

**THE FOURTH INDUSTRIAL REVOLUTION:
INCLUSIVENESS, AFFORDABILITY, CULTURAL
IDENTITY, AND ETHICAL ORIENTATION**

(Revised after Blind Peer Review)

Reginald M.J. Oduor, Ph.D.

Senior Lecturer in Philosophy, University of Nairobi

rmjoduor@gmail.com

*Re-Submitted to Filosofia Theoretica for the Special Issue on “African Studies
and the Fourth Industrial Revolution”*

Submitted on: 19th August, 2021

Abstract

Discussions on the impact and future directions of technology often proceed from an empirical point of view that seems to presume that the ebb and flow of technological developments is beyond the control of humankind, so that all that humanity can do is adjust to it. However, such an approach easily neglects several crucial normative considerations that could enhance the standing of individual human beings and whole communities as rational users of technology rather than its slaves. Besides, more often than not, technological products are designed in ways that neglect the needs of persons with disabilities, thereby augmenting their exclusion from society. Consequently, this article proposes four normative considerations to guide the initiatives of African societies in their deployment of the technologies of the Fourth Industrial Revolution, namely, inclusiveness to meet the needs of all human beings, affordability to bridge the digital divide, respect for cultural identity to guard against cultural imperialism, and ethical orientation as the over-arching guide to building a truly human society.

Keywords

Fourth Industrial Revolution, Persons with Disabilities, Inclusiveness, Digital Divide, Cultural Identity, Ethical Orientation

Introduction

“Welcome to tomorrow!” and “tomorrow is already here!” are popular phrases often used in the context of the Fourth Industrial revolution (“4IR”). Thus at the Sight Tech global Conference held on 2nd and 3rd December 2020, one of the plenary sessions was titled “Our AI future is already here” (SIGHT TECH GLOBAL 2020, N.P). However, it is now commonly assumed that the ebb and flow of technological developments is beyond the control of humankind, so that all that humanity can do is adjust to it. Nevertheless, in what follows, I advance the view that humankind ought to ensure that 4IR is guided by a value system that places humankind at the centre of the Revolution as an agent rather than a victim.

Paul Donovan (2021, 20) summarises the past three industrial revolutions as (1) steam power, (2) electric power, and (3) computer power. Nicholas Johnson and Brendan Markey-Towler (2021, 19-26) speak of the four revolutions as the industrial revolution, the technological revolution, the digital revolution, and the fourth industrial revolution. They go on to note that the Fourth Industrial Revolution (4IR) is the current period of economic transition since the mid-2000s, characterized by a fusion of new digital technologies, rooted in advances from the Digital Revolution, with technological applications in the physical and biological domains (JOHNSON and MARKEY-TOWLER 2021, 25). Nevertheless, Donovan (2021) notes that the phrase “industrial revolution” entered common usage long after the first industrial revolution had begun. Karl Marx’s collaborator on *The Communist Manifesto*, Frederick Engels, used the phrase in German in the 1840s. The phrase was first used in English by Arnold Toynbee in 1882 (DONOVAN 2021, 20). This points to the fact that human beings often name something quite a while after they have experienced it, and the same has been

true of 4IR, although we may have named it earlier than the first three because we are now more used to the idea of industrial revolutions than those who went before us were.

MIT's Erik Brynjolfsson and Andrew McAfee refer to 4IR as the Second Machine Age ("2MA"). According to them, while the first machine age was about the automation of manual labor and physical strength, the 2MA technological progress in digital hardware, software and networks is about the automation of knowledge (cited in GLEASON 2018, 2). At the core of the automation of knowledge is artificial intelligence (AI). Johnson and Markey-Towler explain: "Artificial intelligence, especially when endowed with machine learning algorithms, is a technology which seeks to mimic the functioning of the human mind, and which can therefore mimic human action guided by a process that mimics human thought" (JOHNSON and MARKEY-TOWLER 2021, 100). Johnson and Markey-Towler further observe that artificial intelligence has greatly enhanced the use of robots:

..., the 4IR moves the goalposts from automation to smartization, whereby intelligently programmed software and robots are able to collect new data during the regular course of their operation, share it with other approved devices on the network, analyse the data, and use the conclusions to update their course of action. The 4IR took "dumb" autonomous machine and made them "smart." This step was essential to the development of technological marvels such as self-driving cars and trucks and next-generation industrial robotics (...). (JOHNSON and MARKEY-TOWLER 2021, 115)

During the Sight Tech Global Conference which I referred to at the beginning of this article, Kai-Fu Lee, one of the world's top scientists and top investors in the field of artificial intelligence and author of *AI Superpowers: China Silicon Valley and the New World Order* (2018), observed that the current generation's breakthrough in a type of AI called neural nets, sometimes referred to as deep learning, has enabled remarkable advances in areas such as computer vision and natural language processing. He went on to state that today's AI capabilities are so great in this raw form that what is needed now are the engineers, and, most importantly, the data to make the most of all the possibilities. He explained: "... computers

... can see and hear at the same level as people now. So with speech recognition for machine translation and for object recognition, AI is now at about the same level as humans. And AI is improving rapidly, based on its ability to take a huge amount of data whether it's spoken language or recorded videos to really train itself to do better and better. So over time, it will be a better see-er and hear-er than humans.” Referring to what he calls the third wave of artificial intelligence as perception AI, Lee spoke of "... extending and expanding this power throughout our lived environment, digitizing the world around us through the proliferation of sensors and smart devices. These devices are turning our physical world into digital data that can be analyzed and optimized by deep learning algorithms" (DESMOND and LEE 2020, N.P).

Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, formerly the European Management Forum, lists emerging technology breakthroughs in fields such as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage and quantum computing among the things that will drastically change our lives in 4IR (2016).

Indeed, the lives of the peoples of Africa are already being touched by 4IR in ways that many of them are yet to perceive - their smart phones, with their “Location” function on, are beaming data about their movements to networks, and the data are then sold to high tech transport companies desperate to gather information about traffic flow in cities; many of them unwittingly allow phone apps to access their microphones and cameras, with the real possibility of their conversations and actions being monitored; their emails and social media posts are being monitored for information about them that is sold to marketers, advertisers and politicians who use it for targeted advertisements; their faces are increasingly being

scanned by cameras connected to face-recognition software ostensibly to enhance security, but with the real possibility of surveillance for purposes unknown to them. What is likely to be more alarming to many, however, is the fact that the combination of artificial intelligence and robotics supported by high speed online connectivity is threatening to render jobless those without requisite new skills in a few years time (SCHWAB 2016, N.P; DONOVAN 2021, 22-27).

Rob Floyd (2021, N.P) informs us that the African Centre for Economic Transformation, working with other institutional partners and nearly 40 data scientists and machine learning experts from around the globe, recently completed the continent's first "Artificial Intelligence Challenge" ostensibly to help predict what infrastructure Africa will need in the future. According to Floyd, the exercise sought to identify machine learning tools and approaches that can inform policy decisions. The data scientists created models and designed methodologies that could help determine what infrastructure to build, where to build it, and what factors will have long-term economic impacts on the continent.

As intimated in my opening paragraph, it is now assumed that all that humans can do in the face of new technologies is to adjust to them. Thus Schwab (2016, N.P) talks of "the inexorable shift from simple digitization (the Third Industrial Revolution) to innovation based on combinations of technologies (the Fourth Industrial Revolution) ". Nevertheless, such an approach easily neglects several normative considerations requisite for enhancing the standing of individual human beings and whole communities as rational users of technology rather than its slaves. These considerations are crucial in 4IR, whose advent has implications on weighty moral issues such as privacy, respect for the integrity of the human person, personal choice, and the right to cultural identity.

Consequently, in what follows, I propose four normative considerations that, in my view, ought to guide the initiatives of African societies in their deployment of 4IR technologies, namely, inclusiveness to meet the needs of all human beings, affordability to bridge the digital divide, respect for the right to cultural identity to guard against cultural imperialism, and ethical orientation as the over-arching guide to building a truly human society.

1. Inclusiveness to Meet the Needs of all Human Beings

It is a truism to state that the purpose of technological innovations is to meet human needs, whether material, physical, physiological, psychological or social. As such, any technological innovation which impoverishes human life, as the nuclear bomb, landmines, the wide range of chemical and biological weapons threaten to do, is a non-living monster invented by a human being with monstrous intentions. This simple truth is often bypassed when discussions are cast in terms of the need to respond to technological advancements rather than being framed in terms of the need to identify ways of ensuring that users of technology give direction to such advancements. The approach that is beholden to technological advancement is sometimes summed up in the saying that if we do not adapt to change, change will sweep us along with it.

Tragically, in our time, dominated by capitalist values with their highly individualist orientation, human need is often narrowly viewed in terms of physical necessities or physical cravings, with formal education being conceptualised as the path to meeting them. This explains the growing popularity of the neoliberal notion of “market-driven courses” that is threatening to reduce education systems around the world to handmaids of the market rather than tools for moulding the whole person (SANTAMARÍA 2019, N.P). More crucially, the values of the so-called economic liberalism currently driving 4IR are contrary to the communalistic values

that the vast proportion of African peoples embrace, variously expressed by the saying “I am because we are, and because we are, therefore I am” (MBITI 1969, 141), and by the Kiswahili saying that “*Mtu ni watu*”, which literally translates as “A person is people” (ODUOR 2016/2017). Similarly, the Shona say that “*munhu munhu muvanhu*”, while the Ndebele and Zulu say that “*umuntu ngumuntu ngabantu*”, both of which can be rendered as “A person is a person through other persons” (MANGENA 2014, 36). Thus in the African context, the meeting of human need includes ensuring that the individual drinks deeply from the well of communal living. Consequently, any technology that diminishes the quantity and quality of interaction among family members, colleagues or friends by affording individuals hours of solitary enjoyment, as is the case with social media currently, is a barrier to the meeting of a crucial human need.

Another pertinent concern is the fact that the gender disparity which characterised the first three industrial revolutions is threatening to worm its way into the fourth. As Gleasen (2018, 5-6) explains, “Females are less likely to have digital literacy, which means they will be less likely to take advantage of technological opportunities. Even for those who are fortunate enough to be participating in the technology-related workforce, women are significantly underrepresented. ..., the reasons [for this] relate to a lack of mentors, a lack of female role models, gender bias, unequal growth opportunities compared to men, and unequal pay for the same skills.”

There is also the urgent need to ensure that the full inclusion of persons with disabilities in society is promoted in 4IR. According to the United Nations Convention on the Rights of Persons with Disabilities (CRPD), “Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various

barriers may hinder their full and effective participation in society on an equal basis with others” (UNITED NATIONS 2006, Article 1). A major social barrier that persons with disabilities confront on a daily basis is prejudice - the irrational, albeit tacit, discrimination of members of this group on the basis of their sensory, motor or cognitive impairments; and this discrimination is manifested in government planning, decisions by leaders of private businesses, and in one-to-one interactions, all of which results in the marginalisation or outright exclusion of such persons from the life of society. Thus highly qualified persons with disabilities often miss employment due to the prejudice of those responsible for hiring, who will often not even bother to find out how such persons cope with the limitations arising from their disabilities. Donovan highlights the deleterious effects of any prejudice on the economy as follows:

Why is prejudice so bad for the economy? Prejudice throws away skilled workers for no good reason. Prejudice stops workers from moving to better jobs for no good reason. Prejudice prevents good decision-making. Prejudice weakens profits and economic strength. Prejudice wastes workers’ talents. Companies and countries succeed if they make the most of their workers’ talents. (DONOVAN 2021, 1)

Indeed, due to prejudice, physical and social environments are regularly designed without considering the needs of persons with disabilities. According to the World Health Organisation’s *World Report on Disability* (2011)¹, more than one billion people in the world lived with some form of disability, of whom nearly 200 million experienced considerable difficulties in functioning. The report indicated that in the years ahead, disability would be an even greater concern because its prevalence was on the rise due to ageing populations and the higher risk of disability in older people, as well as the global increase in chronic health conditions such as diabetes, cardiovascular disease, cancer and mental health disorders. The report went on to observe that persons with disabilities have poorer health outcomes, lower

¹ I cite this 2011 WHO report because there has been no other comprehensive report on the issue after it - which itself highlights the marginality of disability in global discourse.

education achievements, less economic participation and higher rates of poverty than people without disabilities. This is partly because they experience barriers in accessing services such as health, education, employment, transport and information (WORLD HEALTH ORGANISATION 2011, N.P).

To mitigate the disempowering effects of disability-unfriendly physical and social environments that perpetuate exclusion, the UN Convention on the Rights of Persons with Disabilities (CRPD) stipulates the Principle of Universal Design, which it defines as " the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. Nevertheless, universal design does not exclude assistive devices for particular groups of persons with disabilities where these are needed" (UNITED NATIONS 2006, Article 2).

Members of the community of persons with disabilities often illustrate the principle of universal design stipulated in the CRPD by comparing a ramp and a staircase: if you only erect a staircase in a building, only persons with two working feet can go upstairs unaided; but if you build a ramp instead, the wheelchair users will have equal access to the building, so the ramp is more inclusive than the stairs. In the era of 4IR, we need to act as builders of ramps rather than erectors of staircases in all our technological innovations to ensure that we break the disability-poverty symbiosis. This is in line with the CRPD, which is a significant move away from the medical model of conceptualising disability (which views persons with disabilities as objects of charity) towards a social model (which conceptualises them as bearers of rights).

It is important to bear in mind that universal design of ICT products (which are the gateways to 4IR technologies) is cost-effective. For example, when web content is designed from the start to be accessible to persons with disabilities, the expected costs are only 1 to 2 percent of the costs of the overall web design project (LAZAR and STEIN 2017, 1), whereas the cost of designing and manufacturing separate technologies to mediate the access is much higher. Yet when persons with disabilities are denied access to ICT, they are also excluded from enjoying freedom of expression, freedom of information, political participation, civic engagement, inclusive education, the right to access the highest level of scientific and technological information, and participation in social and cultural opportunities (LAZAR and STEIN 2017, 3-4).

There have been amazing strides in what in the digital technology world is called accessibility, that is, in-built features that enable people with a variety of disabilities to use technology. The enhanced “hearing” and “seeing” capabilities of computers in the advent of AI that Kai-fu Lee, earlier cited, speaks about have enhanced the effectiveness of speech recognition software, enabling persons who lack the use of their hands to type using their voices (JOHNSON and MARKEY-TOWLER 2021, 87). Similarly, text to speech recognition software has resulted in screen-reading applications that enable persons with total visual disability to get audio output from devices such as computers, mobile phones, thermometers, blood pressure machines and weighing machines, thus enabling them to use such devices without sighted assistance; conversion of text on the screen to virtual Braille on a pannel enables persons who are deaf-blind to use computers unaided; magnification technology has come in handy for persons with low vision; captioning has made information relayed through sound accessible to persons who are deaf or hard of hearing. Many of these 3IR innovations are now augmented by AI to produce hitherto unimaginable accessibility to technology by

persons with disabilities, particularly in the use of computers and smart phones. Universal design of 4IR products would greatly contribute to promoting the inclusion of persons with disabilities in society, as they would thereby be able to pursue independent living, formal education, commerce and employment on an equal basis with others.

It is also noteworthy that universal design is not only beneficial to persons with disabilities, but also to people who are able-bodied. To give a few examples, just as a ramp is greatly beneficial to those who are temporarily ill-disposed and need to use wheelchairs for a limited period of time, so also magnification software gives those with sight wider options for the layout of documents that they wish to read, speech-recognition software enables those who find it difficult to type using their fingers to avoid doing so, while screen-reading software gives the sighted the option of listening to text instead of looking at it. Similarly, with the use of appropriate icons and voice output, there is no reason why an able-bodied peasant farmer who does not have the benefit of literacy cannot use voice commands on a smart phone to search the web for the best prices for his or her produce or to dictate text messages to his or her friends; he or she can also send voice messages to his or her son or daughter and receive replies through the same channel.

A crucial aspect of human welfare is personal liberty, entailing rights such as those of free association, movement, expression and privacy. Yet 4IR is eroding these very liberties through surveillance: smart phones now easily “hear” and “see” much more than their users intend or know. What is more, governments are consolidating various databases (such as those on health insurance, births and deaths, voters’ lists, and criminal records) into single super-databases, so that at the click of a button those with access can view a citizen’s information in astoundingly fine details that can be used against him or her. Thus in the run-

up to the 2020 US elections, some US citizens wrote a parody of the famous American civil war-period song “His Truth Goes Marching On”, part of which stated:

Our right to privacy is gone, devices are the spies.
For government surveillance those are now the ears and eyes.
They use the corporate data, no subpoenas, no surprise,
And still we don't catch on.

All this calls to mind George Orwell’s dystopian novel, *1984*, in which the single party, embodied by the mythical “Big Brother”, deploys 4IR-type technologies to monitor not only the people’s actions, but also their thoughts (ORWELL 1961 [1949]). Yet we must refuse to sink into helplessness, because governments and big corporates cannot withstand concerted, co-ordinated pressure by citizens or consumers. For example, in early 2021, due to the mass exit of users, the tech corporate which owns a leading chat platform had to temporarily halt its plans to avail users’ data to advertisers, thereby confirming the diagnosis of the sixteenth-century French jurist and political philosopher, Étienne de la Boétie, that a tyrant cannot retain his or her position if the subjects cease to serve him or her: “I do not ask that you place hands upon the tyrant to topple him over, but simply that you support him no longer; then you will behold him, like a great Colossus whose pedestal has been pulled away, fall of his own weight and break into pieces” (LA BOÉTIE 2002, 48-49).

In sum, the peoples of Africa must not see themselves as passive recipients of the technologies of 4IR, but rather as users and innovators of such technologies, with their needs clearly in view (GYEKYE 2013, 48-63). Already during the Third Industrial Revolution technologically knowledgeable Africans undertook innovations to meet the needs of their peoples. For example, my own country, Kenya, won itself a place in the global digital innovation map by inventing the first mobile money transfer service called M-Pesa. Now with 4IR, there is almost infinite room to design apps to meet the needs of farmers, traders, mechanics, and the wide array of professions, and to promote the inclusion of persons with

disabilities, as well as others with diverse limitations and preferences not categorised as disabilities (illiteracy, for example), in all these endeavours through universal design.

2. Affordability to Bridge the Digital Divide

Rashied and Bhamjee (2020) observe that industrialisation in 4IR could easily continue along the path of coloniality, in which the wealthy countries of the Northern hemisphere exploit the resources of countries in the South, but that it could also result in some of the wealthier countries of the Global South exploiting their poorer counterparts. During the Third Industrial Revolution, the inequality between the wealthy countries in the North and the poor ones in the South was regularly referred to as “the digital divide” - a divide which is already finding its way into 4IR.

As Schwab (2016, N.P) observes, “To date, those who have gained the most from it [the Fourth Industrial Revolution] have been consumers able to afford and access the digital world; ...” The *Digital Economy Report 2019*, released by the UN Conference on Trade and Development highlighted the disproportionate concentration of the digital economy in the United States and China, with the rest of the world trailing considerably, especially countries in Africa and Latin America. The United States and China account for 90% of the market capitalization value of the world’s 70 largest digital platforms, over 75% of the cloud computing market, 75% of all patents related to blockchain technologies, and 50% of global spending on the Internet of Things. The report predicts that, under current regulations and policies, this trajectory is likely to continue, contributing to increasing inequality (cited in TANGUAY 2021, N.P). Yet, perhaps even more disturbing, is the digital divide right inside each of our countries in Africa, where the middle class enjoys virtually all the benefits of 4IR technologies that their counterparts in the affluent West and East enjoy, while the vast

majority of their compatriots still grapple with lack of basic amenities such as access to electric power so that for them the issue of entering the digital world does not even arise. Thus as Donovan (2021) observes, there are many people who cannot afford a smart phone and a data plan to enjoy the benefits of 4IR, so that “The democratisation of communication only applies to those above a certain income level” (DONOVAN 2021, 66).

It is therefore urgent that during 4IR, this gap is bridged through affordable technology , thereby forestalling the perpetuation of marginalisation based on people’s material circumstances. Happily, the Third Industrial Revolution, which commenced with intense protectionism in the development and sale of computer software, winded up with an explosion of open-source software, enabling economically disadvantaged users to simply download and use open access word processors, spread sheets, presentation applications, among others. In academia, this saw the proliferation of open access journals that even forced most of the leading publishing firms to set up open-access departments to ensure they remained relevant. This trend ought to be encouraged as we enter 4IR. On this point, H. Odera Oruka’s concept of the human minimum - the conviction that no human being ought to be left to suffer certain levels of lack (ORUKA 1997, 131-132) - can be re-modelled in the light of the 4IR digital divide. In this context, the ethical principle of the human minimum would affirm that humanity ought not to be contented with a situation in which residents of the North enjoy the benefits of 4IR while those of the South continue to live below the subsistence level where even electrical power is a pipedream, so that the benefits of a highly digitised world are extremely hard for them to imagine. Similarly, the middle classes in the South ought not to continue to enjoy the benefits of 4IR while masses of their compatriots eak a living using inefficient technologies in rural villages and urban informal settlements.

A less well-known but debilitating digital divide is that between people who are able-bodied and those with disabilities. This is aggravated by the exorbitant cost of adaptive ICT, that is, software and hardware specifically designed to mitigate various sensory, motor and cognitive impairments. In his Foreword to the *World Report on Disability* (WORLD HEALTH ORGANISATION 2011) earlier cited, Stephen W. Hawking, renowned astrophysicist who lived with motor neurone disease most of his adult life, wrote:

I have benefitted from access to first class medical care. I rely on a team of personal assistants who make it possible for me to live and work in comfort and dignity. My house and my workplace have been made accessible for me. Computer experts have supported me with an assisted communication system and a speech synthesizer which allow me to compose lectures and papers, and to communicate with different audiences. My success in theoretical physics has ensured that I am supported to live a worthwhile life. It is very clear that the majority of people with disabilities in the world have an extremely difficult time with everyday survival, let alone productive employment and personal fulfilment. (HAWKING 2011, p.ix)

Yet many persons with disabilities in African countries and elsewhere need facilitation that costs much less than what Steven Hawking required for them to lead highly productive lives, and many of the solutions they need lie in promoting affordability of the technologies of the third and fourth industrial revolutions. Already several persons with disabilities in African countries have excelled in professions such as law, academics and computer programming due to accessible computer resources, but many more still languish in poverty simply because of lacking affordable adaptive ICT products that would enable them to engage in self-improvement through formal education, employment and entrepreneurship.

3. Respect for the Right to Cultural Identity to Guard against Cultural Imperialism

Disregard for factors such as cultural identity and political convictions is often reflected in the very design of 4IR products themselves (TANGUAY 2021; see also GYEKYE 2013, 48-

63). For example, machine learning algorithms, although designed to help in problem-solving and decision-making, are vulnerable to biases and errors arising either from their creators or from the datasets used to train the systems themselves. Thus Amazon's time- and resource-intensive effort to build an AI recruitment tool was shot through with bias against women. Engineers reportedly attributed this bias to the AI combing through CVs submitted to the company over a 10-year period, most of which were submitted by men. Amazon had to abandon the system on the grounds that despite making edits to it, there was no guarantee that it no longer discriminated against female candidates (TANGUAY 2021).

It is heartening that consumers can now boycott companies that do not agree with their political positions: apps even suggest alternative products with better scores (DONOVAN 2021, 69). However, "With an app, the opinion that works out the details is someone else's opinion. If the shopper has different priorities to the app designer, they may spend in areas they do not actually support" (DONOVAN 2021, 69). In addition, although it is often claimed that the communication technologies have democratized communication, "It is true that views can be posted. But at the same time, the process has given more editorial control to the platforms on which views are posted. Not everyone on social media is created equal. Algorithms give preference to some social-media users. They also will censor others. Government censorship was commonplace 300 years ago. The private-sector equivalent is the demonetisation, downgrading or banning of published content" (DONOVAN 2021, 66).

Within the African context, Western hegemony compounds the challenges described in the foregoing two paragraphs. The current process of globalization, heavily influenced by this hegemony, espouses an ethnically-blind vision of society in line with the Western liberal democratic tradition. Yet as the growing literature on communalism and communitarianism

illustrates, the liberal democratic vision of ethnically-blind societies violates the rights of individuals and groups to identify themselves with particular cultural formations. As Okondo (1964, 37) noted, just as it is necessary for one to accept and to have a degree of pride in one's ancestors, so it is desirable to draw strength from association with an ethnic group whose traditions enrich one's life. As the Canadian philosopher Charles Taylor (1994, 25) observes, a person or group of people can suffer real damage if the people around them mirror back to them a demeaning picture of themselves, imprisoning them in a false, distorted and reduced mode of being. Indeed, ethnic minorities in several African countries have suffered decades of social, political and economic marginalisation, many living in countries whose very names (such as Uganda and Botswana) signify the privileged positions of the dominant cultural groups in them (ODUOR 2018).

The liberal ethnically-blind socio-political vision also contravenes the International Covenant on Civil and Political Rights which stipulates that ethnic minorities are entitled to collective rights:

In those states in which ethnic, religious or linguistic minorities exist, persons belonging to such minorities shall not be denied the right, in community with the other members of their group, to enjoy their own culture, to profess and practise their own religion, or to use their own language. (UNITED NATIONS 1966, Art.27)

Yet cultural domination is becoming equally, or more pronounced, within the context of globalisation, where the dominant Western culture is putting non-dominant non-Western cultures under great pressure to allow themselves to be assimilated in the global (read "largely Western") cultural pool on the presumption that they are inferior to Western culture. As Lamola (2021b) observes, "An authentic global culture should surely be a fusion of contributions from all 'Civilisations', in which Western agonisations about the nature and future of humanity is only taken into account as merely one among several."

With regard to the deleterious impact of foreign cultural domination on Africans within the context of 4IR products, Lamola (2021a) points out that "... the scientific paradigm that is systematically inaugurating this revolution in the re-engineering of the human, the digitalisation of human existence and modes of sociality, is driven by cultural-epistemic presuppositions that are exclusively and ethnocentrically informed by the Western intellectual heritage with its self-endowed belief in its universality and supremacy." According to Lamola (2021b), 4IR is primarily inspired by a combination of the logic of "digitized reason" and a neo-imperialism of tech-corporatism, both of which are manifestations of a postmodernism of the Western intellectual heritage. Lamola points out that all this negatively and palpably affects the African end-user as follows:

As the human user is 'forced' to adapt to using a strange and complicated device, an asymmetry of influence occurs between the user and the technological device, in which the latter assumes greater ontic-ontological influence. The culturally disadvantaged user is thus simultaneously mesmerised and alienated by an object that imposes itself as instrumental for the efficiencies of her life; during the same experience she must align her way of doing things to the intricacies of the operation of this device or machine, as well as to the social role it is cast to serve in her life. (LAMOLA 2021a)

There is therefore urgent need to ensure that the choice of 4IR technologies deployed in African societies takes cognisance of the worldviews of the said societies instead of subjecting them to a homogeneity created by their erstwhile colonisers. It cannot be gainsaid that 4IR provides an unprecedented variety of choices of technologies, which should make it practicable to identify those that are best suited to specific cultural contexts. Yet the range of choices is largely determined by the Western corporations that produce the bulk of these technologies, thereby perpetuating the Western cultural hegemony. Consequently, it behoves Africans to diligently engage in decolonization in their theorizing and innovations on an ongoing basis.

4. Ethical Orientation as the Over-arching Guide to Building a Truly Human Society

I use “ethics” here as a synonym of “morality” to refer to the practice of evaluating human conduct as either right or wrong, and human traits of character as either virtuous or vicious. Schwab (2016, N.P) observes that the fourth industrial revolution is characterized by a fusion of technologies that is blurring the lines between the physical, digital and biological spheres. He goes on to write: “The Fourth Industrial Revolution, ..., will change not only what we do but also who we are. It will affect our identity and all the issues associated with it: our sense of privacy, our notions of ownership, our consumption patterns, the time we devote to work and leisure, and how we develop our careers, cultivate our skills, meet people, and nurture relationships. It is already changing our health and leading to a ‘quantified’ self, and sooner than we think it may lead to human augmentation. The list is endless because it is bound only by our imagination.” Yet that imagination can, and ought to be, moral. Even Schwab, who is a 4IR enthusiast, observes that “...the revolutions occurring in biotechnology and AI, which are redefining what it means to be human by pushing back the current thresholds of life span, health, cognition, and capabilities, will compel us to redefine our moral and ethical boundaries.” However, I hold the view that the issue is more that of the clarification and re-affirmation of our moral values rather than that of a redefinition of our moral boundaries as Schwab suggests. This is due to the fact that redefining our moral boundaries simply because we are confronted by new technologies seems to me to imply that the technologies determine our moral boundaries, in which case our redefinition of the boundaries is, by and large, superfluous.

With regard to some of the pertinent moral questions arising within the context of 4IR, Tanguay writes:

New technologies are ... raising perplexing moral questions that most of us have never contemplated. Should your driverless car value your life over that of a pedestrian? Should we legalize predictive policing based on AI? Should gene editing be made legal to create “designer babies”? If you could undertake a little gene editing to increase your child’s IQ, would you do it? What if it was possible to patent a human *gene*? (TANGUAY 2021)

In addition, pertinent moral issues arise relating to the use of various digital platforms for commerce and communication, some owned by governments, and others by private entities:

Ethical issues arise, ..., when third-party institutions and organisations choose to interfere in the digital flows of information. For example, a government may believe it has the right to control trade flows, but can the same reasoning be applied to information flows? Another grey area arises when private, unelected companies are the third-party institutions which manage a private platform through which users become de facto producers and consumers of information and news updates. These platform companies derive enormous market power from their ability to determine how producers and consumers coordinate to find each other and negotiate deals (...), what terms and conditions of entry to the platform marketplace are imposed, and whether there is a participation fee. (JOHNSON and MARKEY-TOWLER 2021, 89)

The situation described in the previous paragraph is aggravated by the fact that we live in the era of fake news, demanding of us more effort and time to verify what we read, view and hear. Donovan explains:

A viral message spreads out faster and further if it is “fake news”. Analysis of 12 years of Twitter activity shows that “fake news” is around 70% more likely to be retweeted than actual news. And “fake news” is spread significantly faster than the truth. This is particularly true of fake political “news”. Fake political “news” will reach 20,000 people three times faster than a true political story reaches 10,000 people. “Fake news” can be put into sensational language. This becomes what is known as “click bait”. If the author is not worried about the truth, it is easy to sensationalise the story. That attracts readers and speeds up the sharing of the story. (DONOVAN 2021, 63)

Yet fake news has become such a major problem because of the lack of sound ethical orientation among those who produce it.

There is near-consensus regarding the distinction between “the earth” and “the world”, the former being the physical environment on the planet as a whole devoid of human action, the latter the result of human action on both the physical environment and the conceptual orientation that guides the deliberate, human shaping of both the physical and social realms.

Central to this conceptual framework has always been morality - the conviction that our actions and traits of character ought to be restrained by considerations of the welfare of people around us. Entering into 4IR without commitment to maintaining a sound orientation of human values with morality at its core exposes us to living in a rudderless technological space rather than in the world (GYEKYE 2013, 48-63). This in turn exposes the succeeding generations of African peoples to the grave danger of having no substantial normative grounding, which would spell doom for both individuals and societies. All this points to the urgent need to integrate values such as equity, diversity and inclusion into programme design and implementation (TANGUAY 2021).

In view of the kinds of changes that 4IR is unleashing on humanity, it is imperative that humanity, more than ever before, fine-tunes its moral compass, for failing to do so leaves humankind at the whims of an elite of techno-savvy individuals. We ought to urgently clarify our moral values, and based on them, formulate clear guidelines to restrain developers and marketers of 4IR technologies from dehumanising the peoples of Africa by manipulatively imposing technological innovations on them. It is only through such an ethical framework that we can protect the individual's rights to personal choice and to privacy, as well as his or her physiological and psychological integrity. Yet in the African context, the rights just listed must be construed within a communalist framework that is antithetical to the individualist values of Western liberalism that manifest as capitalism in the economic sphere and as liberal democracy in the political. For example, capitalist theory and practice presume that intellectual property can only be owned by individuals, and yet African peoples often hold such property communally. Thus while the West has propagated the framework of exclusive individual intellectual property rights, it is difficult to see how a single individual could ever have moulded himself or herself from infancy to the level where he or she is able to arrive at innovations without the input of his or her society, and thereby to warrant his or her exclusive rights to such innovations. Even in highly individualistic Western societies, copyrights and patents are usually not granted in perpetuity. As Oruka (1997, 150) observes, "There is no country in which, ..., one would accept a wish or a will from one of its citizens which stipulates that upon death all his achievements, however dear to the country, should be exterminated or kept from use by anybody. The objection to this will can be supported by invoking issues of common origin, common security and common wealth of the community of which the person was a member." All these considerations suggest that with regard to 4IR products and other innovations, African societies can opt for communal intellectual property rights.

We in Africa ought to deeply reflect on social visions such as that of Pixley ka Isaka Seme which he articulated in his celebrated 1906 speech at Columbia University, where he spoke of a regenerated African civilization whose most essential departure "is that it shall be thoroughly spiritual and humanistic -indeed a regeneration moral and eternal" (SEME 1906, N.P). As Lamola (2021b) explains, for Seme, "the surrender of human agency to machines is ... not fathomed. His was a novel conception of the possibility of the symbiosis of scientific progress with human spirituality." However, Seme's speech did not spell out what this moral and spiritual character would entail. Nevertheless, his vision can be augmented by the considerably large body of literature on the communalist orientation of African peoples (e.g. NYERERE 1974;

MENKITI 1984; MASOLO 2009; Wiredu and Gyekye eds. 2010; OGUDE and DYER eds. 2019). Our earlier reflections on the importance of ensuring that the 4IR technologies that we adopt meet the needs of all human beings, where we pointed out, among other things, the importance of guarding against technologies that diminish the quantity and quality of interactions in social contexts such as those among family members, colleagues and friends, is also relevant in this regard.

The need for an ethical orientation touches on all the previous three considerations, because only through a firm grounding in moral values can we steadfastly pursue inclusiveness to meet the needs of all human beings, affordability to bridge the digital divide, and respect for the right to cultural identity to guard against cultural imperialism.

Conclusion

I began my reflections by cautioning against an outlook that views African societies, or any other societies for that matter, as collectivities of passive beings to be acted upon by technological advancements. Tanguay (2021) notes that a growing “tech for good” movement is actively exploring how to use technology to benefit society and build a more sustainable and equitable world. By addressing social and economic challenges through, in many cases, integrating concepts of inclusion and diversity into solutions. The gist of my reflections is that as the peoples of Africa enter the Fourth Industrial Revolution, they ought to do so in a manner that upholds their human dignity, their liberty as communities and individuals, and, as a result, their human agency. This will entail a conscious and consistent repudiation of Eurocentrism in the realm of technology in line with Frantz Fanon’s admonition:

If we want to turn Africa into a new Europe ..., then let us leave the destiny of our countries to Europeans. They will know how to do it better than the most gifted among us.

But if we want humanity to advance a step further, if we want to bring it up to a different level than that which Europe has shown it, then we must invent and we must make discoveries. (FANON 1967, 315)

Relevant Literature

DESMOND, Ned., & LEE, Kai-Fu. “Ned Desmond interviews Kai-Fu Lee at the Sight Tech Global Virtual conference,” organised by the Vista Center For The Blind and Visually Impaired, 2-3 December, 2021. <https://2ubdf87690uue57w30pj7y16-wpengine.netdna-ssl.com/wp-content/uploads/2020/12/our-ai-future-is-already-here.txt> Web

DONOVAN, Paul. [Profit and Prejudice: The Luddites of the Fourth Industrial Revolution], 2021. Routledge: New York. E-book.

FANON, Frantz. [The Wretched of the Earth], 1967. Farrington, Constance trans. Penguin Books Ltd.: Middlesex. E-book.

FLOYD, Rob. “ACET Uses Artificial Intelligence to Predict Future African Infrastructure Needs,” African Center for Economic Transformation (ACET). 3 March, 2021. <https://acetforafrica.org/highlights/acet-uses-artificial-intelligence-to-predict-future-african-infrastructure-needs/> Web

GYEKYE, Kwame. [Philosophy, Culture and Vision: African Perspectives], 2013. Sub-Saharan Publishers: Accra. Paperback.

GLEASON, Nancy W. ed. [Higher Education in the Era of the Fourth Industrial Revolution], 2018. Springer Nature Singapore Pte Ltd.: Singapore. E-book.

HAWKING, Stephen. W. “Foreword,” World Health Organisation. [World Report on Disability], 2011. https://www.who.int/disabilities/world_report/2011/report.pdf Web Web.

JOHNSON, Nicholas., & MARKEY-TOWLER, Brendan. [Economics of the Fourth Industrial Revolution: Internet, Artificial Intelligence and Blockchain], 2021. Routledge: New York. E-book.

LA BOÉTIE, Étienne de. [*The Politics of Obedience: The Discourse of Voluntary Servitude*], 2002. Kurz, Harry Trans. The Mises Institute: Auburn. E-book.

LAMOLA, M. John. “Africa in the Fourth Industrial Revolution: A Status Quaestionis, from the cultural to the phenomenological,” [*African Values, Ethics, and Technology*], Beatrice D. OKYERE-MANU Ed., pp.35-52, 2021a. Palgrave Macmillan: Cham. Paperback.

--. “The future of artificial intelligence, posthumanism and the inflection of Pixley Isaka Seme’s African humanism,” [*AI & Society*], 2021b. <https://link.springer.com/article/10.1007/s00146-021-01191-3> Web.

LAZAR, Jonathan & STEIN, Michael A. “Introduction,” [Disability, Human Rights, and Information Technology], Jonathan LAZAR and Michael Ashley Stein eds., pp. 1-8, 2017. University of Pennsylvania Press: Philadelphia. E-book.

LEE, Kai-Fu. [AI Superpowers: China, Silicon Valley, And The New World Order], 2018. Mariner Books: New York. Paperback.

Mangena, Fainos. "Ethno-philosophy is Rational: A Reply to Two Famous Critics," [*Thought and Practice: A Journal of the Philosophical Association of Kenya*], new Series, Vol.6 No.2, 2014, pp. 23-38. DOI: <http://dx.doi.org/10.4314/tp.v6i2.3>

Masolo, D.A. 2009. "Narrative and Experience of Community as Philosophy of Culture: Community as Method and Principle of Thought". *Thought and Practice: A Journal of the Philosophical Association of Kenya*, New Series, Premier Issue, Vol.1 No.1, pp.43-68. <https://www.ajol.info/index.php/tp/article/view/46306>

MBITI, John. S. [*African Religions and philosophy*], 1969. Heinemann: London. Paperback.

Menkiti, Ifeanyi. 1984. "Person and Community in African Traditional Thought," [African Philosophy: An Introduction], Richard WRIGHT Ed. University Press of America: Lanham, MD. Paperback.

NYERERE, Julius. K. [Ujamaa: Essays on Socialism], 1974. Oxford University Press: Oxford. Paperback.

Oduor, Reginald. M.J. "Western Liberalism, African Communalism, and the Quest for an Adequate Ideological Foundation for the Recognition and Protection of the Rights of Persons with Disabilities in Kenya," [*East African Law Journal*], Special Issue on Disability Rights, pp.29-49, 2016/2017. <http://rodra.co.za/images/countries/kenya/research/East%20African%20Law%20Journal%20-%20Special%20issue%20on%20disability%20rights%202017-2017.pdf> Web.

--. "Nationhood and Statehood: The Impact of a Conflated Discourse on African Polities and their Non-Dominant Ethnic Groups," [Utafiti: Journal of Humanities and Social Sciences], pp.45-66, December, 2018. Vol 13 No2. <http://journals.udsm.ac.tz/index.php/uj/article/view/2341> Web.

OGUDE, James., & DYER, Unifier, Eds. [Ubuntu and the Everyday in Africa], 2019. Africa World Press: Trenton. Paperback.

OKONDO, Peter. J.H. "Prospects of Federalism in East Africa," [*Federalism and the New Nations of Africa*], David P. CURRIE, Ed., pp.29-38, 1964. The University of Chicago Press: Chicago.

ORUKA, H. Odera. [Practical Philosophy: In Search of an Ethical Minimum], 1997. East African Educational Publishers: Nairobi. Paperback.

ORWELL, George. [1984], 1961 (1949). Signet Classic: N.P. E-book.

RASHIED , Naiefa., & BHAMJEE, Muaaz . "Does the Global South Need to Decolonise the Fourth Industrial Revolution?" [The Disruptive Fourth Industrial Revolution: Technology, Society and Beyond], Wesley DOORSAMY, Babu Sena PAUL & Tshilidzi MARWALA, Eds., pp. 95-110, 2020. Springer Nature Switzerland AG: N.P.

SANTAMARÍA, Gerardo del Cerro. "A Critique of Neoliberalism in Higher Education," [*Oxford Research Encyclopedia of Education*], 2019. <https://oxfordre.com/education/view/10.1093/acrefore/9780190264093.001.0001/acrefore-9780190264093-e-992> Web.

Schwab, Klaus. "The Fourth Industrial Revolution: what it means, how to respond," World Economic Forum, 14 January, 2016. <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/> Web.

Seme, Pixley Ka Isaka. "The Regeneration of Africa," April, 1906. https://www.sahistory.org.za/sites/default/files/regeneration_of_africa_by_Pixley_Seme.pdf Retrieved 14 August, 2021. Web.

Sight Tech global. "Our AI future is already here," December, 2020. <https://sighttechglobal.com/session/our-ai-future-is-already-here/> Web.

Tanguay, Geneviève. "Addressing the Ethical and Social Challenges of Emerging Technologies: Creating the Conditions to Play a Leadership Role in the Fourth Industrial Revolution," [The Fourth Industrial Revolution and Its Impact on Ethics: Solving the Challenges of the Agenda 2030], Katharina MILLER & Karen WENDT, Eds., pp. 1-14, 2021. Springer Nature Switzerland AG: N.P. E-book.

TAYLOR, Charles. "The Politics of Recognition," [Multiculturalism: Examining the Politics of Recognition], Amy GUTMANN, Ed., pp.25-73, 1994. Princeton University Press: Princeton, NJ.

United Nations. 1966. "International Covenant on Civil and Political Rights." www.hrcr.org/docs/Civil&Political/intlcivpol.html Web.

--. 2006. "convention on the Rights of Persons with Disabilities." <http://www.un.org/disabilities/convention/conventionfull.shtml> Web.

WIREDU, Kwasi., & Kwame GYEKYE. Eds. [Person and Community: Ghanaian Philosophical Studies, I], 2010. Council for Research in Values and Philosophy: Washington, D.C. E-book.

WORLD HEALTH ORGANISATION. [World Report on Disability], 2011. https://www.who.int/disabilities/world_report/2011/report.pdf Web.