The Fourth Industrial Revolution, Techno-Colonialism, and the Sub-Saharan Africa Response

Edmund Terem UGAR
Department of Philosophy, Centre for the Philosophy of Medicine, Public Health, and Epidemiology, University of Johannesburg and Durham University, and Institute for Pan-African Thought and Conversation, University of Johannesburg
Email:teremedmund@gmail.com
https://orcid.org/0000-0003-3034-5045

Abstract
Techno-colonialism, which I argue here to specifically mean the transfer of technology and its values and norms from one locale to another, has become a serious concern with the advancement of socially disruptive technologies[1] of the Fourth Industrial Revolution (4IR), like artificial intelligence and robots. While the transfer of technology from one locale, especially economically advanced countries, to developing countries comes with economic benefits for both regions, it is important to understand that technologies are not value-neutral; they come with the values, cultures, and worldviews of their designers. However, despite the nonvalue-neutrality of the technologies of the 4IR, they are still relevant for sub-Saharan Africa's development. Thus, using a phenomenological approach, especially the sub-Saharan African experiences of past histories of colonialism, I prescribe cautionary measures that sub-Saharan Africans ought to take in approaching the current industrial revolution and its technologies.
Keywords: Techno-Colonialism, Sub-Saharan Africa, Fourth industrial revolution, Values, Technology.

Introduction

An industrial revolution can be defined as a movement from traditional ways of production (such as human-sourced labour) to new ways of production using new technologies (RASHIED AND BHAMJEE 2020). The Fourth Industrial Revolution (4IR) (which proceeds after the Third Industrial Revolution (3IR) (the information technology era), and that goes back to the First Industrial Revolution (1IR) (the steam engine era) (XU, DAVID, AND KIM 2018), is said to be characterized by intensified production and use of cybertechnologies such as Artificial Intelligence (AI), robotics, Internet of Things (IoT), 3D Printing and others (XU, DAVID, AND KIM 2018).

Theorists like Spyros Makridakis (2017), Klaus Swab (2017), and Xu n.d.n. (2018) variously argue that the 4IR comes with sophisticated technologies that are said to improve production across countries. In line with these views, thinkers like Wim Naude (2019) and Ayentimi Tutu & John Burgess (2019) claim

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[1] Socially disruptive technologies means technologies that are unpredictable, as a result, they constantly distort our norms, values, and how we engage with each other in our societies (HORPSTER 2021)

that the application of technologies of the 4IR in sub-Saharan Africa can eliminate pressing social issues like poverty in this context.

On the contrary, Moses Oketch (2014) and Benjamin Ogwo (2018) argue that sub-Saharan Africans lack the requisite skills to engage with the technologies of the 4IR. In addition, and most relevant to the theme of this paper, Ibekwe Chinweizu (1975), Naiefa Rashied and Muaaz Bhamjee (2020), Willem Gravet (2020), and Edmund Ugar (2022a) all maintain that technologies of industrial revolutions are guilty of perpetuating colonialism and/or neo-colonialism. As a result, these theorists problematize the idea that sub-Saharan Africa's current social issues, like poverty and inequality, can be solved by embracing the technologies of the 4IR.

Contrary to the view that the technologies of the 4IR may be problematic in solving sub-Saharan African social challenges, in this paper, I agree that the current socioeconomic challenges of sub-Saharan Africa can be solved using the technologies of the 4IR, such as AI, robots, and big data. However, I argue that sub-Saharan Africans must be critical of its use and engagement with the technologies of the 4IR. This is because the technologies of the 4IR, like any other technology, are not value-neutral or value-free. These technologies are embedded in them the norms, cultures, and values of the society where they are designed. For instance, technologies like sex robots carry with them what is considered "appropriate" sexual relations in the locus where they are designed. Additionally, technologies like autonomous weapon systems reflect their designers' conception of warfare. This view is exposed more clearly by Langdon Winner (1989), Don Ihde (1993), Manuel Aviles-Santiago (2015), and Ugar (2022b).

For example, Winner (1989) argues that technologies are created by their designers to facilitate the convenient establishment of power dynamics and relations by the authorities of a given locale. In this sense, Winner contends that technologies tend to adapt to how they are used in an environment. To further this view, Aviles-Santiago claims that technologies come with "intractable properties that are unavoidably linked to the institutionalized patterns of power and authority in which they were initially embedded" (AVILES-SANTIAGO 2015,2). Given the embedded politics, patterns of power, and societal relations that are embedded in technologies, Ihde (1993) and Ugar (2022b) argue that when a technology is transferred, the technologies also come with these dynamics and the cultural worldviews of the designers, as in the case of the aforementioned examples which could also be extended to other technologies. Ihde specifically sees technology transfer as the "introduction of some set of material artefacts out of their original context of human praxes or techniques, into some other cultural context" (IHDE 1993,32).

In the context of this paper, technology transfer means the transfer of technologies of the industrial revolution, specifically the 4IR, such as AI and robots, from their original context, which is Euro-America, the United Kingdom, China, and Japan, to solve sub-Saharan African issues[2]. Undoubtedly, sub-Saharan

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[2] In this paper, I focus specifically on technologies that are designed and transferred from Europe and America.

Africa has so much to gain with the technologies of the 4IR in solving their socioeconomic challenges, especially in mechanizing their agricultural sector and building infrastructures. However, I argue that sub-Saharan Africans should not be oblivious to the non-value-neutrality of technologies and their implications. One of the implications of the nonvalue-neutrality of technologies is that these technologies may be guilty of being used to perpetrate techno-colonialism, understood here as the transfer of values and/or norms from one context to another through technology. This transfer implies that the recipient society, sub-Saharan Africa, may begin to adapt to the values/norms that come with the technologies.

Given the past experiences of colonialism in sub-Saharan Africa and the aftermaths of colonialism, which resorted to the distortion of the social, political, and cultural worldviews of sub-Saharan Africans, this paper aims to challenge the region to think critically of its engagement with technologies of the 4IR in solving their socioeconomic challenges. Furthermore, the paper prescribes some cautionary measures to circumvent the possible techno-colonialism in sub-Saharan Africa that may arise from its usage of the technologies of the 4IR.

I structure this paper in the following way. In the first section, I briefly expose the 1IR, 2IR, and 3IR and the colonialism that came with these industrial revolutions. The second section discusses the issue of techno-colonialism in the 4IR. I begin by first discussing what technology means. Second, I show how technologies replicate the values of their designers. Third, I discuss how the technologies of the 4IR can be used to advance my conception of techno-colonialism. In the third section, I prescribe some cautionary measures on how Africans ought to engage with technologies, especially those of the 4IR.

Exploring the Colonialism of the First, Second, and Third Industrial Revolutions

In the simplest form, an industrial revolution is a radical deviation from traditional ways of goods production, service rendering, and governing society by improvising and bringing new factors and their combination into the current system (ONWUGHALU & OJAKOROTU 2020, 78). The simplest explanation in describing any industrial revolution is to view the industrial revolution as a transition of any current labour force that uses human energy to machines. In addition, industrial revolutions aim to transform society with technological innovations. As a result, the First Industrial Revolution (1IR), which allegedly began in the mid-18th to 19th century, lasting about a century, 1750-1850, saw the invention of the steam engine (PRISECARU 2016, 57). The invention of the steam engine created a transition into a manufacturing era by applying machines in production and replacing manual labour (AYETEMI & BURGESS 2019). The dominant aspects of manufacturing which played a very important role in the 1IR were textile and steel (PRISECARU 2016).

Building on 1IR, the Second Industrial Revolution (2IR) began between 1850 and 1914 (PRISECARU 2016). The 2IR saw the invention of the combustion engine, which led to an advanced level of industrialization using oil and electricity to power mass production, communication technology, and advanced transportation (PRISECARU 2016, 58; MAKRIDAKIS 2017; XU n.d.n 2018). The focus of the 2IR was on the invention of electricity, normalizing the use of steel, and the advancement of the method of transportation, which began with the

introduction of the steam engine in the 1IR (PRISECARU 2016). The invention and use of electricity for communication, motors, and lighting eased the production and distribution of goods. Additionally, this industrial revolution witnessed the building of internal combustion engines for air and ground transportation (PRISECARU 2016).

The 3IR began in the 20th century (PRISECARU 2016). The major drivers of the 3IR were digitalization and the advancement and growth of electronic technologies (AYENTIMI & BURGESS 2019; ONWUGHALU & OJAKOROTU 2020,78). Electronic technologies, here, also include digital technologies. Digital technologies of the 3IR were not only computers and communication devices but also materials that powered these devices, such as semiconductors, faxes, emails, electronic documents, the internet, e-commerce, personalization of devices, mobile telecommunication, and the automatic teller machine (ATMs).

The developments and innovations of the industrial revolutions are the transformative catalysts that transitioned humans from the Stone Age to the modern era characterized by modern technologies. However, despite the developments and inventions stemming from the industrial revolutions and the benefits that human societies have enjoyed from the advancements of technologies of the industrial revolutions, these revolutions, especially the 1IR and the 2IR, have been guilty of being used to staged colonialism in some parts of the world.

The advent of colonialism is tied to the advent of the 1IR and 2IR in the global North, which brought significant changes in production and industrialization (OCHENI & NWANKWO 2012). The colonization of Africa was Europe's response to provide themselves with raw materials for production to cater for the continent's growing population (CHINWEIZU 1978, 35). The technologies of the 1IR and 2IR made Europe's exploitation and search for raw materials for production realizable. However, there were adverse implications of European exploration. One of the implications was that their exploration led to exploitation. Their exploitation also led to domination by colonializing places like sub-Saharan Africa and creating systems that valorized their worldviews over the African way of life (OCHENI AND NWANKWO 2012). Consequently, colonialism benefited Europe as it helped the continent economically and politically. On the contrary, colonialism distorted sub-Saharan Africa's cultural, epistemic, moral, and economic systems. How so?

The West benefitted from colonialism at the expense of sub-Saharan Africa by looting the colonies they colonized and using their resources to build colonial empires (FIELDHOUSE 1965, 382). Second, the colonizers extracted gains from the colonial territories by establishing transnational companies that used their colonies' indigenous labourers and provided them with low and stagnant returns (AMIN 1972). Third, food and finances were transferred from the colonies to the metropolis to sustain the metropolis while leaving the colonies poor (AMIN 1972). Last, there was a high disregard for the native cultures, belief systems, language, and heritage; these aspects of the colonized were seen as primitive and of low standard (UGAR 2022a). I focus on this last point in the third section of this paper.

On the contrary, here are some of the implications of the arrival of the colonialist to sub-Saharan Africa. First, upon arrival in sub-Saharan Africa, the colonizers provided Western education, imposed a Western belief system, changed the production method, and altered the political landscape of sub-Saharan Africa. As much as these provisions were subtly and seldom beneficial to the African people, it was not built on African epistemic and cultural systems; thus, when the colonizers left, the colonized were still dependent on the colonizer's ways of life in Africa. Through this dependence, Africans have mirrored the Western way of life. This is evident in how sub-Saharan Africa has been "unable" to develop African-centred technologies to participate in the drive of the 4IR but depends on the colonizer's technologies.

However, the region does not realize that when they consume the colonizer's technologies, they also consume the values, norms, and cultures embedded in these technologies, as I will show in the next section. What is worth knowing is that there is an uneasy tension between values from the West and those of sub-Saharan Africa. While the West believes in individualist value systems, such as individual human rights, autonomy and freewill, the dominant worldviews of sub-Saharan Africa gravitate towards communal rights and responsibility (IKUENOBE 2016). The tension between Western individualist and sub-Saharan African communitarian value systems is evident in how technologies, such as sex robots and autonomous weapons designed in the West, mirror individualist values and cultures. However, before I show this tension in technologies such as sex robots and autonomous weapon systems, it is necessary that I show how technologies reflect the values and norms of their designers. This is because this current paper is more concerned with the technologies, rather than the mindsets, of the industrial revolutions, especially the 4IR.

An Exposition of the Concept of Technology as a Value Placeholder
The meaning of the term "technology" has been engaged with through the works of Herbert Marcus (1998), Verbeek (2001) and Heidegger (1993). Marcus (1998) alludes that technology is "a mode of production, as the totality of instruments, devices and contrivances which characterize the machine age" (MARCUSE 1998, 41). Marcuse's definition reveals the relationship between humans and technology (UGAR 2022b). To this, philosophers of technology who take the instrumentalist view argue that technologies are just tools that can only be judged by their usage (VERBEEK 2001,143). Contrary to this view, those who take the substantivist view, especially Heidegger (1993), see technologies as that which are not mere tools but things that can change a people's culture.

In this paper, I take a middle ground between the instrumentalist and the substantivist, a stance similar to Don Ihde (1999). I consider technologies to be artefacts that assist humans in carrying out tasks. However, at the same time, these artefacts are bearers of values and norms. Here, I focus primarily on technologies of the 4IR, such as AI and robots. I focus on these technologies because of their disruptive nature; their ability to constantly disrupt our norms, values, and cultures due to their unpredictability (HORPSTER 2021).

Ibo van de Poel defines the above technologies as "sociotechnical systems" that are dependent on "technical hardware, human behaviours and social

institutions" (VAN DE POEL 2020, 391) to function properly. These technologies are sociotechnical because they are technical artefacts designed to function in technical ways with a specific intention (VAN DE POEL 2020, 391). Second, the technologies are designed to have some form of agency, such as autonomy, adaptability, and the ability to interact with other agents in their environment (VAN DE POEL 2020). Last, these technologies are designed to follow certain rules (VAN DE POEL 2020, 392). However, they follow technical norms rather than human institutional norms; the latter requires some form of intention, while the former requires "causal-physical" interaction with rules (VAN DE POEL 2020).

Drawing from Van de Poel's contention, sociotechnical artefacts such as AI and robots are expected to mirror human intellectual processes, carry out tasks, possess a certain form of artificial agency by interacting and learning from their environments, and follow certain rules prescribed by the social institutions of their designers. Furthermore, these technologies are also expected to mirror their designers' peripheral and internal appearances, thinking, and being. Catherine Botha (2021) advances this point further.

Botha (2021,119) contends that social technologies, such as humanoid robots, are designed to replicate "human bodies that are consistent with their own cultural norms" (BOTHA 2021, 119). The designers of these robots make their designs align with their cultural norms as well as their gender and race. One can then draw from Botha's contention that technologies are instruments of the cultures and societies where they are designed since they mirror the actions and appearances of their designers. This view has been advanced by Winner (1989), Ihde (1993), Aviles-Santiago (2015), and Ugar (2022b).

According to Winner (1989), technologies are not value or culturally neutral. Technologies tend to assume the relations in the context in which they are designed. It is Winner's (1989) contention that technologies are designed for economic purposes and to foster the establishment of power dynamics and relations within the environment where they are borne from. These technologies possess "intractable properties that are unavoidably linked to the institutionalized patterns of power and authority in which they were originally embedded" (AVILES-SANTIAGO 2015, 2). The point Winner (1989) and Aviles-Santiago (2015) are trying to drive home is that the designers of technologies design their artefacts to replicate their values and norms; they may do this either consciously or unconsciously. I briefly make this point clearer by discussing two examples of technologies that mirror the locus of their design.

Sex Robots

Technologies like sex robots have become better with the advancement of the 4IR. Sex robots, understood here as humanoid robots with human appearances, intentions, and moves, are technological designs that aid human sexual stimulation and release (DANAHER 2017, 4). Sex robots are creations of Douglas Hines of the TrueCompanion company and Matt McMullen of the RealDoll company in New Jersey and Las Vegas in the United States (DANAHER 2017, 6; UGAR 2022c, 7). The technologies are designed to assist individuals in exercising their liberty of living out their sexual fantasies with robots that replicate human sexual

behaviours and appearances (UGAR 2022c). Within the locus where sex robots stem from, people have the liberty to engage in sexual activity with whoever and whatever they desire to have sex with. In addition, they can choose to marry whoever and whatever they desire.

This is because people in America, by extension, the West, operate within an ethical framework which allows individuals to choose their sexual desires and fantasies. Americans see the human person as an individual with dignity. Their idea of dignity is characterized dominantly by freewill, rights and autonomy- the ability to choose one's desires in life as long as it does not threaten another person's life. Because American society operates within the above ethical paradigm, technologies of the 4IR, from America or the West, are designed to advance the Western value system of individualism chiefly characterized by autonomy and rights (CANTWELL-SMITH 2019).

However, contrary to the Western view, sub-Saharan Africans operate within communitarian value systems with community-centred norms (MBITI 1969; MENKITI 1984; IKUENOBE 2016). Within the sub-Saharan communitarian setting, individuals do not make decisions that are contrary to the norms and values that the community has stipulated. In this sense, the values prized by the community take precedence over individual values. In the case of sex, sub-Saharan Africans consider sex pleasurable for men and women, but at the same time, the primary importance of sex is for procreation (KELBESSA 2017, 375). It is not the individual's responsibility to prescribe how sex should happen but the community's responsibility. The point I am trying to foster here is that humans engaging in sexual relations with robots do not fall under the African normative conception of sexual activities. This is primarily because, on the one hand, the robots are not humans, and sexual activities within the sub-Saharan African locale are prescribed to happen between humans (OKYERE-MANU 2021,113-4; MOYO 2021; UGAR 2022c). Sex with robots cannot lead to the primary goal of sex, which is procreation, on the other hand (UGAR 2022c).

Furthermore, the very appearance of sex robots[3] as a replica of the human body objectifies the human body, especially the body parts, from a sub-Saharan African perspective (UGAR 2023). From a sub-Saharan African perspective, the human body is considered sacred (TEMPLES 1959; MBITI 1969; BUJO 2009), including the body parts (NZEGWU 2011). For instance, recurrent sub-Saharan African cultures conceive the female vagina as sacred because it brings life into existence. Nkiru Nzegwu (2011), a Nigerian philosopher on African sexuality, discusses what the Igbo tribe in South-eastern Nigeria conceives the vagina to be. She writes that:

> [T]he positive conception of the vagina derives from its vital role as a conduit through which all people come, regardless of sex, class, and social status. Because of its importance in the continuation of birth and

[3] The research field of humanoid robotic design is a research area that is emerging in the 21st century. Humanoid robots mean artificial beings with human-like characteristics, representation, and appearances designed "to interact closely with humans in social contexts" (BOTHA, 2021, 119)

the expansion of families, the vagina becomes the seat of women's power. It is a cavernous chamber that works with the uterus to incubate life and later delivers it into the world. (2011, 262)

Given the above exposition, it is evident that the very representation of sex robots and what the technology is used for goes against African beliefs as opposed to the Western belief system. These differences and disparities can be explained from the perspective that technologies are designed to replicate their designers' worldviews, bodies, norms, and values. I strengthen this claim by providing another example, using a lethal autonomous weapon.

Lethal Autonomous Weapon System
Lethal autonomous weapons are smart weapon technologies used by the military. The smartness of these weapons comes from their ability to make critical decisions autonomously. The robots use AI algorithms to enable them to identify, select, and eliminate their targets without the intervention of human actors. The development of autonomous weapons has been more reliant on sensor technologies, robotics, AI facial recognition system, information technologies and other technologies (ETZIONI & ETZIONI 2017, 72). One of the main aims of developing an autonomous system is to supplement and/or replace human combatants on the battlefield.

Roboticists like Ronald Arkin (2010, 332) argue that autonomous weapon robots are morally acceptable and ethically preferable to human combatants. For Arkin (2010), there are several reasons why these weapons are preferable. One reason is that they are not programmed with self-preservative instincts; as a result, emotions like fear do not cloud their judgments. In addition, the systems are programmed to process more information faster than humans. Contrary to the above view, some theorists consider the technologies unethical (ETZIONI & ETZIONI 2017; UMBRELLO 2019). Some concerns are that the technology depends on algorithms to make decisions. However, one cannot trust algorithms to comprehend the value of human life by empowering such systems with the decision-making capability to choose who gets to live or die.

In the context of this paper, I am more concerned with the "worldviews" of these technologies. For example, the very nature of an autonomous weapon system is that the technology replicates Western values/norms, such as autonomy. The technology is designed to have the primary capacity to make decisions autonomously without human interference. However, this is contrary to African communitarian norms and practices. Within the sub-Saharan locale, a decision, such as who gets to live or die or a decision that may have a possible adverse impact on the community, like warfare, cannot be abdicated to a single individual to make. The community makes such decisions through deliberation with all the stakeholders involved. Thus, it is safe to say that the very nature of an autonomous weapon system contradicts sub-Saharan African views of shared rather than autonomous decision-making.

However, a critic might say Africans also prize individual autonomy, just like in the West. For instance, the critic may argue that African theorists, such as Kwame Gyekye (1996) and Motsomai Molefe (2017), variously pointed out the

individualist thinking in African societies. For instance, Gyekye (1996) believes that even though individuals are members of their society, they can still express their *individualness* through making personal choices. However, as much as the theorists mentioned above point out some form of individualist thinking in sub-Saharan Africa, it must be understood that individualist orientation is secondary within the African context. Sub-Saharan Africans' recurrent values and norms are community-centred and characterized by interpersonal relationships and communal good (GYEKYE 1996; METZ 2011; MOLEFE 2017). Given the tension between Western values and norms, which are primarily individual-centred and sub-Saharan African values and norms, which are community-centred, the next section discusses the possible problems that may arise from the Western design of technologies when used in sub-Saharan Africa.

Techno-Colonialism: A Case of Cultural Colonialism through Technology
As previously outlined, colonialism is "a practice of domination involving the subjugation of one people by another through military, economic, and political means" (MIGNOLO & WALSH 2018, 116). In this sense, colonialism can be further explained as a form of control of one nation or region over another by possessing and occupying its land with settlers, extracting its resources during the period of settling, and exploiting the region economically, socially, mentally, and otherwise (MIGNOLO & WALSH 2018, 116). Techno-colonialism also takes this approach.

The term techno-colonialism came into light with its first usage by Randy Bush in 2000. Bush conceives techno-colonialism as "the exploitation of poorer cultures by richer ones through technology" (2015, N.P.). However, in this paper, I take another approach to techno-colonialism. I narrow the meaning of techno-colonialism to mean value colonialism through the use of technology. This form of colonialism may occur during technology transfer.

As Ihde (1993) contends, technology transfer comes with cultural transfer. He defines technology transfer as the "introduction of some set of material artefacts out of their original context of human praxes or techniques, into some other cultural context" (1993, 32). As I have outlined in the previous section, technologies replicate their designers' values, norms, and worldviews; as a result, when technology transfer happens, the culture, norms, and worldviews of the designers' societies are also transferred.

Consider the following extract from Ihde:

> (a) When a "technologically advanced" people-with steel axes-come into contact with, say, people using only Stone Age tools, there will be an initial flow of artifacts from the advanced to the indigenous people. They will simply adapt and even covet steel axes, (b) The reason, the standard analysis usually holds, is that the steel axe is obviously more efficient, and functional-it cuts down trees faster and with less effort. Never mind that this reason is also ipso facto already an assumed value within the "advanced" culture, (c) But, then, at first unknown to the recipient people, more is being received

than a steel axe. What, underneath, is being taken in is a new set of relations, primarily economic, which will eventually result in dependency relations for the indigenous people. Thus, because the indigenous people, now accustomed to the steel axe, cannot produce one- they do not have the technological praxis- they must enter trade and other relations…which eventually make them dependent upon the "advanced" culture. (IHDE 1993, 32)

Cultural transfer hidden in technology happens through fascination. For example, technologies of the 4IR, such as sex robots and autonomous weapon systems, may fascinate sub-Saharan Africans because of their representation and operation. As a result, they might want to purchase these technologies. However, it is pertinent to understand that technologies are not abstractly designed but based on the experiences of human relations in the society where they are designed, as pointed out in the extract from Ihde. For Ihde, these experiences and relations are multidimensional in that they include economic productivity and expose their designers' cultures, values, and norms (1993, 34). It is multidimensional because of the interwovenness of the cultural, economic, and existential exchange that happens when technologies are used. My notion of techno-colonialism, understood as culture/value/norm transfer in technology, becomes a possibility through this transfer. When this transfer occurs, it disrupts the values of the recipient's culture, values and norms. This is because the recipients of the technologies begin to replicate and live by the cultural norms and values of the designers of the technologies they use. Technologies of the 4IR can advance this form of colonialism because of their disruptive nature. The paragraphs that follow discuss the possibility of techno-colonialism, specifically in sub-Saharan Africa, through the technologies of the 4IR.

The expression "4IR"[4] comes from Klaus Schwab (2016) in his World Economic Forum address, where he spoke about the world's movement to a new technological era. As he explains,

Like the First Industrial Revolution's steam-powered factories, the Second Industrial Revolution's application of science to mass production and manufacturing, and the Third Industrial Revolution's start into digitization, the Fourth Industrial Revolution's technologies, such as artificial intelligence, genome editing, augmented reality, robotics, and 3-D printing, are rapidly changing the way humans create, exchange, and distribute value. (SCHWAB 2017, NP)

The 4IR (which proceeds after prior Industrial Revolutions) is characterized by intensified production and use of cybertechnologies such as AI, robotics, the Internet of Things (IoT), and 3-D Printing (XU n.d.n 2018). Thinkers like Wim

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[4] The 4IR began in the second half of 2017 and is still ongoing (LEE n.d.n 2018). It is a "cyber-physical production system" driven by new technologies determining and defining the speed of development within and amongst nations, creating new jobs and eliminating old jobs through automation, creating impacts on governmental regulations, and putting humans as consumers.

Naude (2019), Ayentimi Tutu and John Burgess (2019) are optimistic that the technologies of the 4IR are economically beneficial to sub-Saharan Africa. I partially agree with Ayentimi and Burgess (2019) and Naude (2019) on the view that 4IR technologies have some economic benefits for sub-Saharan Africa if deployed to the region. For example, technologies of the 4IR can be applied to healthcare, such as electronic health data, to carry out state-of-the-art clinical diagnosis. Furthermore, the agricultural sector can benefit from 5G networks and the application of machine learning technologies to advanced crops and allow farmers to carry out e-commerce. Thus, sub-Saharan Africa stands a chance to benefit from the technologies of the 4IR and should not be left out in the pursuit of 4IR technologies.

However, despite the importance of AI technology to the sub-Saharan African economy, sub-Saharan African states should not be overzealous in the simple wholesale import of AI technologies and robots that do not reflect the values and norms of their region. This is because the wholesale importation of these technologies comes with the importation of the underpinning values, norms, and cultures that are embedded in these technologies by their designer, like the case of sex robots and autonomous weapons discussed above. I contend that the transfer of these technologies may lead to the value colonialism of the recipient societies, in this case, sub-Saharan Africa. For example, in the case of sex robots, sub-Saharan Africans may begin to abandon their conception of sex, as prescribed by the community, to visualize sex in whichever way they individually deem fit. Here we can see the individual freewill and autonomy overshadowing communal norms. To circumvent this problem, I prescribe some cautionary measures that ought to be taken by sub-Saharan Africans to allow them to enjoy the benefits of the technologies of the 4IR.

Cautionary Prescriptive Measures for the Deployment of 4IR Technologies in Sub-Saharan Africa
One of the characteristics of colonialism, which I have stressed in this paper, is that the minds of the colonialists are geared towards domination and control. Here, I juxtapose my idea of control and dominance with Heidegger's (1993). *Bestand,* as used by Heidegger (1993), means "standing reserve" or turning everything that exists into raw material for production (1993, 325). I read the implication of Heidegger's (1993) *Bestand* to mean a situation where human beings lose touch with their essence, given how they are being reduced to mere objects without dignity (FEENBERG 1998, 9). Since human dignity is defined and shaped by cultural identity, values, and norms, it follows that human beings could also be said to lose their culture, values, norms, and everything that makes their identity when they begin to embrace a culture that is not theirs. This embrace can be made possible through technology transfer. Here, the receiving culture begins to consume the technology and the culture, values, and norms embedded in the technologies. In doing so, they begin to self-annihilate their values, norms, and cultures while they assume the norms, values, and cultures of the designers of these technologies. In this way, they become passively controlled by another society without realizing it, thereby losing their identity.

Given sub-Saharan Africa's past histories of colonialism, it is pertinent that they are cautious of how they use technologies of the 4IR to deal with their

socioeconomic challenges because of the nonvalue neutrality of these technologies. Failure to use these technologies cautiously will put sub-Saharan Africans at risk of losing their identities, norms, values, and cultures while using deployed technologies, especially from the West. To circumvent this possible annihilation of African values, norms, and cultures through technology transfer, I provide relevant cautionary measures the region should follow.

First, sub-Saharan Africans must understand that technologies are not value-neutral. Technologies come with the values of their designers and the cultural orientation of the locus from which they are designed. Understanding that there may be contradictions in values and norms embedded in deployed technologies within the region is a prerequisite to knowing which technologies should be deployed into the region. For instance, technologies of the 4IR, such as the internet, are important in conducting business in sub-Saharan Africa. However, the internet has also made sub-Saharan Africans less socially engaging with each other through face-to-face conversation, given the advent of social media technologies, which are dependent on the internet. Nonetheless, because the internet has economic importance for sub-Saharan Africans, it can still be deployed into the region but with the awareness of the above-mentioned challenge. On the contrary, technologies like sex robots, as I have spelt out, are not necessary in sub-Saharan Africa because they do not fit into the cultural worldviews of those in the region. Thus, they should not be deployed.

Second, and most importantly, sub-Saharan Africans must begin to develop their technologies rather than consume technologies from other regions. Sub-Saharan Africans must start a new history of technological mindset and innovation. To achieve this technological production mindset, sub-Saharan Africa must generate ideas on developing technologies that fit into their reality and challenges. To begin with, they must first create the conditions for a suitable technological ecosystem to develop the technologies they can call their own; that is, technologies that replicate their values, norms, and cultures.

This can be achieved through the continent's investments in the "craftshumanship" of Africans. Furthermore, to enjoy the benefits of the current 4IR technological era and future technological advancements, they must develop policies that allow for the independent production of technologies within the region free from the coloniality of the West and its propriety measures. Finally, they should look into the abundant resources in their indigenous knowledge systems and combine these knowledge systems with acquired modern technical skills to produce novel technologies. For example, I have argued elsewhere (UGAR 2022a) that they can use their relational system of thoughts to create relational technologies. However, I leave this aspect to African developers to figure out how to create these technologies. My intuition is that if technologies can replicate their designers' values, cultures and norms, it is feasible to create technologies in whichever way we envisage. However, this can only be figured out by engineers and software developers.

Concluding Remarks

In this paper, I have argued that technologies are designed to replicate their designers' values, worldviews, and norms. Given this view, when a technology is transferred from one environment to another, the cultural norms and values of the

designers are also transferred. In most cases, these values sit in an uneasy tension with the recipient values and norms, like the case of the West and sub-Saharan Africa, as I have shown in this paper. The implication of this technology transfer might lead to techno-colonialism, understood here as the transfer of cultural values and norms, through technology, from one locale to another. Given the past histories of colonialism in sub-Saharan Africa, on the one hand, and the apparent need of the region to tackle its current socioeconomic challenges using technologies of the 4IR, on the other hand, I spelt out some prescriptive cautionary measures that can enable the region to leverage the benefit that comes with 4IR without being recolonized. These measures are that the region must understand that the values embedded in technologies of the 4IR are not value-neutral. As a result, it is important to be careful regarding the technologies they choose to deploy in the region. Second, the region must create an enabling environment to become producers of technologies that speak to its realities rather than just consume external technologies.

Declarations
The author declares no conflict of interest and no ethical issues for this research.

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