THE FOURTH INDUSTRIAL REVOLUTION AND NIGERIA

A Policy Conundrum and High Stakes for the Future of the African Continent

By O.A. Ladimeji

Outline

This article argues that it is necessary to take into account political, cultural, and economic factors when evaluating potential responses to the Fourth Industrial Revolution (4IR). This approach is similar to that taken by Joseph Schumpeter, who argued for the essential relevance of politics, culture and economics (1942). This article begins by identifying past national Information and Communication Technology (ICT) policies in Nigeria and their impact or lack thereof. It then seeks to identify the nexus that controls decision making in respect of ICT and responses to new technology, as well as which aspects of policy have been successful and unsuccessful. Finally, the article discusses the opportunities and challenges presented by the 4IR, with a focus on what a successful policy response would need to include and what might be the necessary pre-conditions for success.

The Nigerian Government and ICT

The Nigerian government is aware of the importance of ICT: it holds regular conferences

and produces many policy documents related to this matter. A recent eGov conference held in 2019 focused upon utilising ICT to drive transparency, improve tax collection, and improve the provision of government services to citizens.

The History of Nigeria's ICT Policy

In 2002, the general view appeared to be that Africa was woefully behind in terms of ICT, and that serious government policy was needed to address the issue. Analysts wrote of a "digital divide" (Yusuf, 2005), and of a lack of basic access to equipment. At that time, a focus of academic energy was on government institutions, and the National Information Technology Development Agency (NITDA) was created to implement Nigeria's national ICT policy. Typically, the policy announced a series of goals but no specific means to achieve them. For example, it focused on the use of ICT in schools, but made no provision for appropriate training for teachers. Appropriate local content was not recognised as an essential requirement. Though the policy mentioned the importance of ICT, it had no specific goals or proposed directions.

Despite this inadequate policy environment in 2002, the use of ICT exploded. Policy discussions at the time focused on government or private sector expenditure. This reflected the dominance and capture of African academia, such that only two options existed in the minds of policy analysts: either the government controlled it and paid for it, or it was wholly devolved to the private sector.

It is useful to identify what led to the explosion in the use of ICT. Mobile phones and banking were the two areas that made the most impact on the population as a whole. Mobile phones provided considerable benefits in a society where the infrastructure of communication and travel was either lacking or very expensive. In the past, businesses in Lagos had to use private courier as a means of communication. Mobile phones and the internet overcame this issue by offering instantaneous communication options. There were also significant changes in banking, driven in part by the market but also by government regulation. The Central Bank of Nigeria (CBN) insisted that all banking data must be held locally, thereby creating the basic market for local cloud provisions. Other regulations by the CBN also drove deeper and effective digitalisation of banking services. In large part, it is these CBN regulations that kickstarted the fintech sector that is presently booming. M.O. Yusuf outlined several important steps in the development of ICT in Nigeria: "Maximising ICT potentials will involve quality ICT policy, greater involvement of private and public in the funding of the implementation, and proper implementation and monitoring" (2005). However, no mention was made of the role of regulation.

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Regulation

Policy advisers have overlooked the important role of regulation. Instead of basing policy around government expenditure, a focus on regulation would have achieved far more. The government is capable of making the provision of tablets and e-learning a precondition for school registration. To avoid the unnecessary closure of small or rural schools, the government could use its purchasing power to provide tablets to educational institutions at or just above cost, but far below market price. Such a policy would drive e-learning adoption without any net government expenditure. The policy analysts' focus on government expenditure (as opposed to regulation) made it easier for the government to get off the hook, as they were able to agree that some things should be done, but declared a shortage of funds. Policy analysts also failed to understand their own market. For instance, Audu wrote of Nigerian ICT policy and made recommendations which entirely ignored the place of markets and market mechanisms, economic incentives and the role of reward and competition (2017). Adomi commented on the fact that "very little progress has been achieved in policy implementation in Nigeria" (2011).

While the analysts recount the failures of implementation, there is never the suggestion

that these failures may reflect inappropriate or undeveloped policies. Adomi concludes that "there is a need for the government to ensure strict implementation of its ICT policy so the objectives can be fully achieved" (2011) – however, no suggestion is made as to how this is to be done.

Impact of Neo-Liberal Consensus/Structural Adjustment Programs on Policy Analysts

In the 1990s, the IMF stepped in to stabilise African foreign exchange and debt balances. As a result, major decisions were taken by creditors and international multilateral organisations, and then put into effect by local leaders. A side-effect was that policy analysts found that discussions and debate had become pointless: all that mattered was the decisions taken by the countries' leaders. This has essentially corrupted the policy makers'/analysts' environment and demoralised its participants. Central governments are perceived as all-powerful (rather than as weak) and control of the central government becomes the goal of policy makers. This mirrors the goal of multilateral agencies such as IMF and the World Bank, who prefer to deal with specific leaders.

Nigeria's Current ICT Environment

The United States Department of Commerce's International Trade Administration states that: "Nigeria exited a protracted economic recession in 2017, though the country remains Africa's largest ICT market with 82% of the continent's telecoms subscribers, 29% of internet usage, and about 11.8% contribution to national GDP in 2018. The Nigerian Communications Commission estimates that the country has over 64 million subscriptions on broadband (penetration of 34%) and 173 million lines in the voice segment as of March 2019, representing 91% teledensity. The Federal Government of Nigeria recognizes ICT as the enabler for developing other critical sectors, including agriculture and manufacturing" (2019).

It is clear that extraordinary progress has been made in the field of ICT in Nigeria, despite woefully inadequate government policy. However, for 5G and the 4IR, much will depend on appropriate and effective government policy. Success in spite of inadequate government policy may not be easily repeated in the future.

Nigeria's Policy Conundrum

Nigeria's policy conundrum can be expressed as follows: policies are announced without any indication of incentives or sanctions, or any evidence of market coordination. This has led to a tradition of policy announcements and policy documents that are in effect mere platitudes. To understand how this has come about, we need to look deeper at the cultural conflicts that exist in Nigeria.

Cultural Conflicts in Nigeria

There is a tendency to see cultural conflicts as merely synonymous with ethnic differences. While ethnicity plays a role in cultural conflict, it often disguises the true underlying dynamic. In Nigeria, there is a major cultural conflict between the political class and the business class. The political class is still culturally dominated by a landowner culture, which consists of landowners, farm managers, farm labourers and the farm (in sequence: politicians, business men, voters and the country). Farm managers are hired, fired and paid a salary, but are at the beck and call of the landowners. At the end of the year, there is a surplus that is available to the landowners to consume. This cycle naturally repeats itself. Then there is a business class whose dynamic is to make money, and whose members often deride the political class. From the present business class point of view, the role of the political class is to award contracts.

While there is this fundamental difference in the two cultures, they interrelate in practice. The political class becomes a rentier class on the state. It sees the national surplus not as capital to invest, but as surplus to consume, with the belief that there will be a renewed surplus in the following year, without any further intervention. This political class looks down on the business class as mere

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farm managers seeking a share of the surplus that fundamentally belongs to the political class, the landowners. This is evidenced by the widespread pattern of the political class awarding contracts but seeking an immediate payment of a significant share of the potential surplus in advance. This leads to businesses being unable to generate the surplus as capital for future investment. An arbitrary system of the award of contracts means that the greatest return on investment comes from political activity and networking. In turn, even the business class begins to have a low respect for managerial ability and to treat its own managers as lower-class farm managers available to be hired and fired and of little fundamental importance. Generally speaking, most business tycoons in Nigeria have been successful political operators and networkers, rather than introducers of major new management techniques or brilliant investment strategies. The exception of policy co-ordination between the government and the business sector in the case of Aliko Dangote is worth looking at in detail.

The Exception of Aliko Dangote

Giving a speech at Chatham House, Chief Olusegun Obasanjo explained how Dangote became Africa's richest man (Chatham House, 2017). Obasanjo was obsessed with the cement crisis in Nigeria. The country had all the ingredients to make cement, but was importing cement in large quantities, wasting foreign exchange and constraining the development of the country. He identified Dangote as a person with the appropriate business skills to tackle this crisis, and asked Dangote what would be required to start a domestic industry that eliminated the need for such imports. Dangote indicated that he could do this if he was given import protection while he developed capacity. Obasanjo discussed this with his officials and agreed to restrict annual imports according to Dangote's productive capacity. It then became government policy to allow imports only to the level that Dangote's own production could not satisfy local demand. As Dangote's capacity increased, so import allowance would also decrease, until there would be no need for any imports.

There are some very important elements to note in this case. Nigeria has often tried to encourage domestic production with import restrictions, but has in the past been met with the rentier behaviour of the business class, which focused solely on short-term profit making and not long-term investment. Secondly, business men in the past who have sought to engage in long-term investments have often found themselves subject to changes in political climate and government policy – often resulting in the bankruptcy of those who had invested heavily in the future. This inconsistency in government policy leads to the entire business class having a short-term focus.

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The exception in Dangote's case was the policy co-ordination between the government and the business sector. In this case, the policy co-ordination was between two people: Dangote and Obasanjo. As a result, the government obtained its goal to massively reduce the import of cement and Dangote became the richest man in Africa. Unfortunately, this policy nexus has been seriously misunderstood, as most Nigerian businessmen and policy analysts see it as "business as usual" – in other words, the common view is that Dangote became rich as a consequence of politicking, networking and politically motivated contracts. This was not the case – the key difference between this event and prior attempts was the existence of deep policy co-ordination between government and business, a priority given to management skills and an understanding of incentives. By restricting the import controls to proven capacity, the government gained control over possible rent-seeking behaviour and the worst aspects of a monopoly. The focus in Dangote's case was on long-term investment.

This story of successful policy rejects the neo-classical mantra of making policy at the centre and then leaving matters "to the market". In countries such as the US, Germany and China, there is close policy co-ordination and strategic matters are not

left to the whim of market forces. Government policies – through regulation, funding or supply contracts – are focused on driving the market in the strategic direction mapped by the state and as agreed with the business class.

Only a few policy analysts have focused on the exception of Dangote's case, what it says about policy making, and what it proves about the possible speed of market change in Nigeria in the event of good policy making. Obasanjo understood the critical importance of good management and that the landowner model was culturally inadequate. Obasanjo had a large-scale farm, and the challenges of this demonstrated to him the fundamental importance of management techniques. He sought to manage his own assets and, in doing so, learned important certain lessons. In contrast, many other politicians obtained large-scale assets, sub-contracted the management to independent managers and simply received "rent".

The 4IR and Its Opportunities

In order to understand the opportunities presented by the 4IR, we must now turn to the dynamics of ICT, investment cycles and the compromised situation of many foreign Western advisors.

The Importance of Legacy and Creative Destruction

Schumpeter believed that there was "a necessary symbiosis between economic, historical, political, social and all other elements of the process of the functioning and development of the capitalist world" (Croituru, 2012). He also highlighted the role of creative destruction in the emergence of new technologies. New technologies threaten to render existing infrastructure obsolete, whereas existing infrastructure can act as a brake for new developments. The greatest asset of new entrants is their lack of a past legacy. Many Western advisors, aware that Africa has a potentially competitive advantage due to its lack of legacy infrastructure as a late entrant, have cynically sought to impose a legacy infrastructure on Africa.

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In the early 2000s, the UK's Department for International Development (DFID) sought to raise money and send 1 million second-hand computers to Africa. I pointed out that it costs more to send 1 million second-hand computers to Africa than to send new computers, due to the high labour content and warranty expiry involved in second-hand computers, as contrasted with the high automation and decline cost curves available in new computers. The response to this criticism was an attempt to have me dismissed from UN agencies. As it happened, I did not work for any UN agency. As a City of London professional, I was outraged at this attempt to silence criticism. On the one hand, many foreign Western institutions are compromised when advising Africa, as they would be advising Africa on how to overtake their own country. On the other hand, many African academic institutions and personnel have been "captured" by this system and are incapable of providing independent policy (Ladimeji, 2019).

Education

In the field of education, it is now possible – if one starts from a green field perspective – to provide the latest education to the highest standard using a blended education model for $50 a year per child. I was involved in developing a model for modern education for out-of-school Syrian children, through UNESCO and UNHCR. A blended model involves children using tablets and AI systems that identify where the child is good, where s/he needs assistance and where the assistance may be urgent – the model not only alerts the teacher that the child needs attention, but indicates specifically with what (Oweis, 2018). Such a system would auto-pace itself according to each child's learning style, so that each child's experience would be personalised. Our model was met with immense surprise, was closely reviewed, and was found to be appropriate. Later, I mentioned this to a group at a Dell conference in Texas, only to have several Africans working at Intel explain that they were aware of this and had demo-ed a similar system to the Nigerian

government, who apparently did not appreciate the system's implications.

The costs of change would be dramatic for Western countries with established infrastructure, textbook producers and teachers. The opposite is true for countries who have little infrastructure, inadequate numbers of teachers, and poor and out-of-date textbooks – in these contexts, giving up text books for the latest online services and providing higher quality teaching for a larger number of students with fewer teachers would not involve any costs of change. An appropriate policy choice would be to design a system to adopt what will be available in the mid-future (as opposed to the near-future), given the lag time from decisions to implementation. Most of the world's educational systems are adapting to the provision of digital services, whereas Africa has the option of developing systems that are "born digital" and can therefore be far more radical in conception. In this scenario, Africa would go from having the least educational provision to having the best.

Health

In terms of health, the impact of machine learning will be extensive. In African countries, local clinics would be able to draw upon machine learning and AI to provide the best response to sub-critical events, as well as the ability to accurately identify conditions requiring critical services. Smartphones could be used to take pictures, record audio and report data, which would then be analysed by a learning engine. An appropriate response would be provided, extending high-quality services to remote areas. Working in collaboration with an existing AI player, African countries would provide extensive data, learning and test fields to catapult the quality of learning engines.

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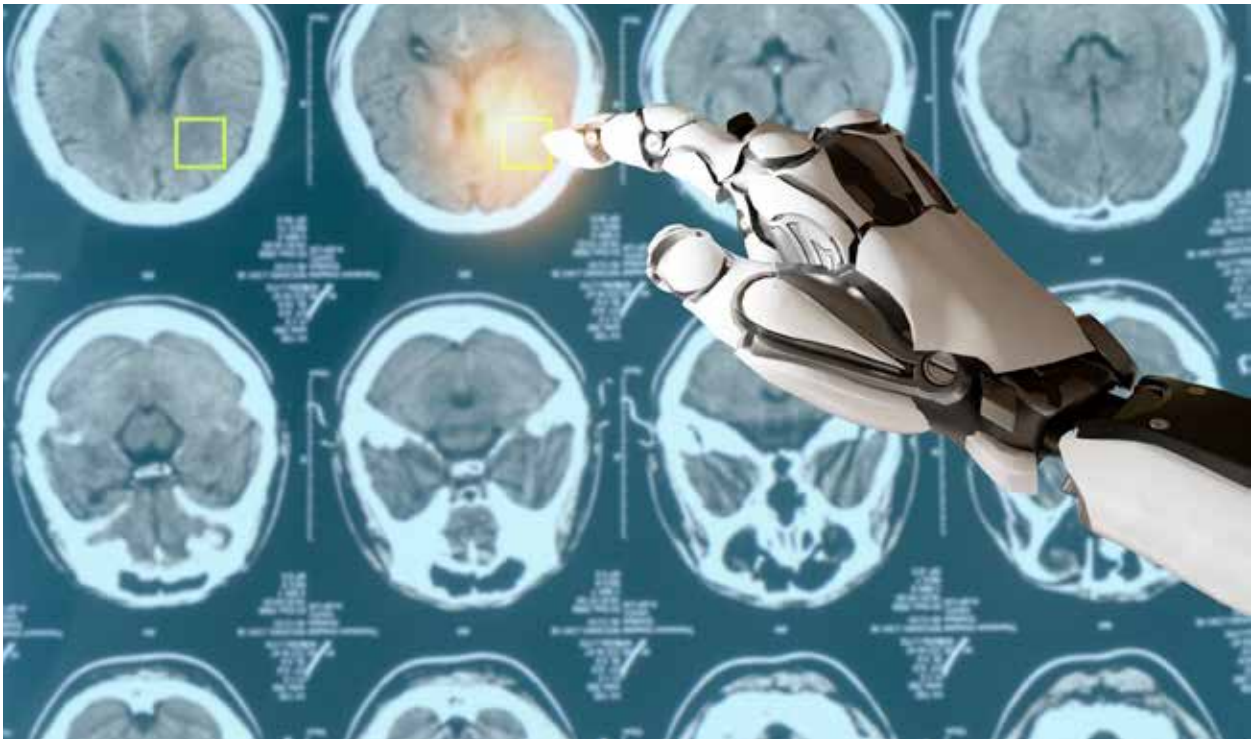
According to the Royal Society, machine learning requires big data and becomes the first step towards a full appreciation of AI and the emergence of the 4IR. They state: "In healthcare, machine learning could help provide more accurate diagnoses and more effective healthcare services, through advanced analysis that improves decision-making... A machine learning system



“This confluence of revolutions sets developing countries on a new “leapfrogging” growth trajectory that may not reflect how the United States, Canada, Europe, and other developed regions emerged... Most important, whereas these developing economies used to be mainly consumers of technology, they now are becoming producers.”

trained on tissue images was able to achieve a higher accuracy than pathologists...Moving forward, the potential for machine learning algorithms to assist doctors is substantial” (Royal Society, 2017).

Some of these opportunities for developing countries have already been identified: “This confluence of revolutions sets developing countries on a new “leapfrogging” growth trajectory that may not reflect how the United States, Canada, Europe, and other developed regions emerged... Most important, whereas these developing economies used to be mainly consumers of technology, they now are becoming producers” (Runde and Milner, 2019).

However, there is additional power in establishing all these technologies at the same time. Much of the core infrastructure technologies are capable of being repurposed at low costs, so that the potential network effects and synergies could be astounding.

Manufacturing and Capacity

It is essential that Nigeria should move away from the consumer model of simply purchasing assets. The 4IR is an opportunity to build productive infrastructure and government policy should be developed with this direction in mind. For example, while it is beneficial to make regulations requiring the use of tablets in schools, this should also be seen as an opportunity to ensure the local production of tablets, given that the government has created a guaranteed market. There is also the opportunity to set the groundwork for a maintenance culture, by requiring suppliers to offer maintenance contracts at reasonable prices.

Effects on Employment

In their early stages, new technologies can be surprisingly labour intensive. As China’s wages rise almost exponentially, other regional sources of low-cost labour are being sought. Africa, with its surplus of young labour, is well-positioned to supply a well-educated labour force for technology collaborations, specialising in those areas where large amounts of labour are required. Content creation for educational systems for Africa is entirely labour intensive and would generate large-scale employment.

Pan-African Context

One of the key factors in the cost model of ICT is high initial capital costs and very low marginal costs. In terms of distributing both costs and benefits, it is advantageous to consider projects of the 4IR on a Pan-African scale. While Nigeria can be largely self-sufficient, this would not be feasible for many smaller African countries. However, by Nigeria making its projects Pan-African in scope, a greater data scale is included, a larger talent pool is available, a wider cost-sharing pool is created, and network effects are available. African countries should compete collectively on the global stage, as opposed to primarily and directly against each other.

Policy and Competition

At the level of policy, it should be clear that tactical competitive issues do not belong in the public realm. If detailed competitive steps were outlined in a policy, other players and other countries could easily seek to make counter steps. Only a broad strategic profile belongs in the world of open policy.

Path to the Future

As previously discussed, there exists a cultural conflict in Nigeria between a political class that is primarily based on the landlord model, with many coming from aristocratic or semi-aristocratic backgrounds, and a business class that is divided. In the 1980s and 1990s, a large part of the business class who believed in long-term private investment was destroyed by structural adjustment and inconsistent government policy. Those business men who focused on seeking rent from government contracts prospered. The net effect is a coalition between a landlord political class and a rentier section of the business class. These models of conduct, where the surplus generated by a country or a business sector is

perceived to be available for consumption by the "owners", as opposed to being capital available for investment in the future, are fundamentally in conflict with what is required for either Nigeria or the African continent to respond to the challenges and opportunities of the 4IR.

The existing leadership class needs to change their model of governance or step aside. If they fail to do so, they will be a brake on the future development of Nigeria and will be risking its economic survival. The inevitable result of this will be to create a revolutionary situation. Political activists have already begun calling for dramatic political change. Omoyele Sowore, an activist and former presidential candidate, called for a revolution and was detained and only released after mass public and international protests (Sahara Reporters, 2019). At present, such calls for revolution do not have widespread support, but it is nonetheless significant that they are being made.

Summary and Conclusions

Just as Schumpeter argued, this article has demonstrated the significance of the inter-relations between politics, culture and economics in understanding the processes of important economic change.

The article has discussed how growth in ICT activity in Nigeria in the early decades of this century occurred despite government policy. There exists a fundamental cultural conflict between those who see the national surplus as funds available for consumption and those who see such surplus as capital available for investment in the country's future. With appropriate policy in place, however, astonishing and rapid changes are possible.

Any future policy related to the 4IR should involve formal government regulations, incentives and sanctions, the coordination of government, business and public support, and an acknowledgement of the primacy of management skills. The previous sole focus on government funding should be recognised as inappropriate, and a renewed focus should be placed on government regulation, management skills and strategic direction. If these factors are taken into account, African countries could use the 4IR to slingshot the continent into the future. ■

O.A. Ladimeji is the Editor of the African Century Journal.

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