature.

54. Umbrello, S., *Beneficial artificial intelligence coordination by means of a value sensitive design approach.* Big Data and Cognitive Computing, 2019. **3**(1): p. 5.

55. Liywalii, E., *Analyzing the impact of ethical issues in e-government implementation: a case of Zambia.* 2020, The University of Zambia.

56. Goldkuhl, G. *From policy to design and effects: A framework for e-government research.* in *9th Scandinavian Workshop on E-Government, 9-10 February 2012 Copenhagen, Denmark.* 2012.

57. Friedman, B. and D.G. Hendry, *Value sensitive design: Shaping technology with moral imagination.* 2019: Mit Press.

58. van de Poel, I., *Embedding values in artificial intelligence (AI) systems.* Minds and Machines, 2020. **30**(3): p. 385-409.