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Information is Power, Technology is Apropos and Food Security is a Must in Africa in the Post COVID-19 African States

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ABSTRACT

This paper examines the impact of new media information technology on food security. It specifically determines the extent to which new media technologies such as Instagram, Twitter/X, LinkedIn, WhatsApp, and many more, are agents of development and underdevelopment in food security in Africa. Drawing on systematic qualitative method, thus study assesses how new media technologies have posed positive and negative threats to food security in Africa. The findings showed that while new media technologies have aided food productivity, availability, and accessibility, the same cannot be said about food quality and utilization. The findings indicated that technology has enabled farmers to detect, adapt, and navigate dangerous climate change. However, it showed that the same new media technologies, through advertisement have been used to make huge profits at the expense of the good health of consumers, who are deceptively forced to consume unhealthy food produced through the means of Genetic Modified Organisms (GMOs). The paper recommends more organic food production through the use of new media technologies with more humane initiatives in Africa. It also recommends that food standardization and regulation agencies in African countries should create nationwide awareness, through new media technologies against the consumption of GMO foods that could impair their general well-being. This paper contributes and deepens knowledge on how farmers can detect and adapt to climate change for food security, using digitalized new media technologies in Africa.

Keywords: Food security, Africa, New media, CSR, Agenda setting, Agroecology

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INTRODUCTION

New media information technologies are digitalized internet-enabled information and communication devices that allow messages to be conveyed to desired destinations. Studies have shown that food security in Africa, which had been encapsulated in SDG 2 (Zero hunger) can quickly be attained through technology.[1] Access to technology, which has enhanced swift information and communication is highly

[1] Dele Raheem, Maxim Shishaev, and Vladimir Dikovitsky, "Food System Digitalization as a Means to Promote Food and Nutrition Security in the Barents Region," *Journal of Agriculture* 9, no. 8 (August 1, 2019): 168, https://doi.org/10.3390/agriculture9080168; Klaus

instrumental to the accomplishment of the components of food security- availability (ensuring that appropriate food is sufficient and in large quantities that can feed people), accessibility (having enough income or other resources to acquire food), utilization/consumption (having adequate dietary intake and the ability to absorb and use nutrients in the body). This may have informed the recommendation that with adequate technology in place, Africa can provide food that can feed its population. [2]In today's food security systems, the capacity to produce food in large quantities, transport same to the market for effective utilization and consumption underlies the stability and functioning of any society. Evidence continues to highlight the roles of technology in this direction.[3]

New media technologies, enhance market efficiency, where farmers, through their smartphones, can make inquiries about the latest cost-effective farming system together with what, how and when to start planting and harvesting conscious of the forces of demand and supply.[4] The technology monitors the environment and crops, supports sustainable development, and makes the supply chain more efficient.[5] New media technologies are powered by the internet, an invention of technology that affects every aspect of humanity including food. Food processing, which depletes biodiversity, causes acid rain and increases the large concentration of nitrogen and phosphorous in the lake is monitored by a technology called digital sensors.[6] With climate change effectively being checked and controlled by technology, threats to the plantation and harvesting of food would be quickly detected and prevented.[7]

Another component of new media technologies that has impacted food security is the 'Big data', which provides food manufacturing firms with the right insights into production performance, consumer or customer behaviour, and new product development.[8] Big data has been instrumental to the food security motive of Africa in that new technologies and data generation can transform business practices across the agricultural value chain and address bottlenecks in, productivity, harvesting, market access, finance, and supply chain management.[9]

A critical look at the foregoing shows that indeed technology has constituted a veritable tool for massive food production, processing, and utilization. For instance, food nutrients, safety, and consumption are accurately determined by digital sensors. This positive feat might have influenced Chen to conclude that cyber-physical system increases the capacity and efficiency of food production and consumption.[10] The use of digital technologies (DT) has been very helpful with respect to reducing price variability, addressing nutritional deficiencies of crops, and determining soil texture.[11] Cameras on mobile phones have been highly instrumental in taking pictures of suspected stunt crop growth, sick livestock, invasive destructive insects and soil texture for further analysis and treatment by food security experts.[12] Digital technologies (such as WhatsApp) have remained a veritable tool in the hands of farmers, to showcase on the spot, the marketing of their harvests through video calls to confirm the saying that says "seeing is believing". This is succinctly explained by Raheem et al. that digitalization with accurate data on input

Schwab, "The Fourth Industrial Revolution: What It Means, How to Respond.," *Economy, Culture & History Japan Spotlight Bimonthly*, 2016.

[2] Samuel Chukwudi Agunyai and Lere Amusan, "Implications of Land Grabbing and Resource Curse for Sustainable Development Goal 2 in Africa: Can Globalization Be Blamed?," *Sustainability* 15, no. 14 (July 11, 2023): 10845, https://doi.org/10.3390/su151410845.

[3] World Economic Forum (WEF), "Global Competitive Report 2014-2015," 2014; Kateřina Ciampi Stančová et al., "Smart Specialisation and the Agri-Food System," *Smart Specialisation and the Agri-Food System:A European Perspective*, 2019, 43–57.

[4] World Economic Forum (WEF), "Global Competitive Report 2014-2015."

[5] Technology Watch, " The Importance of ICT in Food Security," *ITU News* 8, no. 1 (2009): 25–29.

[6] Raheem, Shishaev, and Dikovitsky, "Food System Digitalization as a Means to Promote Food and Nutrition Security in the Barents Region."

[7] Agunyai and Amusan, "Implications of Land Grabbing and Resource Curse for Sustainable Development Goal 2 in Africa: Can Globalization Be Blamed?"; Ciampi Stančová et al., "Smart Specialisation and the Agri-Food System."

[8] Global Africa Network (GAN), " Industry 4.0 and IoT: Transforming the Manufacturing Industry," 2017, https://www.globalafricanetwork.com/2017/06/01/company-news/industry-4-0-and-iottransforming-the-manufacturing-industry/.

[9] World Economic Forum (WEF), "Global Competitive Report 2014-2015"; Dhan Prakash et al., "Risks and Precautions of Genetically Modified Organisms," *International Scholarly Research Notices* 2011, no. 1 (2011): 369573; Michelle Marvier et al., "A Meta-Analysis of Effects of Bt Cotton and Maize on Nontarget Invertebrates," *Science* 316, no. 5830 (2007): 1475–77; Sara Hurtado-Barroso et al., "Organic Food and the Impact on Human Health," *Critical Reviews in Food Science and Nutrition* 59, no. 4 (February 21, 2019): 704–14, https://doi.org/10.1080/10408398.2017.1394815; J Slaughter Matthew and David H McCormick, "Data Is Power: Washington Needs to Craft New Rules for the Digital Age," *Foreign Aff.* 100 (2021): 54.

[10] Hong Chen, "Applications of Cyber-Physical System: A Literature Review," *Journal of Industrial Integration and Management* 2, no. 03 (2017): 1750012.

[11] K.R. Krishna, *Agricultural Drones: A Peaceful Pursuit* (Waretown, NJ: Apple Academic Press Inc., 2018).

[12] World Economic Forum (WEF), "Global Competitive Report 2014-2015."

and output processes can promote quality, traceability, and safe food production, distribution, and consumption.[13]

However, despite the foregoing feats in technology and its contributions to food security, its destructive tendencies have also been well documented in the literature.[14] This aspect has contributed to the failing food system in Africa.[15] Máximo, notes that the technological automation of food, which increases food quantity does not ensure food quality, at the same time, it promotes job loss in the food sector.[16] This is perhaps one of the negative aspects of technology, which artificially manipulates the natural nutritional content of food with technological-based chemicals that are injurious to human consumption. Importantly, massive advertisement of the advanced technological GMOs on social media and other digital platforms, in the guise of achieving Sustainable Development Goal 2 is another challenge to food sovereignty. Unfortunately, this promotes mercy killing and thanksgiving.[17] The unsustainable farming system that the fourth industrial revolution (4IR) comes with is a killer through the proliferation of sicknesses such as hypertension, diabetes, obesity, kidney malfunctioning and many other diseases.[18]

Although Africa's food security quest has a long and chequered history, this quest is dogged by challenges including climate change, poor technological advancement, low level of awareness of the usefulness of new media technologies among rural farmers in Africa, among others. To address these problems and enhance food security in Africa, most African countries have deployed digital new media technologies. These technologies allow farmers to detect and control climate threats, produce food massively, and connect with consumers through phone numbers for calls and SMS, for food utilization and consumption (that is, with phones, consumers can now order food and farmers will supply the same in the market at an agreed price, without the intervention of middlemen) and a round-the-clock presence on Twitter, Facebook, WhatsApp, Blackberry Messenger and a mobile application to discover when to plant, harvest, and navigate climate change. Although these technological initiatives often draw attention and commendation, they also raise doubts about sustenance and utility value. There is a research gap in the investigation of the utility and sustainability of new media technologies to boost food security in Africa. Given this, the objectives of this paper include

i. To examine the utility and sustenance of new media technologies using the Corporate Social Responsibility (CSR) and agenda-setting
ii. To examine the positive contributions of new media technologies in food security in Africa;
iii. To determine the negative implications of new media technologies for food security in Africa.

Based on the brief introduction, the next section investigates the methodology and relevant theoretical explanations, CSRs and agenda-setting, that explain the utility and sustenance of new media technology for food security in Africa.

[13] Raheem, Shishaev, and Dikovitsky, "Food System Digitalization as a Means to Promote Food and Nutrition Security in the Barents Region."
[14] Lere Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa," *African Journal of Traditional, Complementary and Alternative Medicines* 14, no. 1 (2017): 103–9; Prakash et al., "Risks and Precautions of Genetically Modified Organisms"; Marvier et al., "A Meta-Analysis of Effects of Bt Cotton and Maize on Nontarget Invertebrates"; Hurtado-Barroso et al., "Organic Food and the Impact on Human Health"; Slaughter Matthew and McCormick, "Data Is Power: Washington Needs to Craft New Rules for the Digital Age."
[15] G. Otero, *The Neoliberal Diet: Healthy Profits, Unhealthy People* (Austin, TX: University of Texas Press, 2018); R. Paarlberg, *Food Politics: What Everyone Needs to Know* (Oxford: Oxford University Press, 2013).
[16] Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa"; Roberto Lo Scalzo et al., "Variations in the Phytochemical Contents and Antioxidant Capacity of Organically and Conventionally Grown Italian Cauliflower (Brassica Oleracea L. Subsp. Botrytis): Results from a Three-Year Field Study," *Journal of Agricultural and Food Chemistry* 61, no. 43 (2013): 10335–44; Faidon Magkos, Fotini Arvaniti, and Antonis Zampelas, "Organic Food: Nutritious Food or Food for Thought? A Review of the Evidence," *International Journal of Food Sciences and Nutrition* 54, no. 5 (2003): 357–71.
[17] Lere Amusan, *Mercy Killing and Thanksgiving: Food Security with Tears in Africa: Being a Paper Presented at Faculty Distinguished Lecture Series 1, Held on Friday, May 17, 2019, Faculty of Social Sciences, Federal University Oye Ekiti, Ekiti State, Nigeria* (Faculty of Social Sciences, Federal University Oye Ekiti, 2019).
[18] Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa"; Anne Lise Brantsæter et al., "Organic Food Consumption during Pregnancy and Hypospadias and Cryptorchidism at Birth: The Norwegian Mother and Child Cohort Study (MoBa)," *Environmental Health Perspectives* 124, no. 3 (2016): 357–64; Carolina Parelho et al., "Testicular Damage and Farming Environments – An Integrative Ecotoxicological Link," *Chemosphere* 155 (July 2016): 135–41, https://doi.org/10.1016/j.chemosphere.2016.04.043.

METHODOLOGY

Systematic qualitative methodology was adopted in this paper. The data sources were basically through desktop reviews of studies on technology and food security, periodicals, newspapers, government and international organizations reports on technology and food security, and internet materials, especially those that discussed in detail topical issues relating to the subject of technology and food security in Africa. Data collected were analysed under various themes using content descriptive analysis.

Utility and sustenance of new media technologies for food security in Africa through corporate social responsibilities (CSRs) and Agenda Setting (AS)

In social sciences humanities, it is usually tedious to have a universally accepted definition of concepts because most of the definitions are coined from different backgrounds and perspectives of academic disciplines. While Freeman and Hasnaou notes that CSRs differ across countries and within countries, Hofstede and Hofstede ascribe cultural differences to the disparity in their meanings. For CSRs, most of the definitions take into consideration three specific words Corporate for organisation, Social for society or environment, and Responsibilities for essential services (such as social, economic, or environmental).[19] It was observed by Carroll that the current idea of CSR is dated 1950 and grew through the 1960s, passing through different phases, where it has been recognized by the government and non-governmental organisations.[20] The theory holds the view that companies and organisations including multinational organizations that operate or do business in certain host communities have the responsibility of rewarding the society or environment where they operate. The reward may be in the form of social, economic, and environmental incentives, usually provided to improve the socio-economic conditions of the host communities. It may be explicit and/or implicit. It is explicit when an organization willingly and out of their move or interest engage in the provision of social, economic, and environmental incentives to the host communities.[21] Implicit CSRs, on the other hand, are the responsibility imposed on the organizations by the host community.

The activities of some NGOs in the global south with the employment of the new media to hype unsustainable community programmes is an issue that continues to generate academic curiosity.[22] Evidence has shown that most of these agents are paid by some states in the global North and their MNCs for easy penetration of Africa and other developing areas.

They provide donations to African countries in a bid to illegally cart away minerals and plant resources. One may not come up with a position that not all NGOs are working against stakeholders. The case of Nestle, a baby formula producer and International Baby Food Action Network (IBFAN), an NGO that kicked against the use of the only formula for children in place of breastfeeding in the early 1970s easily comes to mind.[23] With their effective control of the new media, they always project an impression that their activities are environmentally compatible as in the case of Shell, Chevron, and other oil MNCs that are active in Angola, Gabon, Nigeria, and Sao Tome e Principle to mention a few. Technology transfer can aid the massive production of food, for instance, the use of new media to promote a need for GMOs litter print, electronic and visual media. The use of drones is also common to spy against any farmers who keep seeds for the next planting season, which according to the World Trade Organisation, is against intellectual property rights (IPRs).[24] As it is in place in the US, the law will soon be imposed on Africa when wild plants are wiped off the continent through GM plants.

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[19] Ina Freeman and Amir Hasnaoui, "The Meaning of Corporate Social Responsibility: The Vision of Four Nations," *Journal of Business Ethics* 100, no. 3 (May 25, 2011): 419–43, https://doi.org/10.1007/s10551-010-0688-6; G Hofstede, G J Hofstede, and M Minkov, *Cultures and Organizations: Software of the Mind, Third Edition* (McGraw Hill LLC, 2010), https://books.google.com.gh/books?id=o4OqTgV3V00C.

[20] Archie B Carroll, "The Pyramid of Corporate Social Responsibility: Toward the Moral Management of Organizational Stakeholders," *Business Horizons* 34, no. 4 (1991): 39–48.

[21] Olanrewaju David Adeyanju, "An Assessment of the Impact of Corporate Social Responsibility on Nigerian Society: The Examples of Banking and Communication Industries," 2012; Dirk Matten and Jeremy Moon, "Corporate Social Responsibility," *Journal of Business Ethics* 54, no. 4 (December 2004): 323–37, https://doi.org/10.1007/s10551-004-1822-0.

[22] Timothy Doyle, Doug McEachern, and Sherilyn MacGregor, *Environment and Politics* (Routledge, 2015).

[23] For a comprehensive understanding of this, see Lamy, Masker, Baylis, Smith and Owens (2019: 198).

[24] Lere Amusan, "The Plights of African Resources Patenting through the Lenses of the World Trade Organisation: An Assessment of South Africa's Rooibos Tea's Labyrith Journey," *African Journal of Traditional, Complementary and Alternative Medicines* 11, no. 5 (2014): 41–47; Lere Amusan, "Imposed Socially Responsible Pricing on HIV/AIDS Drugs in Developing Areas," *Indian Quarterly: A Journal of International Affairs* 71, no. 1 (2015): 67–79.

On the agenda-setting theory, it became known in research, when Lippmann was concerned about the role of mass media in influencing certain reactions and thinking in public minds.[25] It is based on the idea of how the mass media can set an agenda that influences the opinion of the public on certain issues. This theory was later popularized by McCombs and Shaw's findings which showed that mass media shaped the opinion of voters, especially those that relied on information from the traditional media through their research on the impact of mass media on voters' choice.[26] Similarly, the utility and development of agenda-setting as an explanatory device were further recognized by Matsaganis and Payne, their findings have particularly exposed the agenda of the originator of such news.[27] This receives academic interrogation through the works of Michael Wolff when he exposed the activities of Rupert Murdoch and his control of "the news".[28] Murdoch's agenda and his patronage (political parties, MNCs, state governments, NGOs) for a long time influenced the kind of news reports or information disseminated to the public in Europe, the Americas, and Oceania regions. This mostly shaped the opinion of the people or public that consume such information. Sometimes the reputation of media houses in terms of credibility, professionalism, and quality of news reporting, affects public opinion. Thus, the agenda-setting of these media outlets impacts greatly on the acceptability of the news emanating from them. The same applies to the new media where big data continue to form an opinion either from the public or the establishments that handle the same.

This is the case of X and the Nigerian situation when the Nigerian government banned the company under the guise that it supports secessionist movements. The reason behind Abuja's move against the global X continues to generate academic interrogation because some perceived it as a need for the state to claim its legal sovereignty as opined by Krasner. On the other side, consumers of X product see it as a violation of human rights with a special focus on the first-generation type of rights that deals with information and speech.[29] However, this position fails to appreciate the Cybercrime Act that forbids misinformation and character assassination that is all over new media as displayed always by bloggers, Xs, and Facebook to mention a few with deleterious impacts on consumers. The same comes to the fore when one digs into the activities of multinational agribusinesses and retail food outlets such as McDonald's, KFC, and Mr Biggs that use aggressive adverts to lure people into consuming junk food. This continues to impact on health and financial status of many households in Africa and compromise food sovereignty.

The agenda-setting in a new media is different from news media. The news media disseminate information or news through the old traditional platforms such as the TV and radio. They were in existence before the advent of big data technologies.[30] The new media is a digitalised internet service technology that disseminates on-demand information at any time using any of the digital devices.[31] The new media platforms include instant and on-the-spot video, music, picture-sharing, wiki, blogs, and the internet. The new media is accessible through various channels like X, Instagram, LinkedIn, YouTube, Facebook, My Space, Flickr, and Google Groups.[32] Agenda setting under the new media is determined by personal interests and it is largely prone to abuse, fake information, and misguided or uncontrolled proliferation of

[25] B F Wright, "Lippmann, Walter, Public Opinion.," *Social Science Quarterly* 3 (1922): 169.
[26] Maxwell E McCombs and Donald L Shaw, "The Agenda-Setting Function of Mass Media," *Public Opinion Quarterly* 36, no. 2 (1972): 176–87.
[27] Matthew D Matsaganis and J Gregory Payne, "Agenda Setting in a Culture of Fear: The Lasting Effects of September 11 on American Politics and Journalism," *American Behavioral Scientist* 49, no. 3 (2005): 379–92.
[28] M. Wolff, *The Man Who Owns the News: Inside the Secret World of Rupert Murdoch* (London: Vintage Books, 2010).
[29] S.D. Krasner, *Sovereignty: Organized Hypocrisy* (Princeton: Princeton University Press, 1999).
[30] Daniel Byman, "Why Drones Work: The Case for Washington's Weapon of Choice," *Foreign Aff.* 92 (2013): 32; Martin Wolf, "Same As It Ever Was: Why the Techno-Optimists Are Wrong.," *Foreign Affairs* 94, no. 4 (2015): 23–28; Audrey Kurth Cronin, "Why Drones Fail: When Tactics Drive Strategy," *Foreign Aff.* 92 (2013): 44; Neil Gershenfeld and Jean Pierre Vasseur, "As Objects Go Online; the Promise (and Pitfalls) of the Internet of Things," *Foreign Aff.* 93 (2014): 60; Krishna, *Agricultural Drones: A Peaceful Pursuit*; Lere Amusan, Samuel C Agunyai, and Hope Amoge Ikedinma, "Herders Mobility, Food Security and Covid-19 Pandemic Challenges during Lockdown in Nigeria," *Gender and Behaviour* 20, no. 3 (2022): 20311–26; V. Mayer-Schonberger and K. Culier, *Big Data: A Revolution That Will Transform How We Live, Work, and Think* (Boston and New York: An Kamon Dolan Book, 2013).
[31] Bruno Schivinski and Dariusz Dabrowski, "The Effect of Social Media Communication on Consumer Perceptions of Brands," *Journal of Marketing Communications* 22, no. 2 (2016): 189–214.
[32] Henry Jenkins, "Convergence Culture. Where Old and New Media Collide," *Revista Austral de Ciencias Sociales* 20 (2011): 129–33; Sonia Livingstone and Amanda Third, "Children and Young People's Rights in the Digital Age: An Emerging Agenda," *New Media & Society* (Sage Publications Sage UK: London, England, 2017); Jane B. Singer, "The Political J-Blogger," *Journalism* 6, no. 2 (May 29, 2005): 173–98, https://doi.org/10.1177/1464884905051009.

information. For instance, many political leaders, entrepreneurs, and MNCs have deployed the use of new social media platforms such as Facebook, blogs, and X, to set their agenda that has shaped and influenced the opinion of the public. The case that readily comes to mind is the case of former US President Trump, who used his X handle to set an agenda that almost ruined the hallowed legislative chamber in the country. Trump's constant release of his opinion as a public agenda on social media platforms (X, Facebook) had a significant influence on the public, the majority of whom are his supporters. Based on the above discussion, the next section examines the influence of big data and its impacts on food security.

Digital Technologies (New Media) and Food Security in Africa: Positive Implications

The new media, unlike the news media, is currently the in-thing in the international system, including Africa. It is otherwise known as digital technologies whose functions in terms of information or news dissemination are largely beyond internet services. Big data encapsulates a technology that profits farmers in the form of livestock, irrigation, precision farming, pest control, satellite images and the use of drones and climate change among others. The leitmotif of this is to ensure quantity production cost-effectively.[33] Internet connectivity ranges from speed, accuracy, timely, on-the-spot transfer, or reception of messages, among others.

Digital/big data had earlier been defined by the World Bank as the internet, mobile phones, and social media.[34] For Diamond, it is a freedom technology, which has the capacity of promoting agricultural, food, social, economic, and political liberation.[35] Diamond's definition brings to the fore how the introduction of smartphones and E-wallet technology to farmers freed them from the excessive profiteering bondage over issues of racketeering of fertilizers, seeds and seedlings distributions, and marketing of farm produce in Africa. The platforms continue to boost massive agricultural food production, distribution (supply chain), and utilization. It provides opportunities for farmers to 'report the news', expose the shady business of the middlemen, express their opinions, mobilize protests, monitor government policies or programmes on agricultural facilities, foreign/humanitarian aid, or food infrastructure, deepen more participation in food security activities, and expand the horizons of freedom in food security.[36] For Maximo, farmers with access to the internet and social media have greater opportunities to be trained, highly informed, and better able to engage in food security.[37] Maximo's view succinctly buttressed how access to the use of smartphones enables farmers to monitor the movement of their farm produce in transit from the farm to the market. The ability to target the right consumers or customers for their harvests and the prevailing prices both in the domestic and global markets through their phones is assured. This invariably has not only positively contributed to the attraction and participation of more people in agricultural food production, but it has also given farmers the freedom to make an informed decision on agricultural investment.

Besides, Technology Watch in its attempt to showcase the importance of technology in food security, reported how the World Summit on the Information Society (WSIS), launched two leading initiatives called Bridging the Rural Digital Divide (BRDD), and the First Mile Project (FMP) in Tanzania.[38] The FMP was established to link farmers in rural areas, across the continent to information and customers in the market chain through internet-connected phones and e-mail.[39] This invariably would enhance the chances of the rural farmers to produce massive agricultural food. Similarly, new media technologies such as internet-connected phones are significantly helpful in the reduction of food wastage. It enables farmers to quickly receive information on the quantity of supply to buyers, instead of the

[33] Lindi Botha, "Is Data the New Soil in Agri?," *Farmer's Weekly* 2020, no. 20012 (2020): 30–32.
[34] World Bank, *Digital Dividends: World Development Report* (Washington DC: World Bank, 2016).
[35] Larry Diamond, "Liberation Technology 1," in *In Search of Democracy* (Routledge, 2015), 132–46.
[36] Global Africa Network (GAN), " Industry 4.0 and IoT: Transforming the Manufacturing Industry"; Raheem, Shishaev, and Dikovitsky, "Food System Digitalization as a Means to Promote Food and Nutrition Security in the Barents Region"; Machiadikwe N Agbarevo and Onyinyechi Ukagha, "Determinants of Participation of Farmers in the E-Wallet Agricultural Input Delivery System in Abia State Nigeria," *Journal of Agricultural Extension* 22, no. 3 (2018): 109–16.
[37] Máximo Torero, "Without Food, There Can Be No Exit from the Pandemic," *Nature* 580, no. 7805 (2020): 588–89.
[38] Technology Watch, " The Importance of ICT in Food Security."
[39] Technology Watch, " The Importance of ICT in Food Security."

oversupply of food. The case of a study in Kerala, India, where fishermen on the sea were able to prevent wastage due to overfishing and immediately meet market demand for their fish.[40]

Digital technology provides farmers 'with the food production and supply chain knowledge', enhancing information sourcing and effectiveness.[41] Smartphones and social media offer new hopes of empowerment for farmers, especially, women and allow increased transparency in agricultural food production and distribution and smoothen communication between farmers and marketers or consumers on the one hand, and government representatives on the other hand.[42] Empirical studies have credited the value of digital technology to food security in areas such as massive food production and distribution, the ability to determine conducive soil texture for planting, agro-meteorological, detection of disease in animals, and in liaising with the public across the globe.[43] Farmers are employing DT platforms to enhance their food security. For instance, Krell et al. revealed how the M-services have contributed immensely to m-agric and m-payment, which in turn have contributed to the ease of farming and payment of agricultural products.[44] Relatedly, Qiang et al. revealed how farmers' access to information on the m-services, specifically on issues of climate, crop ailments and market information improved agricultural production and profitability in Kenya.[45]

In Nigeria, digital technologies are serviced by the Information and Communication Technologies (ICTs), the ICTs have insistently faced challenges such as poor infrastructure, and a demographic and socio-economic and digital gap, to become the most viable sector. The ICTs cover the continent's highest users of GSM phones and the Internet.[46] In Nigeria, as reported by Odeyemi and Obiyan, users of Facebook rose from 6 million to 16 million, from 2012 to 2016), and more than one million subscribers for X, WhatsApp and BBM.[47] Similarly, Nigerian Communications Commission reported a rise in the number of fixed active telephone lines from 400, 000 lines to 237 million connected mobile telephone lines from before 1999 till date.[48] The rise in the use of new media platforms, especially social media and smartphones by farmers is reflected in the growing renewed interests of the youths in agricultural production, advocacy, and promotion of food security.[49] Of note, Hansen et al. opined that the use of new media especially phones to disseminate agro-meteorological information can eradicate the usual uncertainty and bottlenecks in inputs acquisition, adoption of technology, and promoting the well-being and livelihoods of relevant stakeholders in food security venture (women and men farmers).[50] According to Baumuller, it helps farmers to cope with or manage agricultural risks and reduction of risks inherent in climate variability.[51] However, despite the good side of technology concerning food security, it is equally prone to severe negative side effects, which tend to be the bane of food insecurity in Africa as discussed below.

[40] FAO (Food and Agriculture Organisation of the United Nations), " Present and Future Markets for Fish Products from Small-Scale Fisheries – Case Studies from Asia, Africa and Latin America," FAO Fisheries Circular No. 1033. Rome: FAO., 2008, http://www.fao.org/3/i0230e/i0230e.pdf.

[41] Agbarevo and Ukagha, "Determinants of Participation of Farmers in the E-Wallet Agricultural Input Delivery System in Abia State Nigeria."

[42] A Adesina and P Verkooijen, "OPINION: African Agriculture Is Ready for a Digital Revolution," *Thomson Reuters Foundation News. URL Https://News. Trust. Org/Item/20210406095449-Jl81a/(Accessed 2.21. 22)*, 2021.

[43] Heike Baumüller, "Mobile Technology Trends and Their Potential for Agricultural Development," 2013; Susan Wyche and Charles Steinfield, "Why Don't Farmers Use Cell Phones to Access Market Prices? Technology Affordances and Barriers to Market Information Services Adoption in Rural Kenya," *Information Technology for Development* 22, no. 2 (April 2, 2016): 320–33, https://doi.org/10.1080/02681102.2015.1048184; Raheem, Shishaev, and Dikovitsky, "Food System Digitalization as a Means to Promote Food and Nutrition Security in the Barents Region"; Lere Amusan and Samuel Oyewole, "Global Democratisation and Capitalism: Discovering the Third World States in the Era of Limited State and Unlimited Quest," *Canadian Social Science* 8, no. 5 (2012): 57–64.

[44] N. T. Krell et al., "Smallholder Farmers' Use of Mobile Phone Services in Central Kenya," *Climate and Development* 13, no. 3 (March 16, 2021): 215–27, https://doi.org/10.1080/17565529.2020.1748847.

[45] Christine Zhenwei Qiang et al., *Mobile Applications for Agriculture and Rural Development* (World Bank Washington, DC, 2012).

[46] World Bank, *Digital Dividends: World Development Report*.

[47] Y. Kazeem, " More People Use Facebook in Nigeria than Anywhere Else in Africa ," Quartz Africa, February 6, 2016, http://qz.com/611516/more-people-use-facebook-in-nigeria-than-anywhere-else-in-Africa/; Temitayo Isaac Odeyemi and A Sat Obiyan, "Digital Policing Technologies and Democratic Policing: Will the Internet, Social Media and Mobile Phone Enhance Police Accountability and Police–Citizen Relations in Nigeria?," *International Journal of Police Science & Management* 20, no. 2 (2018): 97–108..

[48] Nigerian Communications Commission, *Monthly Subscriber Data* (Abuja, Nigeria, 2021).

[49] Qiang et al., *Mobile Applications for Agriculture and Rural Development*; Krell et al., "Smallholder Farmers' Use of Mobile Phone Services in Central Kenya."

[50] James Hansen et al., "Climate Change and Trace Gases," *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 365, no. 1856 (2007): 1925–54.

[51] Baumüller, "Mobile Technology Trends and Their Potential for Agricultural Development."

The Negative Implications of Technology (New Media) for Food Security

Information on new media technologies, especially social media platforms such as Facebook, Instagram, and X is rarely scrutinized and monitored. Most of the time, it is prone to fake news and misleading information about a certain issue, which becomes a 'fake fact' over time, because of the massive spread of the information by users. Keith in a similar vein, opined that misleading information becomes a fact in no time because of its spread and inadequate control.[52] In the realm of social media, the information therein is hardly pruned and scrutinized, and this loophole has been unjustly manipulated by the West and their agents, MNCs and questionable NGOs, to progressively replace our organic food with inorganics. The idea and dissemination of information on GMOs across the world, especially in Africa, which could have partly flowed through social media, had, in the long run, shaped the thinking and opinion of African agriculturalists towards the adoption of the same agenda in Africa. Just like the agenda-setting theory, GMO foods were an agenda of the West and MNCs to make more profits, reduce the African population, and further extend their hegemony in Africa.

This view has been upheld by scholars such as Maximo, Keith, Amusan, and Krell et al. among other African scholars. [53] Amusan specifically, blamed the greedy appetitive nature of the West and their advanced technology for the imposition of GMOs on Africa.[54] Maximo argued that the policy of GMOs across the globe and Africa was a known agenda of the Western world to control the acclaimed population explosion, which the West believed is rampant in Africa. Further, social media has remained a tool in the hands of the West and MNCs in mollifying and deceitfully creating an agenda in the new media, the abandoning of native knowledge of some African plants, known for their potency in the treatment of diseases like hypertension, diabetes, obesity, and other chronic ailments. One such plant according to Amusan is Hoodia.[55] He blamed the MNCs and the Global West for surcharging local farmers of the San community in Southern Africa. The MNCs volunteered in what seems to be CSR in the form of deploying their advanced technology to process Hoodia, but contrary to the people's will and decisions, they were not consulted after the breakthrough. This is against the Prior Informed Consent (PIC) and Access Sharing Benefit (ASB) which are in line with the Convention on Biological Diversity together with the Nagoya Protocol on biodiversity.[56]

In addition, because of the tedious and energy-sapping nature of agricultural food production, where farmers, fishermen, and hunters, as well as others in the food security sector work massively on farms, they tend to have a very low chance of accessing social media platforms like Facebook, Instagram, LinkedIn, X and other viable outlets. The busy nature of their work, which makes them stay more on farms, limits their access to social media. In addition to this is the poor educational background of rural farmers, who lack the knowledge and skill to explore social media towards extensive food security.[57] This has partly been responsible for why social media benefits only a few farmers, except for the educated ones. The service sector, unlike the agricultural sector, is more exposed to the use of social media, because of its entertainment attributes.[58] This has implications for the misleading and misguiding of farmers who are easily influenced by the propaganda from the West.[59] For Amusan, the agenda-setting in the new media that farmers in rural areas lack knowledge of advanced technology has made it very easy for MNCs and the West to illegally manipulate and adopt African indigenous knowledge on hoodia and rooibos plants without the knowledge of the Sans and Khois.[60] Relatedly, Popplewell observed that it was a calculated agenda of the West and MNCs to dislodge the San of their indigenous resources, due to their poor access

[52] W. Keith, "The Effects of Climate Change on Agriculture and Food Security in Africa," 2018.
[53] Torero, "Without Food, There Can Be No Exit from the Pandemic"; Keith, "The Effects of Climate Change on Agriculture and Food Security in Africa"; Amusan, "Imposed Socially Responsible Pricing on HIV/AIDS Drugs in Developing Areas"; Krell et al., "Smallholder Farmers' Use of Mobile Phone Services in Central Kenya."
[54] Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa."
[55] Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa."
[56] Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa."
[57] Keith, "The Effects of Climate Change on Agriculture and Food Security in Africa."
[58] Keith, "The Effects of Climate Change on Agriculture and Food Security in Africa."
[59] Keith, "The Effects of Climate Change on Agriculture and Food Security in Africa."
[60] Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa"; Amusan, "The Plights of African Resources Patenting through the Lenses of the World Trade Organisation: An Assessment of South Africa's Rooibos Tea's Labyrith Journey."

to information and technology.[61] Amusan's view was similar to that of Littlejohn and Foss who have earlier implicated gatekeeping as one of the limitations and boons of the agenda theory.[62] A gatekeeper sieves information and this role can be manipulated for selfish interests.

Through advanced technology, especially in genetic engineering (GE), highly modified and fortified foods have been shipped to Africa through a well-publicised digital technology platform. Most Africans are easily moved by the sound and prolific advertisement of goods and services including foods and not by the quality and safety of the items being advertised. This view is consistent with Keith, who opines that because of limited or zero checks of information on social media, most fake news including the advertisement of unsafe and unapproved goods and services have been taken to be sacrosanct.[63] This has negatively influenced the decision of the public towards accepting what is fake as fact. While earlier studies had found that GMO foods are a practice to improve the rapid growth of crops,[64] subsequent technological advancement, which allowed a higher magnitude of modified organisms had been detrimental to human health as well as the stimulated tendency of food insecurity, at best, food fraud.[65] Rapid changes in technology, which permit the synthetic and genetic modifications of food as well as the proportions with which such GMOs are imposed on consumers further worsen by well-publicised advertisement agribusinesses outlets that are rarely monitored.

The foregoing is likened to what Amusan described as 'mercy killing and thanksgiving' that can be interpreted to mean that while the people, especially those in Africa, applaud the global North and MNCs in their quest to use their technology to advance agricultural food security in Africa, especially, through the dangerous GE, MNCs, in a desperate chase for healthy profit at the expense of healthy people supported by aggressive adverts.[66] While they are mercifully killing Africans through their fraudulent foods. This could be appreciated when one examines how the elite, daily import pizza from London and New York despite its unhealthy attributes.[67] Africans are ignorantly thanking them for increasing food productivity through gene editing which is vigorously promoted by Bill Gates and his Bayer MNC that is good at promoting hidden hunger.[68] The recurrent trend of diseases such as hypertension, obesity, diabetes, liver and kidney ailments and other emerging diseases are caused by inorganic food imposed through new media.[69] Consumers are rarely aware of the implications of GM foods. This worsens with the politics of labelling. Manufacturers are of the view that labelling will increase the price of their products, which would be shifted to consumers. This position hardly holds water. The real reason is to confuse and ensure patronage from their consumers.[70]

Technology has also been blamed for advancing the interests of the major international financial institutions (IFIs) such as the International Monetary Fund (IMF), World Bank, and African Development Bank (ADB) of food security in Africa. For instance, Flora opined those past policies of the IMF and World Bank regarding financing agriculture intensified cases of land grabs, high price volatility, and the

[61] Nicola Popplewell, "Permit Required for Indigenous Biological Resources: Association News: Coschem News," *South African Pharmaceutical and Cosmetic Review* 38, no. 11 (2011): 57–58.
[62] Stephen Littlejohn and Karen Foss, *Encyclopedia of Communication Theory* (2455 Teller Road, Thousand Oaks California 91320 United States : SAGE Publications, Inc., 2009), https://doi.org/10.4135/9781412959384.
[63] Keith, "The Effects of Climate Change on Agriculture and Food Security in Africa."
[64] Magkos, Arvaniti, and Zampelas, "Organic Food: Nutritious Food or Food for Thought? A Review of the Evidence."
[65] Amusan, "Politics of Biopiracy: An Adventure into Hoodia/Xhoba Patenting in Southern Africa"; Lo Scalzo et al., "Variations in the Phytochemical Contents and Antioxidant Capacity of Organically and Conventionally Grown Italian Cauliflower (Brassica Oleracea L. Subsp. Botrytis): Results from a Three-Year Field Study"; J. W. Spink, *Food Fraud Prevention: Introduction, Implementation, and Management* (New York: Springer Nature, 2019).
[66] Amusan, *Mercy Killing and Thanksgiving: Food Security with Tears in Africa: Being a Paper Presented at Faculty Distinguished Lecture Series 1, Held on Friday, May 17, 2019, Faculty of Social Sciences, Federal University Oye Ekiti, Ekiti State, Nigeria*; Otero, *The Neoliberal Diet: Healthy Profits, Unhealthy People*.
[67] Lere Amusan and Seyi Olalekan Olawuyi, "Between Food Quality and Quantity for All in Africa: What They Refuse to Tell Us about GMO Foods," *Gender and Behaviour* 17, no. 1 (2019): 12284–98.
[68] A. H. Kimura, *Hidden Hunger: Gender and the Politics of Smarter Foods* (Ithaca and London: Cornell University Press, 2013); Bill Gates, "Gene Editing for Good: How CRISPR Could Transform Global Development," *Foreign Aff.* 97 (2018): 166.
[69] Amusan and Olawuyi, "Between Food Quality and Quantity for All in Africa: What They Refuse to Tell Us about GMO Foods"; A S Bawa and K R Anilakumar, "Genetically Modified Foods: Safety, Risks and Public Concerns—a Review," *Journal of Food Science and Technology* 50, no. 6 (2013): 1035–46.
[70] Bawa and Anilakumar, "Genetically Modified Foods: Safety, Risks and Public Concerns—a Review."

centralisation of power in agricultural ventures, as well as climate change-induced technology.[71] This significantly contributes to the challenges of food sovereignty in Africa. Similarly, the harsh conditions attached to IMF and World Bank loans such as trade liberalisation, removal of agricultural subsidies, privatization of public enterprises, and granting foreign investors to the country's natural resources with relevant new media promotion of these serve as an agent of land dispossession and unsustainable large-scale farming.[72]

RECOMMENDATIONS

Given the inherent negative consequences of technology and its effects on food security in Africa, it becomes pertinent for African leaders to look inward for an alternative means of investing in the agricultural sector. This can be through maximizing finance for development, where monies realized in previous years from the exportation of food and investment in food can be ploughed back into the sector.

Africa should devise public policy mandating compulsorily the MNCs to provide sustainable CSR to the host communities rather than satisfying just a few people at the expense of the entire community. CSR should be monitored by the host government through a strong legislative framework that will be implemented without any fear or favour. This will help check the excesses of the MNCs in Africa. For instance, in Nigeria, food regulating institutions should be adequately equipped through relevant new media. This will go a long way to limit tendencies of food fraud and poisoning.

Importantly, African leaders should target the adoption of Africanism in solving African problems rather than depend on foreign aid from the West. The ability to solve one's problem without any interventions from the global north will send a signal of self-reliance evolvement in the continent. Similarly, it is of paramount importance that African leaders begin to re-think new biopiracy diplomacy that is African-based with relevant big data that will promote food sovereignty.

CONCLUSION

Applying twin theories of CSRs and AS, one may begin to appreciate the import of big data in sustainable food security in some parts of Africa even though, there are still some pockets of hunger and malnutrition. In this paper, emphasis has been paid to the potentials that technology offers for sustainable food production. Unfortunately, in Africa, a combination of activities of the Western world and MNCs through their agenda of imposition of GMOs through their well-packaged new media technologies have negatively challenged and weakened food security capacity and food sovereignty in the continent. This intensifies human insecurity. The deliberate attempt to surcharge Africa through gatekeeping and provision of unsustainable CSR is a symptom of and contributes to underdevelopment. Other challenges limiting Africa's food security include stringent loan conditionalities of the global financial institutions, the deceptive use of CSR to cart away Africa's natural resources, dissemination of information to few, land grabbing and displacement, imposition of food directives and choices on Africa, and forceful and illegal adoption or copying of Africa's indigenous knowledge without basic attributes such as geographical indications (GIs), PIC, ASB and IPRs. Food fraud in Africa is another reason that continues to generate academic curiosity due to the low level of education to check to label and expiry dates of dumped food that is inorganic to Africa in the form of questionable humanitarian aid.

The prospects provided by technology are necessary for addressing some of the issues raised on food insecurity. The paper suggests among others that African leaders should revert to organic food production and reject GM foods because of their effects on human health. This should be backed with investment in relevant technologies that could accelerate the production of organic foods and the dissemination of information regarding food chains to encourage farming among the youths in Africa.

[71] Flora Sonkin, "Recipe for Disaster: The IMF and World Bank's Role in the Financialisation of Food and Agriculture," *London: Bretton Woods Project*, 2020, https://www.brettonwoodsproject.org/wp-content/uploads/2020/03/IMF-and-World-Bank-role-in-financialisation-of-food-and-agriculture-At-Issue-Spring-2020.pdf.

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