The tech-novation pathway from pandemic to prosperity: a post Covid-19 roadmap for African economy

ABSTRACT

While the post-colonial African economy remains the poorest performing economy globally, the outbreak of the Coronavirus pandemic has further gravely aggravated its precarious position in the world. This study reflects on the multiple impacts of Covid-19 on African economy and suggests a pathway for its revitalization in the post Covid-19 environment. Undoubtedly, the Covid-19 pandemic has brought the world to a temporary halt, with its attendant bruises mostly notable on the economies of almost all African countries. This paper empirically analyse the incapacitation of African states in providing some strategic responses to the economic wreckages caused by the pandemic. Using technological-determinism as a theoretical framework, this study suggests the technological-innovation pathway as a bridge between the pandemic-induced economic circumstances and prosperity for Africa. Sequentially, the five junctions on the pathway splits as pulling, recovery, innovations, growth, and sustainability (PRIGS), but, however, the kernel of the discussion revolves around the commodification of innovation (technology) for Africa's economic growth and development. This study concludes, the five junctions on the PRIGS' highway absorbs the current developmental challenges of African states and hence, recommends an alternative roadmap for Africa, in its long-term quest and vision for development

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INTRODUCTION

In January, 2020, the World Health Organization (WHO) declared Coronavirus (Covid-19) a global health emergency. With its origin, reportedly from Wuhan, China, in 2019, the virus has blossomed to over 195 countries, including, virtually all African countries. Currently, over 7 million cases have been recorded globally while thousands of people have, sadly, died. On the 11th of March, 2020, the WHO officially declared Covid-19 a pandemic; signifying in essence, a globally challenging times (Chappell, 2020). Consequent of this declaration, many countries adopted stricter measures to contain the spread of the virus. For instance, a broadband of border closure policy was installed by many countries while several international businesses were shut down. As safety valve, billions of children worldwide were ordered home while governments across the world also instructed their varying populations to self-quarantine (The Economist, 2020). Thus far, the huge loss of lives and emotional trauma remained a major fallout, and like muzzle flashes, the Covid-19 pandemic has also disrupted global chains of demand and supply, with resultant impacts such as fall in the revenue of nations, job losses, insolvencies, indebtedness, liquidation of many private firms and many more.

However, what the Covid-19 pandemic portends for a fragile economy like that of Africa is enormous; not alone for the oil-dependent economies who are battling with dwindling oil prices, but also, for the non-oil-dependent nations who are equally battling with restricted fiscal space. For instance, oil prices have drastically fallen by over 54% and at some points, was sold at below 30 dollars, while, the prices of non-oil commodities like aluminum, copper, natural gas, metals, lead and cocoa have plummeted by 0.49%, 0.47%, 30%, 4%, 1.64% and 21% respectively, among other considerations (Madden & Coulibaly, 2020). Meanwhile, the total population living in Africa's urban settlements approximately stood at 600 million (43.5 % of Africa's population) while the remaining over 56 % are living in the slums (UN Habitat, 2016). Although, it was predicted that between 400,000 and 4 million could become fatalities of Covid-19 in Africa, but, however, the provision of radical combative responses from African countries are expected to elaborately prevent the doom and reduce the predicted fatalities [Sawhani, 2020].

Without dwelling much on the socio-economic impact of Covid-19 on African economies, this paper draws its strength from an intensive scientific analysis, and hence, tenders a post Covid-19 economic reclamation plan for Africa. For the sake of simplicity, this study abstractly envelopes the index points (pulling, recovery, innovations, growth, and sustainability) of the discussion as the PRIGS bridge, and thus recommends that bridge as the pathway between the 'termination of the pandemic' and the 'germination of prosperity' for African economies.

REFLECTIONS: THE COVID-19 PANDEMIC AND THE RESPONSES OF AFRICAN GOVERNMENTS

Selecting from its plural challenges, Africa is characterized with poorly serviced dwelling slums and overcrowded population. In all, about 72 % of Africa's labour force are not employed in formal sectors, which makes working from home a difficult task. Even, before Covid-19, 76.7% of employments in Sub-Saharan Africa were vulnerable and not secured [ILO, 2015]. Similarly, Africa hosts the leading numbers of people with prevailing underlying health conditions. About 40% of Africa's children, aged below five years are malnourished. Apart from the largely dependent importation of pharmaceutical and medicinal products, the ratio of Africa's health professionals and facilities to its population is highly disproportionate, constituting the highest among other continents [AUC, 2020]. Talking of social welfare, the inherent corruption, unavailability of accurate data and identity systems makes direct transfer benefits to the vulnerable, a hard job for administrators of social palliatives. Apart from the unsustainability of the lockdown costs, the cheapest preventive technique like constant handwashing remains an expensive commodity in Africa, where only 34% of the total households can access clean water for basic use [Howard, 2020].

Premised on the constant trans-border engagements of people within the African continent, the entry of Covid-19 into one Africa country, only meant that, transiently, the spread would enjoy an unhindered flow into other countries in the continent. Although, many have blamed the WHO's failure to hurriedly declare the virus as a global pandemic as the springboard for its rapid spread, while some also blamed 'the leadership' who failed to shut their borders on time. But, the entry of Covid-19 into Lesotho, Burundi and some other countries, long after WHO's eventual declaration and several border closures only shows the global destiny Covid-19 was bound to have. For example, the index-case in Nigeria was reportedly a returnee from one of the hot spots of the infectious disease [Shaban, 2020]. But that did not prevent the Nigerien who exploited the West African border porosity into Nigeria, only to be subsequently tested and declared positive after mingling with multiple contacts [Vanguard, 2020]. This instance on easy penetration of West African borders speaks for the situation in other African sub-regions and the unavoidable blowout of Covid-19.

However, the pro-active measures, including accelerated testing rates in many African states successfully tamed the early identified cases and have helped to prevent a rapid community spread. As the Covid-19 positive cases rise exponentially across the globe, Africa's figure stood firm in the frames of 'tens of thousands' cases. Commendably, several strategies have been dispatched in many countries, not only to curb the spread of Covid-19 alone, but, also, to reassure the people that, their welfare would not be compromised as we collectively fight the coronavirus outburst, [OECD, 2020]. In Nigeria, South Africa, Ghana and many others, for example, weeks of lockdown were repeatedly announced, while food items and other relief packages were distributed as palliatives to people, mapped out as vulnerable and poor.

Citing one, the Togolese government weekly distributed tranches of funds to over 300,000 households and beneficiaries, affected by the lockdown [Ooko-Ombaka, et al, 2020].

Following the hatchet lockdown policy review in many African states, the continent's economy appears to be warming-up for a resurrection. But, despite the psycho-social feelings of optimism and pessimism about the lockdown relaxations, it is worth-noting that, the preceding days have witnessed hardship, sacrificed freedoms, halted businesses, closed enterprises, unwavering communal spirit and inexplicable perseverance while the tough times persist. As countries anticipate the peaking and dwindling of Covid-19 cases, this study identifies some macro-economic responses outside Africa, ignited by the Covid-19 pandemic vis-a-vis Africa's response capacity. The ultimate aim is to synchronize the series of responses with the economic circumstances of Africa, and thus, develop a post Covid-19 practical agenda that will convey the continent from a pandemic era into a prosperous area.

For instance, the G-20 has pumped out over 5 trillion dollars as targeted economic measures and fiscal policy globally. China equally lowered their reserves, freed over 70.6 billion dollars to inject their economy and announced over 150 billion dollars as aid globally. The European Union (EU) Bank publicized over 740 billion euros as support for the continent's economy. The South Korean mother bank released over 16.7 billion dollars and reduced its interest rate to 0.75% from an initial 1.25%. the "Bank of England" provided over 37 billion dollars at a reduced rate of 0.25% from 0.75% [AUC, 2020]. France disclosed over 333 billion Euros as the Covid-19 response while the World Bank announced 12 billion of dollars. As the list abounds, the International Monetary Fund (IMF) is also mobilizing 1 trillion dollars as its lending capacity for its members, with zero interest marginally detracted to about 10 billion dollars for low-income members [Georgieva, 2020].

But, as a single proof of Africa's incapacity for effective response, its biggest economy-Nigeria, is largely in debt, while its Central Bank could only afford a discouraging minimum interest rate of 5% on its stimulus package [AUC, 2020; 28]. Generally speaking, the initial forecast of 3.4% economic growth for Africa in 2020 has stashed into negative figures. Currently, the preventive travel restrictions from China to Africa, is accompanied by the attendant fall in importation of consumer goods from China. This situation has forced an increasing inflation in Ghana, South Africa, Angola and others. Also, the poor importers of Chinese electronics, household goods and textiles dwelling in Mozambique, Niger, Uganda, Nigeria and several others are largely economically depressed, as chances for livelihood has grown slimmer [Cascais, 2020].

Against the predictions of many bookmaker's, many optimists have expressed strong hopes that, COVID-19 fatalities in Africa, might endure and remain comparatively lower than what transpired in other regions globally. But, nevertheless, these three waves may not be avertable. The first wave is an intermediate drop in Chinese investment in Africa, and lower trade dealings. Countries like South Sudan, Mauritania, Zambia and others that have no replacement for Chinese engagements tends to be more affected. Secondly, the Organization for Economic Co-operation and Development (OECD) and EU countries (that captures about 50% of West

and North African economies); having witnessed a series of lockdown, will slump in demand for Africa's outputs or resources (OECD, 2020). Thirdly, intra-African and domestic trade within Africa may witness a continental supply shock due to travel restrictions and hampered intercontinental trade. However, the likely setback to the third wave is the impending shortage of purchasing power in Africa, since commodity-driven economic models do not create more employments nor improve people's well-being [AUC, 2020].

UNVEILING THE PRIGS PATHWAY FROM PANDEMIC TO PROSPERITY FOR AFRICA

The previous section has brought to fore, the virtual designs of Africa's drawing board for reawakening of its economy in a post Covid-19 arena. Indeed, the pandemic has downed the economy of African states, having witnessed inactivity for over a month. For example, as of March 2020, cancelled flights by national carriers like Kenya Airways, Egypt Air, South-African Airway, Air Mauritius, Air Madagascar, Rwanda Air and Air Maroc, all caused a loss of over 400 million dollars while the Aviation industry lost about 29 billion dollars, worldwide [UNECA, 2020]. In fact, Ethiopia's horticultural industry was forced to lay off 150, 000 workers after reportedly losing 11 million dollars [Ibid].

As more sauntering stories of exiting workers continue to drift across Africa, resultant of Covid-19, the PRIGS mnemonic is a conceptual envelope that suggests a post Covid-19 economic pathway for African countries. Explicitly, 'PRIGS' interprets as follows; Pulling, Recovery, Innovation, Growth, and Sustainability. This recommendation is strongly founded and themed on science, innovation and technology. Incidentally, the middle alphabet in PRIGS stands for innovation, which is equally the nucleus or core of this paper. Now, before unveiling the PRIGS pathway, it is crucial to briefly appraise how the Covid-19 has affected specific country sectors in the household context. Without this brief appraisal, discussing PRIGS might not make too much sense. Just to select few sectors, the pandemic has affected each country politically, socially, economically, culturally, educationally and health-wise.

Politically, African governments were ostensibly not prepared for Covid-19. So, the pandemic forced a constant and incessant policy deliberations and evaluations among the key decision-makers, on different issues, without compromising the peoples' rights and their wellbeing [Nuwagira & Muzoora, 2020].

Socially, the plural safety measures to prevent Covid-19 forbids gatherings, partying and even handshakes between individuals [UN DESA, 2020]. Thus, the way we greet and interact have changed. Social distancing, for example, denotes, individuals would have to communicate with one another, meters apart.

Economically, the multiple weeks of inactivity has ignited job losses, most especially, in private firms where their revenue is gone [Allen, 2020]. Many artisans and craftsmen have also

been idle, and faced with the duo-viruses of hunger and corona. Thus, indebtedness has been a major source of livelihood for households.

Culturally, the spirit of communalism was revived. Individual communities were coming together to contribute and care for the vulnerable people, acknowledging that, the governments of each country cannot do some things alone [Aneasoronye, 2020]. Such community spirit, long-lost since the days of the hunter-gatherer-bands, complemented the social palliatives provided by the government, corporate donations and the well-to-do individuals in each country.

Educationally, schools remain shut-down and pupils or students resorted to learning from their homes. Although, virtual classrooms were created online, which many explored, yet, intimacy- which aids absorption of knowledge- is lacking in online learning and consequently cannot be called a substitute for classroom settings [Li & Lalani, 2020]. However, there is value in preserving the distinction of physical class teachings, as the virtual classes only proved that education should be a 24-hour activity that does not start with sunrise and ends when sun sets.

Health-wise, the warped fragile health systems within the continent benefitted from a global injection of funds, health equipment, facilities, that empowered the setting-up of testing and treatment centres across the continent [Smith, 2020]. This sector, has undoubtedly sucked huge sums from each country's purse, either for remedial research, treatments and as payments or motivators for the health workforce. Yet, it exposed some insufficiencies and shortages within the African health sector.

Using the illustration of Africa as a baby, learning to stand and walk, the pandemic, by implication, pushed baby Africa back to the crawling level, ordering for a restart. As babies learn 'how to crawl' from the home settings, PRIGS is a home-grown template for Africa's rise, stand, and walk to prosperity. Recall, PRIGS implies Pulling, Recovery, Innovation, Growth, and Sustainability.

So, the first phase on this post Covid-19 agenda is pulling, indicating that, African governments need to pull a lot of resources, into the state. This involves a simultaneous pulling of financial and human resources. Primarily, each country needs to pull huge financial resources from the international and national level to uplift the country's human resources and consequently, its economy [Gandhi, Schaeffer & Madden, 2020]. Within Africa, the pulling agenda is radically ongoing and the financial missiles have been primed to light-up the economy.

For instance, the African Development Bank (AfDB) has unveiled 3 billion dollars as bonds to cushion the eco-social impact of Covid-19 on African economy. Afreximbank announced a three billion-dollar facility to shield member countries from the Covid19 storms [NM Partners, 2020]. Also, the Central Bank of African States (BEAC) approved over 152 million dollars for Central African states to support public projects while the central banks in each of the states jerked their weekly allocation to 9 billion dollars from 680 million dollars [AUC, 2020]. The Ivorian government announced 200 million dollars as its response while the Ethiopian government announced 10 million dollars to fight the pandemic. Equatorial Guinea committed 10 million dollars as an emergency fund while the Nigerien government declared 1.63 million

dollars as its response. In Eswatini, their Central Bank fixed a new interest rate at 5.5% from 6.5% while Bank of Algeria fixed the interest rate at 3.25%. The Ghanaian government declared \$100 million to demonstrate Ghana's preparedness and fixed its interest rate at 11.5 % from 13 %. Madagascar's government injected an initial 111 million dollars and a subsequent 53 million dollars as a complement. South Africa's Reserve Bank also adjusted its interest rate to 5.25% from 6.25% and also pronounced over 56 million dollars as a support plan for small businesses [AUC, 2020].

While the list of African Covid-19 responses continues to expand, this study breaks down a simplified analysis of how African countries with decentralized systems of government could approach the pulling strategy. For example, Nigeria's 2020 budget was finalized at 2.19 trillion naira, benchmarking 57 dollars as the price of a single oil barrel. But, the steep drops in oil prices and demand have placed the nation on budget deficit. Thus, Nigeria's finance Minister announced a cut of 1.5 trillion-naira in the nation's unnecessary capital spending [Onyekwena & Amara-Ekeruche, 2020]. Even, the gradual rising of Nigeria's external reserves will not retrieve the image deficit alluded to Nigeria and other countries alike, that are largely dependent on varying single sources of income.

Of course, there were huge inflows of funds into Nigeria as well the legislative approvals for borrowing more. For example, the European Union's 21 billion Naira, Germany's 5.5 million pounds, funds from China and others, in addition to the multiple domestic donations of over 29 billion naira to combat the pandemic [CGTN, 2020]. But, nevertheless, sub-levels of government within Nigeria need not wait for a probable disbursement of these intervention funds. The alternative is to explore the Central Bank of Nigeria's (CBN) stimulus package. The package includes a trillion naira or 2.78 billion dollars, fifty billion naira or 139 million dollars, and a hundred billion naira or 278 million dollars to be acquiesced by the manufacturing sector, SMEs and the health sector respectively (KPMG, 2020). The CBN intervention is accompanied by a downward review of interest rates from nine to five percent.

Therefore, the sub-national tiers of power within Nigeria, such as the states must bring the CBN arrangement closer to the people (individuals, private firms, organizations and industries) and if possible, provide bolster funds to mitigate the interest rates impact, while awaiting a probable disbursement of the intervention funds. The concurrent impact of this financial pull is the motivation of Osun State human capital and indirectly, the material resources. Recall that, people have been separated from their jobs or works for a long time [Onyekwena & Amara-Ekeruche, 2020]. The pandemic has not only caused a physical and social disconnection from their workplaces, but, also, a psychological disconnection that is worsened by stories of financial liquidation; given that, the preceding weeks have recorded a decline in individual and household's consumption, doubtful prospects for income and an erosion of savings, offshoring from the full and partial lockdowns across the country, and inductively, all African states. Therefore, pulling of financial and human resources for baby Africa is quintessential to make her crawl-up again.

In essence, the second phase on this post Covid-19 agenda is recovery. A staggering baby kicked down by Covid-19, has been pulled back to his feet. But, then, the baby will need to recover the lost confidence to keep standing and walking again. Likewise, recovery of what was lost during the pandemic becomes our next focus. Before the pandemic, the internally generated funds in many states across Africa are meagre and most times, reliant on external borrowings for executing the bulk of their budgeted agenda. But, taking a clue from the oil price impact on the oil-dependent economies, this study recommends an alternative venture. With or without Covid-19, the oil influence and attraction has been dwindling and fading respectively. For example, India and several countries are manufacturing electric cars that does not run on fuel [IANS, 2020]. Shenzhen, a Chinese province, was the first city in the world to replace all its buses with electric buses and it is in the process to replace its taxis as well. Besides, about 1.1 million electric cars were sold in China in 2018, representing 50% of the global automobile sales [McCarthy, 2020]. With a set-agenda to balloon the electric cars to other countries in few years' time, many countries have also been exploring alternative sources of energy, should oil die. So, it is imperative for states to plan living without the oil wealth.

From this standpoint, Africa's recovery programs must also explore its alternatives for revenues other than the oil-based wealth, and likewise, the non-oil dependent nations need to grow beyond the crude commodity-induced income. For over 90% of African states, the untapped gold mine is the tourism industry. For instance, Dubai (an oil-rich nation), realizing the vanishing attention on oil, has resorted to tourism and that sector alone granted Dubai \$30.82 billion in 2018 [McCarthy, 2020]. The beautification of Dubai (the second most visited city after Mecca) has made it for mandatory for travelers, especially, roadmaps that pass through the Middle East, to stop-over and behold Dubai's adorations. This has blossomed Dubai's tourism sector and without the oil, Dubai lives on. In 2018 alone, the British Museum attracted 5.3 million tourists, while 9.9 million tourists visited China's Great Wall, [Xinhua, 2020]. Lagos, a major West African business hub is also constructing a world-class city, solely for the purpose of generating huge revenues from tourism without the oil [1]. Whereas, Dubai's population is around 3.33 million more than Djibouti's 958,000 people, Gabon's 2.2 million people, Guinea Bissau's 1.8 million people and other less populated countries. For bigger populations, Dubai is more than Kenya's Mombasa City of 1.2 million people and marginally populated than Nigeria's Osun state of 3.7 million people [Latlong, 2020].

Using Nigeria as an example, Osun state, among others, is endowed with extensive tourist attractions that can yield voluminous revenues for the state. For example, the Erin-Ijesha water falls, Esa-Odo falls, Olumirin water falls, the Sacred Grooves around the state, the Omidiran Kayode and Mbari Arts gallery in Ife and Oshogbo respectively. Even, the Bauhaus styled Obafemi Awolowo University is described by a Switzerland-based Interior Architect as Africa's most beautiful campus. Such continental rating can be leveraged for tourism purposes [Stouhi, 2020]. Therefore, as the world is merely emerging from the shocking waves of Covid-19 pandemic, and the drums of recession beating fast and sounding reggae for Africa, the continent must take advantage of doorstep alternatives, whereby, tourism whispers breakthrough.

Truly, the global tourism sector is battling for life and the travel restrictions and border closure, as of March, 2020 has caused Africa a loss of 56 billion dollars. But, comparatively for the African continent, the tourism sector has only been selectively explored. For instance, in 2019, tourism generates about 2.6% of Africa's GDP, less than the 3.21 trillion Baht or 100 billion dollars that the sector generates for Thailand, that was 20% of Thai's GDP [TATnews, 2019]. Also, out of 71 million jobs that may be affected globally, 6.2 million jobs are mapped out in Africa. Apart from Seychelles, Mauritius and Cape Verde, where tourism accounts for over 25% of their calculated GDP, the tourism industry in Africa has not been elaborately commodified, and may appear as the novel alternative for tourists worldwide [IATA, 2020].

Arguably, many countries are yet to plan for tourism as an alternative income routes, but for most African nations, the beautification of the tourism industry appears naturally augmented. However, this recovery plan does not mean to undermine the other running productive sectors within the continent and their overwhelming contributions in each country. But, then, to break-even for an economist recovering from a bad debt, new revenue models must be added to the firm. For instance, over two-thirds of Africa's terrestrial spaces are cultivable and viable for agriculture. Nevertheless, Sub-Saharan Africa's food importation cost over 47 billion dollars, which includes 17.5 million dollars for cereals importation, 4.8 billion dollars on fish importation and so on [FAO, 2019]. Accordingly, agriculture alone may singularly not be advantageous for Africa's recovery efforts.

Furthermore, one-fifth of Tunisia's population are engaged in agriculture, but, the agricultural yields contributing one-twelfth of Tunisia's GDP shows a gap of either inefficiency in Tunisia's agricultural sector or the availability better alternatives to agriculture [Britannica, 2020]. Using same index of twelve, agriculture was expected to contribute eight-twelfth (two-third) of Nigeria's GDP, bar the ascendancy of oil. But, on the average of climatic variations, the tourism industry seems adaptable to any climatic situation and can be further rebirthed as quick revenue models for African states. The positive remark closing this recovery phase is that, baby Africa will not only be able to now stand, but also, will be ready to walk.

The third phase, and perhaps, the most important, on this agenda is innovation. Innovation incorporates artificial intelligence (AI), technology and scientific knowledge. Science and technology (S&T) is merely a knowledge in itself. But, the application of scientific knowledge and artificial intelligence to solve certain societal problems makes defines an innovation [Wignaraja, 2003]. Also, the integration of AI and innovations into existing sectors (education, agriculture, health and all others) in each African country increases efficiency and productivity. The opportunities and possibilities of a state is a function of its technological-innovations (technologies). This explains why developed nations place premium on technology. For example, Silicon Valley alone is worth \$275 billion and richer than more than half of all Africa countries [Pulkkinen, 2019].

Similarly, China has over 99 Unicorn startup companies that generates over \$1 billion as annual revenue. To demonstrate the vitality of innovation and technology in a nations' development for competitive advantages (rather than the military capabilities alone), China is

currently building Greater Bay Area- the largest Tech Hub, expected to outstrip the Silicon's dominant posture. Innovation and AI is the future of wealth, not oil or commodities. Furthermore, any nation that primes in technology and AI is in contention to effectively compete globally. Apart from the notable tech giants, emerging tech countries like South Korea, among others, recently employed AI robotics for measuring people's temperature and circulate hand sanitizers, battling pandemic with technology. Walmart also scrubbed its floors using the AI innovations. Amazon is set to launch AI that will sort, package and ship its products; an innovation that will replace human efforts and instructors. Financial advisors, robot Cooks, waitresses and fitness coaches are expected to hit the market later this year [3].

This study is not ignorant of this appraisal; comparing Africa, a chronic agrarian economy to the bests in the world? Of course, yes! Should Africa remain poor forever? On the basis of 'when independence was attained', many African nations are colleagues, if not, seniors to some of today's fast rising countries. The World Bank's estimate shows over 48.5 million people will slip into extreme lack or poverty in 2020, while 23 million of that figure will be from Sub-Saharan Africa (World Bank, 2020). In 2019, the gross debt of African governments equals 58% of Africa's GDP. In 2020, its debt-to-GDP ratio may increase from 58% to almost 85%. While larger economies like Egypt, Nigeria, South Africa, Ethiopia and few others may subtly weather the economic storm, the unsustainable debt lane spells shockwaves for exceedingly indebted nations like Cape Verde, Eritrea, Sudan and some others [IMF, 2020].

As the core argument herewith, this paper situates its analyses within the theory of technological-determinism. The theory premised promotion of technology and innovations as the drive for economic and social development. Furthermore, technological-innovation is credited as the governing force for effecting socio-economic progress [Smith, 1994]. Although, Adler agrees technological-innovation attracts positive changes. Yet, he otherwise argued that, technology handles social pressures discriminatingly and ignores some social challenges [2]. Likewise, Postman expresses a correlation between the wonders of technological-innovation and its negative consequences [Postman, 1998].

Nevertheless, the midpoint is that, the more technological advanced a country is, the greater their efficiency in pursuing economic development, and also, their ability to crush challenges which will always arise, with or without technological advancement. For example, the efficacy of everyday living in technologically advanced countries is widely far from the efficacy of life in areas where low emphasis is placed on technological advancement, most especially, in Africa [Sharma, 2018].

Just as it is globally on average, Africa's purse is under pressure. This is a time when Africa needs to rethink. What are the developed countries doing differently? How do we reflect the above analysis on Africa's post Covid-19 agenda? Looking at the way the pandemic affected Africa, this is the right time for Africa to think-tech. As physical businesses went on hold, virtual businesses and e-commerce thrived from online transactions. As schools were under lock, educative web and app developers, internet service providers and other e-learning entrepreneurs prospered financially, as pupils or students and teachers expended money on e-materials to

learn online. As social distancing restricted gatherings, video and audio-conferencing apps like Zoom, Microsoft Teams, Meetups, Ottei, podcasts and other webinar outlets flourished in dollars [UN Habitat, 2020]. So, running a digital economy propels an initiative or drive for Africa's prosperity. The proliferation of digitalized ventures would provide products of global utility and monetization of such ventures would yield overwhelming revenues for countries in Africa, either through taxation or ownership. Therefore, digitalization enhances industrial performance for companies in a diversified economy. It improves governance, business climate, transports, health and communication systems. Thus, Africa needs a wide-scale regulatory measure and data protection policies to scale-up its digital transformation [OECD, 2020].

Among the developing countries, Singapore follows China on internet usage. This motivated Singapore's government to award over 4.5 million dollars to facilitate the entry of small businesses into e-commerce. But, it's a different story in Africa. For instance, to show how important technology is on Africa's spending plans, Ghana's incorporated Ministry of Technology once allocated 0.25% of its GDP to the ministry's activities, while only two-fifth of that figure is planned for research activities [UNECA, 2003]. Asides that, the social media has penetrated widely in Africa. Six African countries ranked among the top fifty Facebook users in 2012. 15% of Africa's Facebook users are online compared to Asia's 11%. Morocco, South Africa and Kenya, among others, registered over 20 tweets/1000 people [IWS, 2013].

Interestingly, over 57% of the counted tweets came through mobile phones. 60% of total Africa's Tweeters aged between 20 years to 30 years. LinkedIn has over 5.7 million users in Africa, with Nigeria, South Africa and Egypt tope the user's ranking; 70% of the users aged between 24 years to 54 years. As of mid-2011, Nigeria's former president, Goodluck Jonathan had over 790, 000 followers, Tanzania's president had 45,000, Algeria's president had 25,000 followers. This data reveals African leaders are aware of social media's growing impact, yet, no homegrown continentally-scaled social platform survived. Competition and deficiency of support did not allow most African innovations thrive (UNECA, 2014). Some notable African startups that got trapped in Africa's unsupportive ambience include South Africa's Wabona and Mxit, Egypt's Bkam and Ousta, Nigeria's DealDey and GoMyWay, Ghana's Tress, Kenya's ConnectMed and some others [Digest Africa, 2019].

Frankly speaking, African countries have not shown slight seriousness on research, technology and its development. For example, Egypt's expenditure on research, technology and development was 0.68% of its GDP, while, Togo and Uganda spent 0.27% and 0.64% respectively on a similar agenda [UNCTAD, 2017]. Even more, Kenya's Vision 2030 may transform to a mere nightmare, if Kenya's government does align towards innovation and technology, which are the lubricants for a 21st Century digitalized economy. Innovation encourages indigenous solutions for public and private sectors. As research and development has proven integral to innovation advancements, governmental cooperation and boundless partnerships with academic institutions, private sectors, international partners and domestic investors must collaborate for efficiency and productivity in leveraging technology. Thus, Obama (2018) called for digital inclusivity and non-discriminatory access to internet and

technology across aboard. In Africa, business-to-consumer technologies remains shadowy, making up 0.5% of Africa's GDP in 2017 at 5.7 million dollars. Thus, UNCTAD (2018) clamored for an unparalleled investment on creating an ambience, conducive to technology and viable innovations, together with supportive regulatory policies from African governments.

In contrast, China understands the place of technology. Although, China's sit among the developing enclaves is debatable, yet, this study is sampling China as the richest among the poor or developing countries. China's radical transformation is validated by their amplified commitment to research and technology, evidenced by investing 1.5% of China's GDP on technology development, from an initial 0.6% between 1995 to 2008. Today, tech development is spreading from Beijing to Chengdu, Guangzhou, Shanghai, Chongqing and other cities [Campbell, 2013]. China's government promotes researchers, scientists and support cutting-edge technologies; the Spark Program in China underscores technology usage, even in its rural communities and counties. China's Ministry of Science and Technology (MOST) has financed over 150,000 tech-inclined developmental innovations. China's High-Tech Fairs also assembles tech users and developers periodically to reaffirm the centrality of Chinese innovation industry as the drive behind its blossoming digital economy. From 2018's figure, China's digital economy climbed by 20.9% to RMB31 trillion [Deloitte, 2019]. While that increase equates 34.8% of China's total GDP, Chinese products and innovative technologies are spreading globally. In fact, Brazil, Japan, South Korea, India and Russia are actively awakening their national innovation industries. On the global innovation landscape, China moved from 26th position to 14th position, between 2016 and 2019. Furthermore, China spends 2.1% of its GDP on scientific research and technology, thus, leading world's technological related publications [Deloitte, 2019]. Yet, China claims infancy in technological innovation and doggedly pressing to advance more.

Thankfully, the pandemic revealed to African leaders, some avoidable expenditure and new outlets of investment. For instance, government representatives may not need to consistently travel around, spending large sums on fixing discussions and meetings. As the Zoom app gained popularity, African countries must empower youths that can develop problem-solving trailblazing innovations and promote them for national, continental and global utility. Zoom's user base leapfrogged from mere 10 million users, as of December to over 200 million people within just five months. Greater than Zoom's score, Houseparty video chat technology witnessed a 1580% download rate growth just within March and April. Instacart, a grocery delivering all experienced a 540% rise in download [Dwoskin, 2020]. These few instances indicate the future of innovations and technology, just that, Covid-19 pandemic drew the future closer.

Currently, informal sectors of employment are competing with technological innovations. For example, 3-D prints are replacing weaving, machining and spinning activities in textile industries [Padhye & Nayak, 2015]. Gene therapy and nanotechnology are transforming healthcare services [Misra, 2010]. Computer-based learning systems are reshaping traditional classrooms [Eck, 2006]. Within January-April 2020 alone, Netflix (a digital company), generated 5.76 billion dollars from its consumers worldwide while Eric Yuan, the founder of

Zoom made 4 billion dollars in three months from his digital software for video conferencing (McKeever, 2020). We can only imagine what that revenue would imply for development, if it was founded and owned by an African country.

Also, while the low earners and middle-income stipendiaries grieve Covid-19's impact worldwide, tech giants such as top five American billionaires reported 434 billion dollar or 20% boost, just within two months. Bezos' net worth alone grew by 30.6% to 146 billion dollars while the top five combined moved to 3.4 trillion dollars from 2.9 trillion dollars. The ripple impact extends unemployment benefits for the millions that may have lost their employments, during the pandemic (Beer, 2020). Meanwhile, Africa's ring of richest people comprising oil moguls and non-oil business kingpins, lost billions [Okwumbu, 2020]. This thin parallel comparison between technology and Covid-19 impact, consolidates innovations and technology as wealth funnels, for countries that invest or endow in it.

It should be resounded that the ultimate objective of this paper is prosperity for African countries. Hence, digital technology and innovation is the global trend and this paper is making all efforts to compare Africa with some of best models, possible. No doubts, Africa has the capacity to actualize the recommendations raised on this third phase. The likely criticism is that, there would be job losses if technology takes over [Piachaud & Li, 2019]. But, rather not! Digitalizing Africa's economy would substantially redefine the nature of jobs and attract investment opportunities into Africa's humble estate. Moreover, what has the pandemic noticeably created in the job market, if not job losses and ululations in the private sector? Also, the future of traditional jobs is bleak, as companies are gradually adapting to the 21st Century economic settings. This explains why many private African investors and philanthropists (Angel Investors, TEF Connect, Anzisha Prize and few others) are relentlessly grooming thousands of startups and tech innovations annually. Yet, the gaps created by lack of governmental supports from many African administrations linger. For example, Anzisha, in partnerships with African Leadership Academy and Mastercard Foundation supports twenty brightest young Africans annually for a successful entrepreneurship journey. In 2018, Anzisha awarded 100,000 dollars to the twenty finalists; Kevin Edoorh from Togo, Aldred Dogue from Benin Republic, Alhaji Bah from Sierra Leone, Alina Karimamusama from Zambia, Awah Ntseh from Cameroon, Farah Emara from Egypt, Lourena Bindi from Angola, Mohamed Sherif from Libya, Vanessa Ishimwe from Rwanda, Richard Turere from Kenya and others [OFA, 2020].

Evidently, the little support these virgin startups enjoyed on their entrepreneurial innovations-on agriculture, businesses, farms, humanitarian services, health supports, rural electrification, -has helped them achieve more productivity and are scaling-up steadily. This paper deliberately dwelt more on innovation and technology, being the kernel and nucleus of this study. Now, baby Africa, kicked down by a pandemic is now back standing, and innovating alternative pathways to avoid any unwanted eventuality. Even more, Duerksen (2020) alarmed that, crushing the flames of Covid-19 in Africa relies on massive African innovations. For example, shortage or dearth of clean water has forced a 400-level African student to invent a solar-powered machine that eases handwashing in a needy community (Ibid).

Conjointly, the fourth and fifth phases after innovation are for “Growth” and “Sustainability”, which would be examined together. Innovation and digitalizing of Africa’s economy breed huge opportunities. Given the high boundless expectations that delving largely into tech-novation brings for African states, the attendant rise in Africa’s GDP equates growth. Economic growth is the increase in the money generated within a specific period of time, by a state, business or entity [Haller, 2012]. But, then, economic growth translates into development when there is a simultaneous improvement in infrastructural construction, social amenities and the people’s living standards. A scholar who shared his secret of sustaining growth once said, “when you make money, let your money be working for you”. That is, sustainability comes when the African government, reinvest the same or greater efforts and commitments into the sector that ignites the growth ab-initio [Demneri-Kruja, 2013].

CONCLUSION

In conclusion, Spencer Johnson’s “Who Moved My Cheese” explicitly captures the dilemma caused by Covid-19 and the implications for Africa. The big lesson is the need for change and that, anyone who refuses to change when circumstances call for it becomes extinct. The bigger lesson is that movement towards new directions helps us discover new cheese. The biggest lesson is that, the earlier we let go of the old cheese, the quicker we discover new and better ones [3].

No doubts, Africa’s cheese (both oil and non-oil commodities) appears to be fading. Agriculture readily comes to mind as the alternative. But, then, global trends, as discussed, has proven that, having a productive agricultural sector in this Century depends on the application of modern day technologies and innovations. In addition, discussing agriculture would be insensitive to the losses Covid-19 brought for an average African. Agriculture is also dependent on several factors including weather, manpower, markets and other factors. But then, this paper has vividly discussed the PRIGS as a realistic pathway that is expected to switch Africa from its pandemic predicaments into prosperity; Pulling, Recovery, Innovation, Growth and its Sustainability (PRIGS) is the model.

For Africa, our new cheese is innovation, capturing (science, technology and Artificial Intelligence). Since innovations are developed for application to solve problems. It is believed that an investment in technological innovations yields positively on all other sectors (agricultural, businesses, educational, health and so on). The recommendation goes thus:

The African governments should diffuse the stimulus packages closer to people in their countries. If the bureaucratic policies of any country’s mother bank appears delaying, mostly common in decentralized countries, the sub-levels of government may seek grants from international partners or supports from Africa Diaspora Investment Fund (ADIF) and others that attracts 3% interest, fairly cheaper than the any country bank’s package [3].

Secondly, African countries must create a Ministry of Tech and Innovation Development (MiTID) separately, directed by an efficient personality, that is specialized in technological ideation and innovation management and ruled by a Collegiate Executive consisting of “seven sisters”: Big Data, Artificial Intelligence, Edge Computing, Cyber Security, Internet of Things, Cloud Architect and Blockchain technologies.

Thirdly, each country in Africa needs to determinedly restart thousands of start-ups in innovations, technology and digital businesses that will scale-up and each startup will target the creation of over 20,000 jobs annually in the coming years. Also, Agriculture and tourism are two key sectors that would serve as a strong baseline for revenue attraction, while the government’s efforts on innovations progress towards commercialization stages.

In addition, African countries need to go into non-exploitative partnerships with all the relevant tech and innovation agencies deemed integral for technological-innovation advancement, while not relenting on efforts on agricultural sector and awakening its tourism sector. Tanzania’s self-sufficiency efforts on maize and rice production is commendable and recommendable for other African countries.

Similarly, Covid-19 may have relaxed AfCFTA’s implementation, hitherto fixed at July, 2020. Nevertheless, each country should progress on varying national plans towards liberalizing trade, productive transformation. Like a medium-to-long term plan, regional integration and alternatives developed through technology will eventually catalyst the AfCFTA agenda. This agenda is vital for building a resilient economic, political and human forte for unplanned future global shocks and challenges, such as Covid-19 [OECD, 2020].

Also, African countries need to create an environment that has the basic qualities, amenities and feasible for sustaining technology and innovations development. (Microsoft, Google, Amazons, Apple, Oracle, Facebook and other successful tech brands only survived within a supportive regime and space.

Lastly, this study recommends the African Union and its spinoff agencies should constitute a team of experts that is vastly informed on the development, evaluation and implementation of a “Technology and Innovation Promotion Agenda” (TIPA). The research is suggestive of specialists who have worked on tech, innovations and robotics, alongside international relations technocrats who can secure the necessary intellectual-property rights and patents for promoting the African label. Finally, the Covid-19 is a transit phase, and its enduring legacies must not be wasted, but painted for a positive rebranding of Africa’s future.

REFERENCES

1. Adama O. (2020). Slum upgrading in the era of World-Class city construction: the case of Lagos, Nigeria. *International Journal of Urban Sustainable Development*, 12 (2), 219-235, DOI: 10.1080/19463138.2020.1719499
2. Adler, P.S. (2006). *Technological Determinism*, Available at: <http://www.bcf.usc.edu/~padler/research/revisingTechnological%20Determinism.pdf>

3. Akano, T. (2020). Find "X" in the Covid-Tech Kingdom. Copied from <https://www.google.com/amp/s/www.thisdaylive.com/index.php/2020/04/29/finding-x-in-the-covid-tech-kingdom/amp/>. Accessed online on May 26, 2020.
4. Allen, T. (2020). 3 Bitter Truths About Coronavirus Job Losses And The Economy. Available at: <https://www.forbes.com/sites/terinaallen/2020/05/10/3-bitter-truths-about-the-coronavirus-job-losses-and-the-economy/#1fb3689467f9>
5. Amandla Ooko-Ombaka, Kartik Jayaram, Acha Leke, and Ying Sunny Sun, (2020). Finding Africa's path: Shaping bold solutions to save lives and livelihoods in the COVID-19 crisis
6. Aneazoronye M., (2020). AIICO feeds underprivileged communities as COVID-19 palliative. Available at: <https://businessday.ng/insurance/article/aiico-feeds-underprivileged-communities-as-covid-19-palliative/>
7. AUC/OECD (2020). *Africa's Development Dynamics, (forthcoming) 2020*
8. Beer, T. (2020). The Net Worth of America's 600-plus Billionaires Has Increased by More Than \$400 Billion During the Pandemic. Available at: <https://www.forbes.com/sites/tommybeer/2020/05/21/the-net-worth-of-americas-600-plus-billionaires-has-increased-by-more-than-400-billion-during-the-pandemic/amp/>
9. Bill Chappell, "COVID-19: COVID-19 Is Now Officially a Pandemic, WHO Says," National Public Radio, March 11, 2020. Available at: <https://www.npr.org/sections/goatsandsoda/2020/03/11/814474930/COVID-19-COVID-19-is-now-officially-a-pandemic-who-says>
10. Bingqin Li & David Piachaud (2019). Technological innovations and social development in Asia. *Journal of Asian Public Policy*, 12 (1), 1-14, DOI: 10.1080/17516234.2018.1546419
11. Britannica, (2020). Tunisia copied from <https://www.britannica.com/place/Tunisia/Languages> Accessed online on May 21, 2020.
12. Campbell Joel R. (2013). Issues in Technology Innovation; Becoming a Techno-Industrial Power: Chinese Science and Technology Policy, number 23, 2013, p5
13. Cascais, A. (2020). Coronavirus infects Africa's economy. Available at: <https://www.dw.com/en/coronavirus-infects-africas-economy/a-52620528>
14. Deloitte (2019). Rising Innovation in China, China Innovation Ecosystem Development Report, Deloitte, China. 4-7
15. Demneri-Kruja, A. (2013). Sustainable Economic Development, a Necessity of the 21st Century Article. *Mediterranean Journal of Social Sciences*. DOI: 10.5901/mjss.2013.v4n10p93
16. Digest Africa, (2019). 16 of Africa's most high profile startup failures of the past 10 years. Available at: <https://digestafrica.com/y-combinator-startups-africa-funding>
17. Duerksen M. (2020). "Innovations Needed to Prevent COVID-19 from Catching Fire in Africa's Cities," Spotlight, Africa Center for Strategic Studies.
18. Dwoskin, E. (2020). Tecg Giants are profiting and getting more powerful even as the global economy tanks. Available at: <https://www.washingtonpost.com/people/elizabeth-dwoskin/>
19. Economic Commission for Africa, 34-51. *EDUCAUSE Review*, 41(2), 16.

20. Erawatch (2012). Spark Program, Brussels: EU Commission, June 8, pp. 1-3. Available at: http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/cn/supportmeasure/support_0015?tab=template&country=cn (retrieved 2/23/13).
21. FAO. (2019). Food Outlook - Biannual Report on Global Food Markets – November 2019. Rome
22. Gandhi D., Schaeffer A., and Madden P. (2020). Africa in the news: COVID-19 impacts African economies and daily lives; clashes in the Sahel. Available at: <https://www.brookings.edu/blog/africa-in-focus/2020/04/11/africa-in-the-news-covid-19-impacts-african-economies-and-daily-lives-clashes-in-the-sahel/>
23. Georgieva, K. (2020). Policy Action for a Healthy Global Economy. Available at: <https://blogs.imf.org/2020/03/16/policy-action-for-a-healthy-global-economy/>.
24. GGTN (2020). China donates funds, medical supplies to help Nigeria's COVID-19 fight. Available at: <https://newsaf.cgtn.com/news/2020-04-18/China-donates-funds-medical-supplies-to-help-Nigeria-s-COVID-19-fight-PNxiZX6kOQ/index.html>
25. Haller, A. (2012). Concepts of Economic Growth and Development. *Challenges of Crisis and of Knowledge Alina Haller Economy Transdisciplinarity Cognition*, 15 (1), 66-71
26. Howard, B. (2020). African governments failing in provision of water and sanitation, majority of citizens say. Available at: http://afrobarometer.org/sites/default/files/publications/Dispatches/ab_r7_dispatchno349_pap14_water_and_sanitation_in_africa.pdf.
27. IANS (2019). How China can impact India's electric vehicle dream. Available at: <https://economictimes.indiatimes.com/industry/auto/auto-news/how-china-can-impact-indias-electric-vehicle-dream/china-is-the-biggest-market-for-evs/slideshow/71389193.cms>
28. ILO (2015). Five facts about informal economy in Africa, Geneva (Switzerland)
29. IMF (2020). Data Mapper: General government gross debt. Available at: http://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/OEMDC/ADVEC/WEOWORLD (accessed on 25th of May, 2020).
30. International Air Transport Association, (2020). Economics Chart of the Week, Havana, Cuba.
31. IWS (2013). Internet Penetration in Africa. Available at: <https://www.internetworldstats.com/stats1.htm>
32. KPMG (2020). Nigeria, Government and institution measures in response to COVID-19, Available at: <https://home.kpmg/xx/en/home/insights/2020/04/nigeria-government-and-institution-measures-in-response-to-covid.html>
33. Latlong (2020). Mombasa, Kenya, Available at: <https://www.latlong.net/place/mombasa-kenya-4229.html>
34. Li C. & Lalani F. (2020). The COVID-19 pandemic has changed education forever. This is how, Available at: <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>
35. Madden P & Coulibaly B.S (2020). Strategies for coping with the health and economic effects of the COVID-19 pandemic in Africa. Available at: <https://www.brookings.edu/>

- blog/africa-in-focus/2020/03/18/strategies-for-coping-with-the-health-and-economic-effects-of-the-covid-19-pandemic-in-africa/
36. McCarthy, N (2020). Dubai Is The World's Top City For Visitor Spending, Available at: <https://www.statista.com/chart/11299/the-cities-where-tourists-splash-the-most-cash/>
 37. McCarthy, N. (2020). Electric Car Sales Are Surging In China. Available at: <https://www.forbes.com/sites/niallmccarthy/2018/06/01/electric-car-sales-are-surging-in-china-infographic/#11babcdcd1f7>
 38. McKeever V. (2020). US billionaires boost collective wealth by \$406 billion as markets rebound in the coronavirus pandemic, report finds, Available at: <https://www.cnn.com/2020/05/01/us-billionaires-boost-wealth-by-406-billion-as-markets-rebound.html>
 39. Misra, R., Acharya, S., & Sahoo, S. K. (2010). Cancer nanotechnology: Application of nanotechnology in cancer therapy. *Drug Discovery Today*, 15 (19–20), 842–850.
 40. Nayak, R., & Padhye, R. (2015). *Introduction: The apparel industry. Garment manufacturing technology*, (pp. 1–17). Cambridge: Woodhead Publishing.
 41. NM Partners, (2020), Afreximbank announces \$3 million COVID-19 response grant for African countries, Available at: <https://nairametrics.com/2020/05/02/afreximbank-announces-3-million-covid-19-response-grant-for-african-countries/>
 42. Nuwagira, E., Muzoora, C. Is Sub-Saharan Africa prepared for COVID-19?. *Trop Med Health* 48, 18 (2020). doi: 10.1186/s41182-020-00206-x
 43. Obam D. (2018). Review of the National ICT master plan. Nairobi: Communications Secretary.
 44. OFA, 2018, Meet the 2018 Anzisha Prize Finalists: \$US 100,000 cash prize for Africa's Youngest Entrepreneurs. Available at: <https://www.opportunitiesforafricans.com/2018-anzisha-prize-finalists/>
 45. Okwumbu, R. (2020). Nigerian billionaires lose billions amid COVID-19 pandemic, Available at: <https://nairametrics.com/category/lifestyle/billionaire-watch/>
 46. Osakwe P. & Moussa N., (2017), Innovation, diversification and inclusive development in Africa, UNCTAD Publications, 22
 47. Postman, N. (1998). Five Things We Need to Know About Technological Change, Talk delivered in Denver, Colorado. Available at: <http://web.cs.ucdavis.edu/~rogaway/classes/188/materials/postman.pdf>
 48. Pulkkinen, L. (2019). If Silicon Valley were a Country, it would be among the Richest on Earth. Available at: <https://www.google.com/amp/s/amp.theguardian.com/technology/2019/apr/30/silicon-valley-wealth-second-richest-country-world-earth> (accessed on May 26, 2020)
 49. Sawlani S. (2020). COVID-19: Africa told to prepare for worst. What's the response? Al Jazeera News Media
 50. Shaban A.R.A (2020). Coronavirus: Buhari meets VP, Task Force; speaker warns Chinese envoy. Available at: <https://www.africanews.com/2020/04/12/nigeria-confirms-third-coronavirus-case-index-patient-fully-recovers/>
 51. Sharma G. (2018). Technological Determinism: Perspectives on Technology and Social

- Change, Faculty of Law, Symbiosis International University, Pune, India
52. Smith, S. (2020). Managing Health and Economic Priorities as the COVID-19 Pandemic Spreads in Africa, ACSS, Available at: <https://africacenter.org/spotlight/managing-health-economic-priorities-covid-19-pandemic-spreads-africa/>
 53. Smith M.S (1994), Technological Determinism in American Culture, in Does Technology Drive History?: The Dilemma of Technological Determinism (Merritt Roe Smith & Leo Marx eds., MIT Press).
 54. Stouhi, D. (2020). Obafemi Awolowo University: A Look at Africa's Most Beautiful Campus. Available at: <https://www.archdaily.com/931007/obafemi-awolowo-university-a-look-at-africas-most-beautiful-campus>
 55. Tats Newsroom, (2019), Press Releases TAT Press Releases 2019 Tourism revenue grows in Thailand's emerging destinations in Jan-June 2019. Available at: <https://www.tatnews.org/2019/09/tourism-revenue-grows-in-thailands-emerging-destinations-in-jan-june-2019/>
 56. The Economist (2020). "The Day the World Stopped: How Governments Are Still Struggling to Get Ahead of the COVID-19". Available at: <https://www.economist.com/international/2020/03/17/governments-are-still-struggling-to-get-ahead-of-the-covid-19>
 57. UC (2020). Impact of the Coronavirus (COVID 19) on the African Economy, African Union Commission, Addis-Ababa.
 58. UN DESA (2020). Everyone Included: Social Impact of COVID-19, Available at: <https://www.un.org/development/desa/dspd/everyone-included-covid-19.html>
 59. UN Habitat (2016). Based on data on Africa's Population Distribution from UN Habitat, 2016.
 60. UN Habitat, (2020). Live Learning Experience: Beyond the immediate response to the outbreak of COVID-19 Digital Technologies and the COVID-19 pandemic Briefing & Learning Note.
 61. UNCTAD (2017). Nairobi manifesto on the digital economy and inclusive development in Africa, Geneva: UNCTAD.
 62. UNCTAD (2018) (United Nations Conference on Trade and Development UNCTAD B2C e-Commerce Index 2018: Focus on Africa. Geneva: UNCTAD
 63. UNCTAD (2003). Africa's Technology Gap, Case Studies on Kenya, Ghana, Uganda and Tanzania, United Nations Publications, pp, 17-43.
 64. UNECA (2014). African Science, Technology and Innovation Review, 2013.
 65. UNECA, (2020). COVID-19 in Africa: Protecting Lives and Economies April 2020 Economic Commission for Africa, www.uneca.org, p. 11.
 66. Van Eck, R. (2006). Digital Game-based Learning: It's not just the Digital Natives who are Restless.
 67. Vanguard (2020). Coronavirus-positive man escapes from isolation centre. Available at: <https://www.vanguardngr.com/2020/04/coronavirus-positive-man-escapes-from-isolation-centre/>

68. World Bank (2020). The impact of COVID-19 (Coronavirus) on global poverty: Why Sub-Saharan Africa might be the region hardest hit. Available at: <https://blogs.worldbank.org/opendata/impact-covid-19-coronavirus-global-poverty-why-sub-saharan-africa-might-be-region-hardest>.
69. Xinhua (2020). Great Wall of China partly reopens to visitors. Available at: <http://global.chinadaily.com.cn/a/202003/25/WS5e7aa913a310128217281ba8.html>

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