The Thinker

SPECIAL EDITION:
African futures and the
Fourth Industrial
Revolution
PART 2

DU PREEZ AND SINHA ON
HIGHER EDUCATION
LEADERSHIP
**IN THE ERA OF THE FOURTH
INDUSTRIAL REVOLUTION**

EMILE ORMOND ON
THE ETHICAL RISKS OF AI

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In This Issue

NOTE FROM THE EDITOR

T he University of Johannesburg acquired *The Thinker* in April 2019 from Dr Essop Pahad. Over the last decade, *The Thinker* has gained a reputation as a journal that explores Pan-African issues across fields and times. Ronit Frenkel, as the incoming editor, plans on maintaining the pan-African scope of the journal while increasing its coverage into fields such as books, art, literature and popular cultures. *The Thinker* is a 'hybrid' journal, publishing both journalistic pieces with more academic articles and contributors can now opt to have their submissions peer reviewed. We welcome Africa-centred articles from diverse perspectives, in order to enrich both knowledge of the continent and of issues impacting the continent.

Prof Ronit Frenkel

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RETHINK. REINVENT.

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THE GHOST IN THE MACHINE

The Ethical Risks of AI
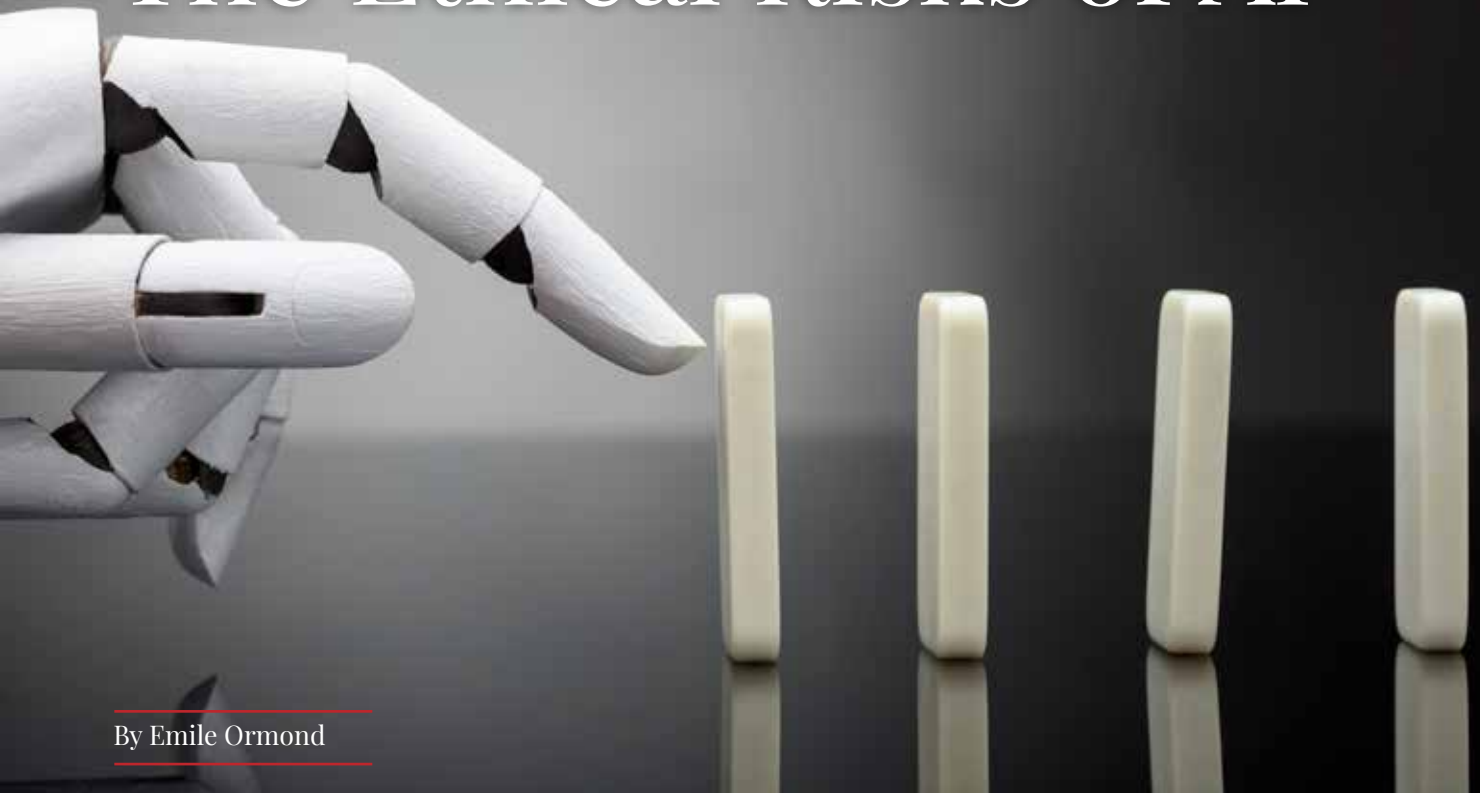
By Emile Ormond

A group of eminent scientists, including the late physicist Stephen Hawking, notoriously claimed that: "Success in creating artificial intelligence (AI) would be the biggest event in human history. Unfortunately, it might also be the last" (Hawkings et al., 2014). Remarks such as these often conjure up dystopian visions of killer robots enslaving humanity, or the redundancy of flesh-and-bone beings in a digitally sentient world. Either way, such notions distort AI's contemporary and subtle threats. Artificial intelligence may pose substantial long-term risks, but an existential threat is preceded by an ethical one – risk resides not only in the future but also in the present. Like their global peers, African policymakers need to consider the ethical challenges of AI. If they fail to do so, the continent is more likely to be a victim than a victor of the technologies underlying the so-called Fourth Industrial Revolution (4IR).

In this article, I will provide an introduction to AI and its impact, with a brief exploration of AI's major ethical themes, along with a more detailed discussion of machine bias. I will then outline some of the measures that governments and other stakeholders are taking towards AI-ethics. Finally, I will conclude with some suggestions for how African stakeholders can strengthen AI's ethical governance.

A Brave New Digital World

Artificial intelligence is a key component of the 4IR – the latter defined as a merging of technologies that blur the lines between the physical, digital and biological spheres – building on the digitally-driven Third Industrial Revolution (Schwab, 2016). Until recently, the digital revolution has relied on human beings to create software and analyse data, but recent advances in AI have recast this process (Kissinger, Schmidt and Huttenlocher, 2019). Experts argue that AI is best understood as a ubiquitous, general purpose technology – similar to electricity – that stretches over multiple

domains (Burgess, 2018). That is, AI (and its most popular subset, machine learning) is potentially applicable to any area that currently requires human cognition.

The reach of the 4IR, and AI in particular, is foreseen to stretch across the globe and eventually affect all sectors and professions (Schwab, 2016). Current notable examples of AI include Apple and Amazon's voice-operated personal assistants, Facebook and Twitter's personalised news feeds, and Google and Tesla's autonomous-driving vehicles (Marr, 2018). Outside of the technology sector, AI is used by firms for recruitment and performance management, by insurance companies to set rates, by banks to adjudicate loans and by health practitioners for diagnoses (Ananny, 2017; Easen, 2018). The use of AI is not limited to the tertiary sector; it can also be used in the primary sector – for instance, in the management of cattle herds in South Africa (Gavaza, 2019).

Studies have claimed that AI could serve as a catalyst for wide-spread economic growth due to, inter alia, productivity gains and spin-off industries. Globally, AI technology could stimulate a doubling of growth rates (Schoeman et al., 2017). Pundits predict that AI will see a strong uptake within Africa in coming years (Hao, 2019; Snow, 2019). In South Africa, the use of AI technologies could result in a two-fold increase in economic growth and boost company profitability by an average of 38% by 2035 (Schoeman et al., 2017).

For now, however, AI's use remains relatively nascent in Africa. A 2019 study in South Africa found that only 13% of corporates currently use AI technology; of the rest, 21% plan to do so within the next 12-24 months (Goldstuck, 2019). Furthermore, 99% indicated that they understand the benefit of AI and will need to use it at some point in the future (Smith, 2019).

Clear and Present Danger

"The real problem is not whether machines think but whether men do." – B.F. Skinner (psychologist, philosopher)

While AI has tremendous potential, it also presents significant challenges for organisations

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and authorities, particularly in the realm of ethics. Many African states are still grappling with the moral, social and economic consequences of the Second and Third Industrial Revolutions (Knott-Craig, 2018; Oosthuizen, 2019), and the gravity of this situation is exacerbated by policymakers who lack an understanding of AI technology and its vast potential impact (Stone et al., 2016; Royakkers et al., 2018).

Artificial intelligence has already played a central role in many prominent cases of ethical failure. A widely-known example is that of Cambridge Analytica, a data analytics firm that used machine learning, fuelled by illicitly gathered social media data, to influence US voters in the 2016 presidential election (Cadwalladr and Graham-Harrison, 2018). Another example is the COMPAS system, which is used by US courts to help assess the likelihood of a defendant becoming a recidivist. The system was found to systematically discriminate against non-white racial groups (Angwin et al., 2016). There are multiple less-publicised and more subtle examples that illustrate how ethical shortcomings in AI can be harmful to individuals and organisations, including infringements on laws and legal rights (Campolo et al., 2017; Fagella, 2018; Whittake et al., 2018; Larsson et al., 2019; Tufecki, 2019).

After an extensive review of relevant literature , I identified six key areas related to AI's near-term potential ethical impacts on the social world. These six areas can be divided into three non-mutually exclusive tranches. The first is related to risk inherent to the nature of AI (accountability, bias and transparency), the second links to the

I reviewed major academic databases, such as Ebscohost, using the following search string, adapted from Larsson et al. (2019): '("artificial intelligence" OR "machine learning" OR "deep learning" OR "autonomous systems" OR "pattern recognition" OR "image recognition" OR "natural language processing" OR "robotics" OR "image analytics" OR "big data" OR "data mining" OR "computer vision" OR "predictive analytics") AND ("ethic*" OR "moral*" OR "normative" OR "legal*" OR "machine bias" OR "algorithmic governance" OR "social norm*" OR "accountability" OR "social bias")'. The date range was 1 January 2015 to 30 July 2019.

real or perceived consequences of AI (autonomy and socio-economic risk), and the final tranche is related to the potential maleficent use of AI. These risks are not limited to AI, as they are also present to a lesser or greater degree in ancillary fields such as data science (Marivate and Moorosi, 2018). I have not included the ethical aspects of data management – ownership, consent and privacy – as these may be exacerbated by AI, but would be present even without it (Taddeo and Floridi, 2018).

Table 1. Near-Term Ethical Challenges of AI

Tranche 1 – Intrinsic	
1. Accountability	It is unclear who is accountable for the outputs of AI.
2. Bias	Shortcomings of algorithms and/or data entrench and exacerbate bias.
3. Transparency	AI systems operate as a "black box", with little ability to understand or verify outputs.
Tranche 2 – Consequence	
4. Autonomy	Loss of autonomy in human decision-making, deference and acceptance of AI systems to make decisions affecting humans.
5. Socio-Economic Risks	AI will result in job losses, and will entrench/ exacerbate income and resource inequality.
Tranche 3 – Utilisation	
6. Maleficence	AI can be used by illicit actors for nefarious purposes, including by criminals, terrorists and repressive state machinery.

Source: Author's own

Firstly, accountability relates to the intrinsic purpose of AI, which is to recreate aspects of human intelligence. Consequently, AI challenges the traditional moral and jurisprudence paradigms that assign agency exclusively to human beings (Davey, 2017; Tegmark, 2018). Secondly, AI – especially if fuelled through machine learning ¬– has also been accused of perpetuating socio-economic bias through outputs (e.g. through recommendations and decisions) that are based on biased data (Anderson, 2018; Larsson et al., 2019). Thirdly, due to AI's complex algorithm, transparency is compromised by the so-called "black box" phenomena – where the output of the system is unknown to even the system's designers or administrators (Etzioni and Etzioni, 2016; Pavaloiu and Klose, 2017).

Fourthly, human self-determination is threatened by increasingly ubiquitous AI systems that openly, but often inconspicuously, shape people's choices and actions (Taddeo and Floridi, 2018). This includes, for instance, the search engine algorithm that determines what results one sees. Fifthly, there have been predictions that the wide-scale adoption of AI will disrupt the global labour market and result in large-scale job losses and the entrenchment of inequality (Bossman, 2016; Miailhe and Hodes, 2017; Green, 2018). Lastly, like most other technology, AI can be abused by a range of legitimate and illegitimate actors. For instance, in the recent past, AI has been used to distort information for political ends (Jurkiewicz, 2018).

While each of the aforementioned issues is fertile ground for much deeper discussion, I will now focus on discussing the issue of bias, which is especially concerning within the African context.

Discriminating Machines

Bias in computer systems can be described as systematic and unfair discrimination against certain individuals or groups (Donovan et al., 2018; Smith and Neupane, 2018). In other words, bias deepens and entrenches existing social inequality and results in AI's benefits being unequally spread amongst different groups across and within countries (Stone et al., 2016; Kaye, 2018).

It is important to understand that data is the food that AI algorithms feast upon. The availability of large data sets is a key prerequisite of most forms of AI. The problem, however, is that data collection mostly occurs in the West and in China, while there is a data shortage in Africa (Microsoft, 2018; Marwala, 2019). The result is that the bulk of collected data does not accurately reflect the African experience, which means that many algorithms may not be properly tailored to the characteristics of local populations (Mahomed, 2018). An example of this

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problem can be seen in image recognition software that struggles to identify human faces with dark tones or erroneously labels black people as gorillas (Ananny and Crawford, 2018).

Bias in AI systems can take multiple forms but can be divided into system- and data-level bias (Anderson, 2018; Kaye, 2018; Larsson et al., 2019). System-level bias is present in several conditions. Firstly, it occurs when developers allow AI systems to confuse correlation with causation (Anderson, 2018) – for example, if a system determines a low-income earner's credit score by using the scores of his or her friends. The individual, who may otherwise be in a good financial position, would receive an undesirable score simply because his associates have credit issues. Secondly, system-level bias can occur if the system includes parameters for known proxies (Anderson, 2018; Pasquale, 2018) – for instance, education, income and area of residence are common proxies for race, especially in South Africa, a country with a socio-economic legacy of segregation. Lastly, at a structural level, the creators select which applications get developed and what features these applications will have (Smith and Neupane, 2018; Larsson et al., 2019). In other words, AI systems are not neutral or impartial systems, but rather are inadvertently value-laden products of those who created them (Campolo et al., 2017). As data scientist Cathy O'Neil pointedly put it: "Algorithms are opinions embedded in code" (2017).

Data-level bias also presents itself in several related ways. Firstly, any bias present in historical data, which is used to identify patterns, is merely reproduced in the output (Kirkpatrick, 2016; Microsoft, 2018). For instance, a system advising on university admissions, which is trained on historical data, will make recommendations related to the university's alumni (Anderson, 2018). Secondly, bias

can occur when the input data is not representative of the target population (Anderson, 2018). For instance, when facial recognition software, which was trained primarily with a data set of Caucasians, is used to recognise faces of various races (Pasquale, 2018). Thirdly, bias often presents itself when data is poorly selected (Anderson, 2018) – for instance, if a navigation application only provides directions for a motor vehicle and fails to include other options such as public transport and walking, which are options likely to be used by lower-income groups. Lastly, there is the danger of bias when data is outdated, incomplete or incorrect. It follows that the output of a system will be inaccurate if input data is not current, comprehensive and accurate (IBE, 2018; Smith and Neupane, 2018).

The impact of bias in AI systems is exacerbated by the fact that they are often used with the goal of balancing or correcting bias in the decisions made by humans (Donovan et al., 2018). Moreover, people generally have a misplaced confidence that digital systems operate fairly and in an unbiased manner (Smith and Neupane, 2018; Larsson et al., 2019). Often people are not even aware that bias has taken place, given that AI systems run as a silent background process (Noble, 2018). The reality, however, is that many systems codify existing biases or inadvertently introduce new ones (Donovan et al., 2018).

It is worth pointing out that bias is not always problematic; in fact, there are situations were one may want to encourage "legitimate bias" in a system's output. An example of this would be an AI hiring recommendation system that is calibrated to promote affirmative action. It could be argued that such bias is fair and socially desirable. However, these are normative concepts that need to be clearly defined by the parameters of the system and require consensus for what this practically entails, as programming social values is problematic due to their abstract nature (Coeckelbergh, 2019; Roff, 2019). The salient point is that AI is a product of human design and data, and therefore is not immune to the underlying – and often biased – values, beliefs and practices of the social world.

Where Angels Fear to Tread

"The danger is not that computers will begin to think like men, but that men will begin to think like

computers." – Sydney J. Harris (journalist, author)

Encouragingly, there appears to be a growing awareness of the ethical challenges presented by AI. Measures to address these include calls for adopting a multidisciplinary approach to AI, establishing an international legal regime and governments crafting strategic plans that address ethical issues.

There is an appeal at an overarching level for the AI fraternity to broaden its influence and considerations beyond its computer science and statistics origins in order to understand the technology's ethical facets (Agrafioti, 2018). The appeal is that AI needs to be approached and researched in a multidisciplinary manner, which will allow for a better holistic understanding and perspective on AI (Crawford and Calo, 2016; Cath, 2018; Dignum, 2018; Whittake et al., 2018; Coeckelbergh, 2019; Larsson et al., 2019). The social facets and impact of AI need to be better understood, as it touches on many different aspects of societal existence, including commerce, economics, law, philosophy, psychology, sociology and politics (Cummings et al., 2018). This approach is exemplified by the Fairness, Accountability and Transparency (FAT) focus in the development and utilisation of socio-technical systems.

There are multiple calls for an international, legally-sanctioned approach to the governance of AI (Underwood, 2017; Anderson, 2018; Groth, Nitzberg and Esposito, 2018; Jurkiewicz, 2018; Kaye, 2018; Medhora, 2018; Raso et al., 2018; Royakkers et al., 2018; Pielemeier, 2019). The implicit assumption in this view is that the boundary-less nature, broad scope and impact of AI means that a global approach is necessary to adequately address its ethical and legal dimensions. This would provide a range of rights, responsibilities and sanctions for AI's stakeholders, including consumers, companies, governments and international organisations.

This internationalist approach broadly consists of two views: firstly, the use or extension of current instruments and, secondly, the creation of new ones. The first and most popular view is to utilise existing international legal frameworks. The current human rights legal frameworks – exemplified by the UN Universal Declaration of Human Rights – provide agreed norms to assess and address AI's impact, as well as a shared language and architecture for convening, deliberating and

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enforcing an international legal regime (Anderson, 2018; Kaye, 2018; Medhora, 2018; Raso et al., 2018; Pielemeier, 2019). The benefit of this is that the statutes are already in existence and have broad consensus. However, the impact, implementation and respect of human rights regimes have long been questioned (Langford, 2018). The second view is that exemplar legislation on digital technologies should be expanded. For instance, it has been suggested that the EU's widely-praised General Data Protec¬tion Regulation (GDPR) legislation, governing the use of big data, should be extended to account for AI and should be adopted in other legal territories (Jurkiewicz, 2018; Coeckelbergh, 2019).

Several Western governments have in recent years released AI white papers or strategic plans that also focus on ethical challenges (Coeckelbergh, 2019). This includes Canada, the EU, France, the UK and the US. However, developing countries – with the notable exceptions of China and India – have overwhelmingly not produced similar plans. There have, however, been green shoots. For instance, in early 2019, South African President Cyril Ramaphosa appointed a 4IR Presidential Commission to devise a national action plan. While positive, the Commission's mandate does not explicitly include the consideration of ethical issues (Ndabeni-Abrahams, 2019).

Codes Necessary But Insufficient

A range of organisations, stretching across the private and public sphere, have drafted a plethora of ethical values and principles to guide the development and use of AI (Algorithm Watch, 2019; Winfield, 2019a), with claims that there are more than 70 publicly available sets of ethical principles and frameworks (Morley et al., 2019). The ethical codes vary in tone, language and style, but in terms of substance are mostly in agreement,
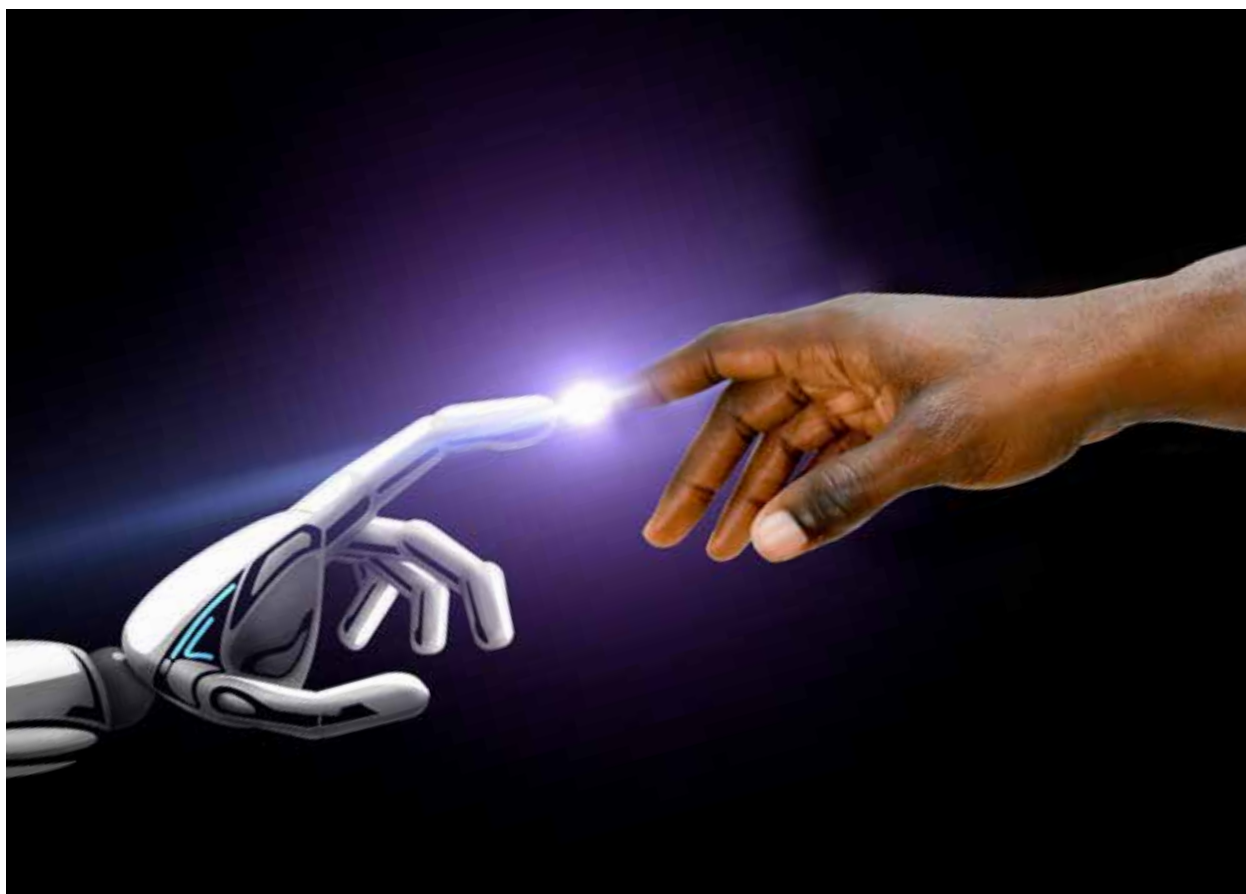
with a sizeable overlap. The documents broadly envision a human-centred view of AI, which sees the technology as having great potential that needs to be managed closely to limit its drawbacks and risks. Similarly, the underlying principles and values are largely aligned. For instance, Floridi et al. (2018) provide a synthesis of six AI-ethics documents and identify the following core underlying principles: beneficence, non-maleficence, autonomy, justice and explicability.

Scholars have praised the ethical codes as a necessary but insufficient step towards ethical AI. Moreover, there is little evidence to suggest that these codes have gained much traction in practice (Campolo et al., 2017; Winfield and Jirotka, 2018; Morley et al., 2019; Winfield, 2019b). Companies, in particular, are accused of (intentionally or not) using these codes for "ethics washing" – where the AI industry's ethics codes and practices are used to rebut the need for external regulation (Wagner, 2018). This has raised concerns that these ethics codes are little more than virtue signalling, which provides the appearance of ethical vigilance but lacks institutional frameworks or structures to

promote, monitor and manage ethics (Vincent, 2019). Relatedly, Greene, Hoffmann and Stark (2019) noted, in a study analysing the content of the codes, that AI ethical codes are "technologically deterministic". In other words, these codes presuppose the desirability and utility of the technology and consequently limit the ethical dialogue on AI from the outset.

Quo Vadis?

Where does this leave African governments and other stakeholders who want to harness the economic power of AI while also mitigating its risks? There are no simple solutions to the complex and dynamic ethical challenges raised by AI and other facets of the 4IR. There are, however, a handful of measures that stakeholders should consider:

· Educate societal shapers – i.e. state and corporate policymakers – to be au fait with AI. While an in-depth technical grasp is not necessary, there needs to be an understanding of the technological drivers and the risks these entail.
· Formulate policy that accounts for unique

African conditions, as opposed to merely importing policy from elsewhere. This means that the focus should not just be on making AI more ethical but, more fundamentally, on questioning whether AI is appropriate or desirable in certain social domains.

- Create a consolidated African Union policy position on AI – a prerequisite being national policies among the majority of member states. African countries will be better able to influence and set requirements for AI firms if they are unified and have standardised requirements.
- Institute standing, cross-governmental AI-working groups to integrate the technology throughout state machinery and policy. Artificial intelligence cannot only be the purview of a cohort of officials in one or two departments.
- Introduce legislation and industry incentives to encourage the protection and fair collection, storage and use of data in AI. This could build on existing laws, such as South Africa's existing Protection of Personal Information (POPI) Act.
- Appoint a digital ambassador to engage directly with technology companies. Several countries, most notably Denmark, have diplomatic staff who focus exclusively on technological actors.

In conclusion, there is a pressing need for the continent to formulate policy, build formal structures and create policymaker capacity to understand, monitor and shape the evolving ethical risks associated with AI in a pro-active and dynamic manner. While Hawking and his peers were rightly concerned with AI's long-term impact, Africans should not overlook its more immediate challenges. ∎

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Higher Education Leadership

in the Era of the Fourth Industrial Revolution

By Jaco Du Preez and Saurabh Sinha

Introduction

A number of universities in South Africa have taken up the quest for the Fourth Industrial Revolution (4IR). Universities like the University of Johannesburg (UJ) aspire to "dynamically shape the future", and the 4IR provides a perfect segue for this – the university's approach towards the 4IR catalyses us to shape graduates who are able to think differently and to distinguish themselves in this way. In particular, our focus has been on learning. Learning encompasses a blend of teaching, research and innovation in an era where even the fundamentals are shifting.

Through a considered process that took almost a year, UJ decided to contextualise its 2025 strategy for Global Excellence and Stature (GES) for the 4IR. This strategic or catalytic initiative has wide implications for the university's business, and in particular for the research-innovation nexus. The quest is to graduate students who are able to access and define new economic zones. South Africa's current focus is not only on the physical and urban economies, but also on the digital economy and the oceans economy, through Operation Phakisa ("hurry up"). The South African government has more recently extended these initiatives to the basic education sector. The digital economy brings about opportunities for creating jobs in a virtual environment, as well as new ways of combatting poverty. While it may be tempting to point out that one of the main culprits

behind the rise in income inequality worldwide is technology, this conclusion does not do the complexity of the problem any justice. Technology improves efficiency and creates avenues for wealth creation. The methods by which we utilise the benefits of these improvements can play a vital role in income disparity, as reported in an in-depth analysis of countries throughout Western and Eastern Europe with respect to technological change (Kharlamova et al., 2018).

The digital economy has, however, been around for some time. One could visualise the oceans and digital/data economy in an analogous way. In the ocean, for instance, there is much water, but most of this is not accessible for (say) drinking. The digital economy similarly has much data, but there are limitations that prevent making use of all this data in a meaningful way – as computing and communication technologies (wired and wireless) have yet to converge in a sophisticated way. Sophistication refers to the inclusion of advanced artificial intelligence (AI) systems utilising machine and, in particular, deep learning. The latter includes data fusion from various man-machine sources, and this will have privacy, security and other secondary implications. Advanced systems, such as traffic networks, may face the complication of a hijack and individual data breaches would routinely occur. Using technologies such as AI in a multipronged way refers to the 4IR and would allow for accessing and utilising data beyond offerings of the "traditional" digital economy (the Third Industrial Revolution). In the analogy of the oceans, it would be like accessing water (data) or aspects of the ocean (digital economy) that are yet to be harvested in a sustainable way. With that said, the importance of curbing the hype behind the alleged powers of big data and seriously taking into account its real world implications, such as privacy and information security, should not be brushed aside.

It is important to note that the digital economy has the potential of deepening inequality, unless a consideration of digital equity and equality is included as an "initial specification" in education and economic scenarios related to the 4IR. In the education scenario, inclusiveness must be a central focus in project and programme initiatives. Fortunately, younger generations (millennials and beyond) are a majority in the "Global South" and their energy, combined with the 4IR, could bring about a new kind of global renewal for equality. In the economic scenario, government must play a role in encouraging entrepreneurship by assisting start-up companies, supporting Small, Medium & Micro Enterprises (SMMEs), encouraging and driving investment in digital infrastructure, and guiding the adaptation of primary and secondary education to the new digital landscape. An example of such initiatives would be to incentivise the 4IR as an economic stimulus, with productivity gains gradually being taxed. The nature of start-up companies operating in highly competitive markets requires government to lower the barrier to entry and loosen the regulatory burden for small businesses. The situation is worsened in the case of the digital economy. The World Bank notes that it takes an average of 40 days to start a business in South Africa, compared to four days in the U.S. and five days in the U.K. As initiatives progress in parallel, education-economic thinking for inclusiveness would need to be central to the graduate's paradigm of thinking, as it would encourage economic participation and would enable previously unexplored horizons.

University students therefore have to be trained to reach a new level of digital astuteness, to access multiple thought domains through interdisciplinary activity, and to develop a mindset that aspires beyond the ordinary. The 4IR provides a perfect platform for this new model of education. A distinguishing characteristic of the 4IR is the effort expended to ensure sustainability, and an acute awareness of the social change that accompanies technological revolution. It can be argued that these changes occurred rather organically in the past, and were in part also a product of the rapidly varying geopolitical situation across the world (prime examples are the two World Wars, which accelerated technological and

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scientific development in addition to drastically altering global economic activity). In today's world, broadly speaking, things are more stable, and new technologies need time to be fully adapted and to produce their full effect.

It is by no means far-fetched to consider the higher education system as an industry in itself, given that it records about $380 billion worth of economic activity in the U.S. (Penprase, 2018). To this extent, the analysis of the education system in the context of the 4IR can be performed. This article first analyses the education paradigm in a historical context, given that there is much to learn from the joint advancement and interaction of technology and higher education, as evidenced in the previous three industrial revolutions. With the background established, we zero in on the unique situation in South Africa and discuss various opportunities where 4IR technology could be adopted in the process of propelling higher education into the next age.

The Effect of the First Three Industrial Revolutions on the Education Paradigm

Figure 1 provides a brief, visualised summary of the move towards Industry 4.0 and highlights some of the pertinent technologies that have come along with it. The utilisation of the 4IR technologies outlined in Figure 1 has been studied extensively for industrial and manufacturing applications (Perera et al., 2015), but recent

efforts in the education industry have also been promising.

The First Industrial Revolution abruptly highlighted the limitations of the educational system at the time, and it opened up a diverse array of new disciplines that could be pursued in educational programs. The New Education, as described by Charles Eliot (President of Harvard at the time), details a dramatic shift in the education paradigm, and universities across the world adopted the German model of postgraduate research (Hawkins, 1964). As a result, dozens of research-focused universities started to appear in the United States, and this model is still influential to how universities are operated today (Watson, 2010). The second half of the 19th century, a time period commonly associated with the Second Industrial Revolution, saw the emergence of electrically driven manufacturing technologies, leading to what was known at the time as a "new economy".

Significant improvements in access to higher education were achieved, which in turn produced a genuine leap in discovery by harnessing the possibilities brought about by technological revolution. The United States in particular saw a drastic increase in innovative institutions of higher education, driven by a combination of private and public funding (Penprase, 2018). Moreover, the Morrill Act of 1862 expanded the options for further study to agriculture, mechanical arts and
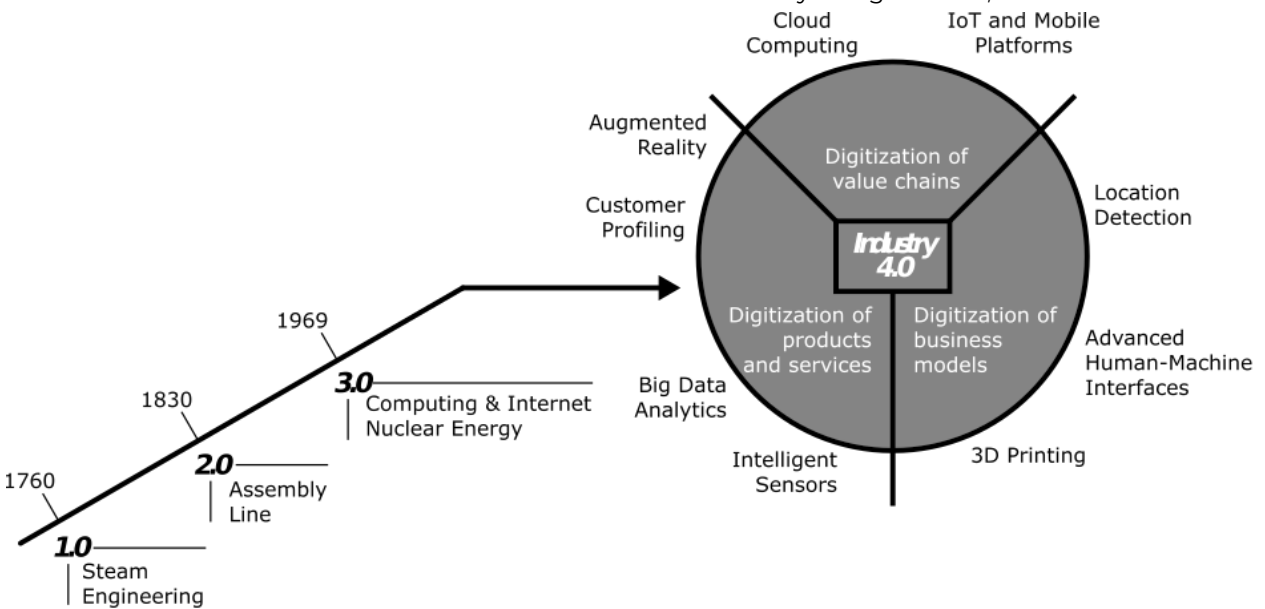

Figure 1. Pathway to the Fourth Industrial Revolution across time.

science and engineering, with the intention of opening up educational opportunities to the industrial class (Jolly, 2009). As a result of this and the previously-unseen profitability of new industries brought about by the revolution, institutions such as Stanford University and the University of Chicago were founded (in 1885 and 1890, respectively). Smaller colleges such as the Throop College (Caltech as it is known today) were also established during this time. The societal and economic changes were both a product of the revolution and a response to it. A role for women as an integral part of the academy and industry was cultivated by the prominence of co-educational institutions.

Given the recent emergence of the Third Industrial Revolution (which will loosely be described as the computer revolution of the later decades of the 20th century), the effect that it has had on higher education has arguably only been truly felt in the past couple of years. Countries across the world have been exhibiting increasing participation rates to higher education programs, and the globalisation of research efforts has further added to this effect. Moreover, the prominence of remote learning has increased substantially due to the availability of online courses – many of which are available from highly reputable institutions, such as the Open CourseWare (OCW) initiative from the Massachusetts Institute of Technology (MIT).

Education in South Africa

The problems facing our education system in South Africa are multi-faceted and should be approached as such. Among age groups from 15 to 64 years, the youth (15-24 years) bracket boasts the highest unemployment for all educational
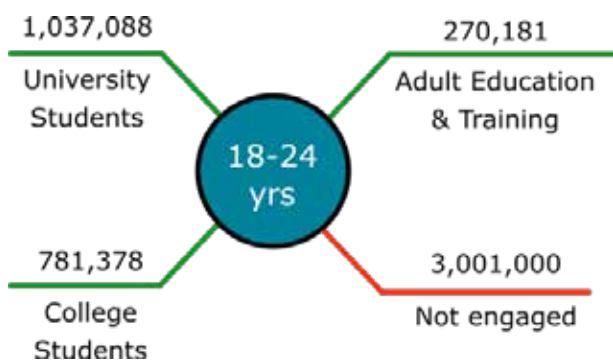

Figure 2. Summary of individual engagement in higher education for persons between 18 and 24.

> 66 Significant improvements in access to higher education were achieved, which in turn produced a genuine leap in discovery by harnessing the possibilities brought about by technological revolution. 99

levels (Stats SA, 2019). More than 30% of graduates of some or other form of tertiary education are not employed, while close to 60% of young people that did not graduate from high school are in the same boat. A breakdown of educational engagement for 18 to 24 year olds as measured in 2014 is shown in Figure 2 (Stats SA, 2019).

Figure 2 shows that 58.9% of our youth are neither employed nor engaged in any form of tertiary training, educational or otherwise. There are plenty of factors that contribute to these alarmingly high rates – resource availability and utilisation in primary and secondary schools, access to mother-tongue education, administrative and policy issues, and school infrastructure problems, to name but a few, and limiting the discussion to but a few paragraphs is nowhere near enough to do the issue justice (Legotlo and Wilfred, 2014). About half of individuals between 18 to 24 state that a lack of funding is the reason behind their inability to attend further education, compared to about 18% that indicated insufficient academic performance. The solutions that the 4IR could bring to problems such as accessibility to education could be significant, but they would rely on harnessing the many aspects of current and future generations of intelligent systems. A handful of initiatives are discussed in the succeeding section.

One of the primary challenges of the 4IR is the scarcity of qualified, trained personnel to spearhead the movement, especially in higher education (Baygin et al., 2016). As such, the importance of improving access to online resources, training material, courses and remote instruction cannot be overstated, as it will facilitate greater enrolment. Online universities, for example, are not burdened by the need for physical proximity and the maintenance of campus

infrastructure, although they do come with their own challenges with regards to infrastructure upkeep. The upcoming section will highlight some aspects of the 4IR that could greatly benefit young people who are eager to learn.

Applications and Educational Improvements Inspired by the 4IR

The subtle entry of machine learning techniques into our daily lives in recent years has truly enabled connected devices to operate as extensions of people, augmenting many ways in which they operate at home and at work. A new era of augmented intelligence is bound to drastically change current educational systems, and the success of the transition relies on efficiently manoeuvring technological changes. The trend of augmentation (as opposed to automation) will most likely continue in the education industry, considering the importance of human interaction and relationships during development. Higher Education (HE) forms an integral part of the 4IR, and HE4.0 (as it is occasionally referred to) will no doubt transform the education system for the better (Xing and Marwala, 2017).

An effective educational plan to cope with the 4IR must follow the example of the Third Industrial Revolution, which took a more hybrid approach to instruction and made a vast array of resources available on demand, even outside of scheduled hours.

Massive Open Online Courses

Massive Open Online Courses (MOOC) are a departure from the classical lecturing paradigm, where students are gathered in a classroom run by one or more lecturers. Removing the need for physical proximity to a lecturer and significantly expanding the reach of lectures presented are two primary positives offered by MOOC. The success of

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online training services such as Udemy, Coursera, Udacity and Skillshare (to name but a fraction of the selection available) clearly highlights the efficacy of these platforms. Courses are rated by users, but are generally not presented and evaluated according to any particular standard – an issue that should be addressed if such platforms are to be expanded to university- and graduate-level training. The Open University is an example of a successful online educational platform that offers degrees accredited by both the Middle States Commission on Higher Education and the Mid-Atlantic Region Commission on Higher Education.

Perhaps one of the greatest advantages of the online university, and for selected academic programmes, is the sizeable reduction in infrastructure and upkeep costs. With South Africa's higher education institutions reporting a reduction in capital expenditure of about 6% between 2015 and 2017, reducing the cost of providing tertiary education is crucial (Stats SA, 2018).

Remote Learning, Tutoring and Support

An integral part of MOOC, remote tutoring and support can also be leveraged in traditional teaching environments. Moreover, access to online discussion boards and remote support from tutors is, for the most part, significantly more efficient compared to traditional teaching environments. The online interface between students and facilitators opens up additional possibilities, such as translating written material into different languages. Natural language processing (NLP) can greatly assist in this regard, especially considering the amount of algorithm training material available. An extension of this is the translation of speech material into a suitable language. The usefulness of such an approach is of course subject to the characteristics of each particular language, but in many cases portions of the material that have considerable overlap between languages could be translated, whereas more technical aspects may not be translatable to begin with. With that said, NLP as a field is not mature enough to handle such complex tasks, seeing that lexical, syntactic, referential and pragmatic ambiguities – fundamental characteristics of language – are not yet properly defined within the framework in which NLP interprets language.

> ❝The profound proliferation of connected and affordable mobile devices, the widely available infrastructure for high–speed internet, and the abundance of quality educational content available online has drastically altered the delivery of educational services for the foreseeable future.❞

Automated Administration

Administrative tasks – such as grading, the collection and analysis of historical data, student administration and feedback – could benefit from the adoption of several machine learning paradigms. Tools such as *nbgrader* offer a standard interface through *Jupyter* notebooks that guide instructors through the grading process of a particular notebook. The tool is an example of an integrated grading solution that is used to release assignments to students, analyse results, collect submissions and provide a combination of automated and manual grading options. Another example is *Gradescope*, which is currently used in at least 500 universities worldwide. This service is capable of grading just about any subject (computer science, math, engineering, economics, etc.), regardless of whether the assignment is paper-based (i.e. with handwritten answers). In-depth analyses of each student, as well as the class as a whole, throughout the course of a semester can be generated easily. *Gradescope* also automatically groups similar answers, allowing instructors to grade multiple papers simultaneously.

Individualised and Adaptive Learning

Data collected from online portals, mobile learning applications, student assignments and other sources opens the door to a long-term analysis of each individual student that can be produced without much involvement from an instructor. All of this data documents the journey of each student, which allows the instructor to access key insights that almost certainly would not be available if such a task were to be approached manually. Like augmenting administrative tasks, this could allow institutions to service a larger number of students with critical instructive tasks. In an environment where outstanding instructors are limited, this could significantly improve the student intake without necessarily sacrificing quality. Furthermore, online material could be tailored to each student: by giving a proficiency goal at the end of a course, a customised pathway through the coursework can be recommended to ensure that students can progress at their own pace.

Improved Connectivity and Accessibility

The profound proliferation of connected and affordable mobile devices, the widely available infrastructure for high-speed internet, and the abundance of quality educational content available online has drastically altered the delivery of educational services for the foreseeable future. With mobile providers investing in 5G infrastructure, and the Department of Communications and Digital Technologies giving the go-ahead on initiating the rollout, internet access is bound to improve even further. Providers could partner up with universities (physical and online) to offer educational packages that would further improve connectivity for students. Collaboration between institutions in different hemispheres has become a reality with the support of the education cloud, which not only improves the quality of teaching but benefits research efforts in multiple different ways. In the 4IR paradigm, the student is seen as a customer who buys into a service with an envisioned outcome, and the service is designed to meet this outcome within certain restrictions – much like universities are accountable to accrediting agencies. Providing students with practical content outside of their normal framework greatly improves long-term understanding, and this is possible now more than ever with the connected nature of our lives. Independent online communities of academics, researchers and students have emerged, facilitating the exchange of experiences, findings and material.

Platforms have become a truly dominant approach to delivering services. They act as mediators between various groups (such as between users and advertisers, as is the case for most free-to-use platforms available today), providing the owners with vast information about user trends and habits. This, in turn, enables the continuous improvement of services and the

expansion of the target audience. The demand for enhanced performance measurement, internationalisation, competition, marketisation and innovation is driving universities towards an unbundling into multiple discrete services (Galbraith, 2018). These services can be catered for by a range of providers, and institutions can then package these services as needed. This creates an education-on-demand paradigm, which can be accessed (and accordingly monetised) by the student as required.

Conclusion

Accessibility to tertiary education remains a central problem in South Africa, from the perspective of students as well as instructors. Limited and expensive infrastructure, practical limitations in terms of classroom size and instructor workload, as well as the limited availability of quality personnel are some of the major problems that must be overcome. The somewhat rudimentary requirements for beginning to harness the educational benefits of the 4IR – such as low-cost smartphones and widely-available broadband internet – are readily available, and online learning is challenging the traditional notion of reliance on a campus-based university education in order to access higher learning opportunities. For us to realise the true potential of the technologies that have taken the world by storm in the 4IR, a new generation of trained and capable instructors must play their part in transforming institutions of higher education through a multi-disciplinary approach. The 4IR is changing every aspect of our lives and is transforming the world into a connected, augmented marketplace of ideas. As industries are gradually reacting and adapting to the 4IR, it is safe to say that the best is undoubtedly yet to come, and the opportunities for growth are up for the taking. It is, however, naive to ignore the challenges – technological and societal – that the new revolution poses, and we should be careful to not sacrifice hard-earned freedoms in the name of progress. An equally sophisticated effort must be directed at maintaining privacy, information security and freedom from tyranny. In Solzhenitsyn's address to the International Academy of Philosophy in Lichtenstein, he famously stated "No, all hope cannot be pinned on science, technology, or economic growth. The victory of technological civilization has also instilled in us a spiritual insecurity. Its gifts enrich, but enslave us as well. All is interests, we must not neglect our interests, all is a struggle for material things; but an inner voice tells us that we have lost something pure, elevated, and fragile. We have ceased to see the purpose" (1993). ∎

> 66 For us to realise the true potential of the technologies that have taken the world by storm in the 4IR, a new generation of trained and capable instructors must play their part in transforming institutions of higher education through a multi–disciplinary approach. 99

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The Impact of the Fourth Industrial Revolution on
Education in South Africa

By M.R. Pather

Introduction

The 4IR is not something that is being predicted – it is happening right now, here in South Africa and across the globe. Even if there are aspects not happening locally, globalisation will ensure that significant changes over which we have no control will influence such diverse activities as manufacturing processes, service industries, energy development, medical procedures and weapons production. This will result in disruptions to areas such as the economy and labour markets, producing positive outcomes for some, and very negative outcomes for others.

The 4IR pushes us to question what it means to be human in the 21st century. This question demands a firm response, not just from economists and business leaders, but also from schools and education authorities. Students at universities and other higher education institutions will graduate in the midst of the 4IR, and they need to be prepared for what this will entail. The 4IR must be humanised. UJ, for instance, has begun to address the issues of large classes by offering more online courses and hybrid courses, so

that disadvantaged students have access to university education.

Can technology enhance learning and teaching?

Universities can do several things when it comes to the 4IR. They can teach about the 4IR in their Science, Technology, Engineering, Arts and Mathematics (STEAM) classes. Students need to understand what is happening in the world around them, how it is happening and why it is happening. The 4IR is not a mystery, and its basic processes can be the subject of investigation, questioning and interrogation. As shown in the collection of subjects above, the 4IR is not just about technology, but also about the arts, and this includes social sciences, philosophy and the rest of humanities.

The 4IR technologies have significant social implications related to job creation, employment opportunities, equality, racialisation and the ongoing development of a fair and just society. Of course, students should be taught to understand the scientific basis of these new technologies, but equally, they should also learn about the social impacts that these will have. Students themselves should be taught to be innovative and creative when it comes to new technologies, but they should also be able to question the underlying values and what is right and wrong in the use of such technologies. Gene editing, roboticised workforces, and 3D-printed automatic weapons are examples of technological advances, but they also raise important questions about human values and how they might be preserved, in this brave new world.

Universities can also teach using 4IR technologies. Social robots have already been shown to be useful adjuncts in the teaching of students with certain special needs. A recent study identified over 300 academic papers that have explored the issue of robots in the classroom and educational contexts. AI can create databases of assessment items that can provide feedback to students on their learning progress. What is more, based on student responses, computers can generate new items that respond to a student's level of learning. 3D printers are already being used in some university systems, requiring design skills of a very high order to create new and innovative products. It is not too much to say that 3D printing

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has turned design education on its head.

Virtual Reality has been shown to work throughout different levels of academic learning, heightening subject engagement, enlivening teaching and facilitating learning. It can provide for independent and personalised learning, even in the context of a common curriculum, as students can dictate their own pace to move towards desired outcomes. Together, these 4IR technologies revolutionise what is meant by university education – providing opportunities to make it not only engaging, but also relevant and linked to the real world.

Universities also have an important role in preparing students for the 4IR. The key skills and values of creativity, critical thinking and problem solving have been widely endorsed and there should be nothing in the university curriculum that does not facilitate these skills and values. If computer coding can lead to innovative, creative and critical thinking in students, then it has a role to play in university education; if it is only about the routine application of rules, then it does not. A robot can apply rules – and therefore computer coding must contain elements that use human skills as well as technical skills. This raises a key issue. Along with the skills and values referred to above, there must be one other key component: the curriculum must teach students what it means to be human. It is essential to question and understand what makes humans human, and how to be more so: this is an essential complement to being a creative, critical problem solver.

How are we to get there?

Nineteenth-century universities cannot prepare students for the 21st century. Academics need to be equipped with new teaching methods and approaches, and new resources and funding are needed to transform education so that it can meet

the needs of the 4IR. Businesses and the South African government cannot plead poverty when it comes to equipping universities for this kind of education. The absence of resources will impede progress, and this will be to the detriment of the whole of society. In particular, it will affect the most vulnerable in society and those for whom universities are the only social safety net for 4IR-readiness. A key driver in 4IR-education is the social media revolution, embodied by platforms such as Facebook, Twitter, WhatsApp and Tencent. These platforms have revolutionised the way we communicate instantly across continents. Currently, more than 30% of people in the world use social media services to communicate and stay abreast of world events.

These innovations can create a true global village, bringing billions of more people into the global economy. They can bring access to products and services to entirely new markets. They can give people opportunities to learn and earn in new ways, and they can give people new identities as they see potential for themselves that was not previously available. These are important conversations, but in our context how do we ensure employment and improved livelihoods for the young people in South Africa begging at traffic lights? It may be useful to turn to other countries for examples – in China, for instance, an introverted newlywed uploads videos of hilarious antics onto social media. Thousands of Chinese people, young and old, view these videos, which act as a stress-reliever after a demanding work day. Young people are able to generate an income through uploading videos such as these, which improves their lives, as well as those of their extended families. South Africa's unemployed youth are talented, as evidenced – for instance – in the mimed shows that we see at traffic lights. These involve using Emotional Intelligence (EQ), more than AI, as the performers must predict what their audience will appreciate.

China's President, Xi Jinping, told a graduating class that EQ is "more important than IQ" and is a competence that should be pursued in the educational milieu (China Daily, 2013). The news made the front page of Chinese newspapers. It goes without saying that IQ also matters in achieving success at university. This argument applies to AI as well. We can describe AI as "stoic" – it does not vary in its performance, and

therefore is unlikely to be outstanding or below par. This feature of AI can be seen in the Google maps voice guide: while the voice is comforting, especially when driving at night, it is stripped of any emotion. Artificial intelligence requires human intervention and control, and this is when EQ is especially valuable.

The advent of the printing press allowed writers to produce their literature in mass quantities in a short amount of time, as opposed to writing each document by hand. Much like the printing press once did, the internet and social media have changed the face of journalism, film, television and the Humanities forever. In the past, the sharing of information always entailed some delay between the time an event happened and the time the information was presented to the consumer. Prior to the advent of television, we received the news through the newspaper. This form of journalism caused an approximate 24-hour delay, as it required writing the article, printing the newspaper and eventually delivering it to the consumer the next day. Social media ensures that a news article is received on a smartphone about as fast as the author can write it. The use of smartphones and social media has ushered in a new era of journalism, as net citizens play a bigger role in the process of news making. Through platforms like Twitter and YouTube, citizens can produce and circulate their own news stories, which are then often picked up by traditional news sources. Large news corporations used to have immense power over citizens, as they controlled the spread of information which they could use to influence the population. Nowadays, the internet allows citizens to share information amongst themselves more easily, which has led to a decline in the consumption of traditional news media. Social media has given power back to the people. Artificial intelligence, robotics, bioengineering,

> 66 The internet allows citizens to share information amongst themselves more easily, which has led to a decline in the consumption of traditional news media. Social media has given power back to the people. Artificial intelligence, robotics, bioengineering, programming tools, and other technologies are beginning to occupy key roles in higher education curricula in South Africa. 99

programming tools, and other technologies are beginning to occupy key roles in higher education curricula in South Africa.

The workplace competencies that independent studies have identified as distinguishing outstanding performers and leaders from the average person are largely based on EQ, particularly as you go higher up the organisational ladder. Online shopping and delivery services—including by drone—are already redefining convenience and the retail experience. Students are experimenting with designing and building drones, which would expand their entrepreneurial competencies. Ease of delivery can transform communities, even in rural areas, and boost the economies of small or remote areas. Digital technology can liberate workers from automatable tasks, allowing them to concentrate on addressing more complex business issues and giving them more autonomy. It can also provide students with radically new tools and insights to design more creative solutions to previously overwhelming problems.

What is the commitment of the South African government?

A Presidential Commission, chaired by President Cyril Ramaphosa, will assist the South African government to take advantage of the opportunities presented by the 4IR. Relevant policies, approaches and action plans will be designed, placing South Africa as a viable global player. A recent summit marked the consummation of a partnership between the newly-renamed Department of Communications and Digital Technologies (DCDT) and 4IR South Africa (4IRSA), which is an alliance between Telkom, Deloitte and the universities of the Witwatersrand, Johannesburg and Fort Hare. The partnership has extended to include global technology giant Huawei and local mobile communications company Vodacom.

Digital devices are now ubiquitous in modern societies, even though there is a significant digital divide both within and across societies. Those who have access to smartphones, computers and portable/wearable devices of different kinds have engaged with the 4IR, and daily living is constructed around these devices. Smartphones include cameras, platforms for multiple applications including banking services, games, access to e-mail, social media and methods of payment.

> **❝**Social media can erase borders and bring people together, but it can also intensify the social divide. Cyber-bullying, hate speech and the circulating of false news are some examples of the negative aspects of social media. We have to decide what kind of social media rules we want to establish.**❞**

What must we be wary about in the 4IR?

Social media can erase borders and bring people together, but it can also intensify the social divide. Cyber-bullying, hate speech and the circulating of false news are some examples of the negative aspects of social media. We have to decide what kind of social media rules we want to establish. We also have to accept that social media is remodelling what we value and how we generate and deploy those rules. The 4IR may have the power to change the world positively, but we have to be aware that the technologies can have negative results if we do not think about how they can change us. We build what we value. This means we need to be cognisant of our values as we create with these new technologies. If we value money above family time, we can build technologies that help us make money at the expense of family time. In turn, these technologies can create incentives that make it harder to change that underlying value. Our intricate relationship with technology means that the technological devices we develop are how we create our world, and we have to develop them with care. More than ever, it is important that we begin right.

"We have to win this race between the growing power of the technology, and the growing wisdom with which we manage it. We do not want to learn from mistakes." — Max Tegmark

Biotechnology can lead to controversial advances such as designer babies, gene drives (changing the inherited traits of an entire species), or implants being required for people to become competitive candidates for schools or jobs. Innovations in robotics and automation can lead to lost jobs, or at least to jobs that are very different and value different skills. In addition, being constantly connected can turn into a liability,

> "The lessons of previous industrial revolutions include the realisation that technology and its wealth generation can serve the interests of small, powerful groups above the rest. New technologies built on global digital networks can be used to keep societies under undue surveillance, while cyberattacks make us vulnerable to physical and verbal abuse."

with no respite from the continuous overload of data and connections. The lessons of previous industrial revolutions include the realisation that technology and its wealth generation can serve the interests of small, powerful groups above the rest. New technologies built on global digital networks can be used to keep societies under undue surveillance, while cyberattacks make us vulnerable to physical and verbal abuse. These are some of the challenges we face in our attempts to ensure that technology and politics do not create disparities that hinder people.

According to the World Economic Forum Global Risks Report 2017, the 4IR has the potential to raise income levels and improve quality of life for all people. In the context of South Africa, these promises are reminiscent of electioneering slogans. Against a backdrop of load shedding, rampant poverty and erratic connectivity, we recognise that the improving of lives in the 4IR will be slow. In South Africa, the economic benefits of the 4IR are becoming concentrated among a small group. This increasing inequality can lead to political polarisation, social fragmentation, and a lack of trust in institutions. To address these challenges, leaders in the public and private sectors need to have a deeper commitment to more inclusive development and equitable growth that lifts up all people. The "digital revolution" has already changed people's lives in many ways, with technological devices supporting and supplementing basic human functions. However, even though phone companies continue to upgrade and refine their products – with better cameras, better wearable devices and larger processing capacities catering for what often seems like an infinite number of applications – this is often product enhancement, rather than innovation.

The 4IR, on the other hand, is much more than the production of powerful devices. Like the digital revolution, the 4IR relies on technologies, yet these technologies have the capacity to perform what have until now been considered human tasks. These might be robots capable of giving directions at a railway station, or assisting with medical procedures, or interacting with autistic children in classrooms. It could be 3D printers capable of producing body parts, weapons or even houses. It might be driverless cars. It might be computers that do not need to be continuously programmed, because they can re-programme themselves based on the data they collect. This big data can make predictions about anything, from identifying the optimal marketing strategy to who will win an election.

Conclusion

Many people in South Africa are ambivalent about the technological implications of the 4IR. Films like *I, Robot*, *Star Wars* and the like only exacerbate this fear. Kathleen Fitzpatrick explains that techno-pessimism arises out of a blindness "to signs of literary culture's continued proliferation, including the increasing number of devices, platforms, and services through which we read today" (2012). She further avers that this kind of apprehension about technology is nothing new. The Greek philosopher Plato maintained that writing would produce forgetfulness – if you can write things down, there is no need to remember them – while the English poet Alexander Pope described the invention of printing as a "scourge for the sins of the learned" (Fitzpatrick, 2012). The 4IR is changing our educational environment, and we need to embrace this change and evolve.

This argument relies on an analysis by Kerry J Kennedy – "Another Industrial Revolution: what schools need to know" – first published in the Daily Maverick on 25th February 2019. ■

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THE FOURTH INDUSTRIAL REVOLUTION

Another Industrial Revolution Leaving Black Women Behind?

By Malaika Mahlatsi

In 2016, Klaus Schwab – founder and Executive Chairman of the World Economic Forum (WEF) – introduced a term that would have significant consequences for global politics, economics, science, and the way in which the world is organised. The Fourth Industrial Revolution (4IR), according to Schwab's book by the same title, would be different in scale, scope and complexity from any that the world had seen before. This fusion of advances in complex technologies, including but not limited to robotics, quantum computing, blockchain, artificial intelligence (AI) and the internet of things (IoT), would affect all disciplines and industries of the modern world. It would reconstruct space, economies, governments and even challenge existing ideas about what it means to be human (Schwab, 2016).

The world was excited, and both developed and developing countries were swept into the frenzy. South Africa became deeply invested in cementing itself at the centre of this revolution, with government and the private sector dedicating over R30 billion to research and development (Department of Science and Technology, 2017). But while discourses on the 4IR are locked in the domain of politicians and captains of industry, its consequences extend to ordinary working-class people in our country. For this reason, it is crucial that these ordinary people be centred in this discourse, not as mere spectators, but as participants in a revolution that could, if not well managed, leave a vast majority of the largely poor working-class population behind.

Using a Black feminist philosophical perspective, this essay aims to analyse the ways in which the 4IR could perpetuate existing patterns

of racialised and gendered inequality. The essay demonstrates how the failure to meaningfully transform education and the segmented labour market will set parameters for an industrial revolution of the elite. It contends that the digital inequality paradox must be resolved through the redress of systematic challenges confronting our democratic dispensation so that, ultimately, Black women are not alienated from these inevitable technological developments.

Industrial Revolutions as Processes of Working-Class Exploitation

Like all preceding industrial revolutions, the 4IR transcends industry, science, technology and economics. While prevailing discourse presents them as isolated, these fields are interdependent structures that evolved historically. This necessitates that we engage the 4IR as both an industrial and an ideological revolution. Fundamental to understanding the importance of grounding discourse on the 4IR in ideological analysis is an appreciation of the historical developments that have led us to this revolution. As such, my starting point is to trace a barometer of the industrial revolutions that have occurred throughout history, in order to situate the 4IR within a broader ideological context.

Linked to this, I want to demonstrate how industrial revolutions have, throughout history, involved working-class exploitation and oppression. This is done in order to contextualise the salient argument of this essay: that the 4IR could potentially perpetuate inequalities and further disenfranchise the poor working-class majority across the world.

The foundational industrial revolution, referred to as the First Industrial Revolution, was characterised by a change from an agrarian economy to an economy based on industry and machine manufacturing. This process started in Britain in the late 18th century, before spreading to other parts of Western Europe and the world. The feature of this revolution was not only technological, but also socio-economic and political. The technological changes that included the use of new basic materials and the invention of new machines impacted the sociology of work. The increased production that led to decreased expenditure of human energy resulted in the development of the factory system that led to the specialisation of functions and the

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division of labour. This marked the early stages of global capitalism and, simultaneously, laid parameters for colonialism.

The link between the First Industrial Revolution and colonialism is pronounced. The increasing application of science and technology to industry enabled the mass production of manufactured goods. But the manufacturing of goods at this scale needed a huge supply of raw materials and natural resources. The acquisition of these was facilitated through the conquering of countries that were rich with minerals and natural resources – a significant amount of which are located on the African and South American continents. These are parts of the world that were systematically underdeveloped, and which today we refer to as developing countries.

While colonised countries in Africa and South America were used as large agricultural factories to feed the growing populations of industrialising countries, Western Europe itself was experiencing a decline in land as a source of wealth in the face of rising industrial production and international trade. The modern phenomenon of urbanisation gestated during this period as new cities were established in industrial and manufacturing nerve centres such as Manchester in the United Kingdom. This rapid urbanisation had implications not only for the urban landscape, but for the very nature of work in the newly developed industries.

As more factories were built, the demand for labour grew. With the decline of the agricultural economy and migration into urban spaces, there was a long line of people, many of them unskilled, willing to do the difficult work. Working conditions in these factories were appalling. According to the literature, factories were a health hazard characterised by overcrowding and dilapidated infrastructure. But another feature of modern capitalism had begun to emerge: the

super-exploitation of workers by those owning the means of production. Not only were workers underpaid, but the exploited labour also included children (Humphries, 2010). Additionally, women received even less wages than men – a feature of the capitalist labour market that exists to this day.

The Second Industrial Revolution was not radically different in its exploitation of both working class people and natural resources. Beginning in the 19th century, this revolution was also characterised by a modern industry that exploited natural and synthetic resources. A key characteristic of this revolution was the development of new energy sources. It was in the Second Industrial Revolution that we saw an expansion of electricity, steel and petroleum. With this came radical developments and technological innovations that set parameters for the massification of international trade as we know it. But where the First Industrial Revolution led to precarious employment, the Second saw increased levels of unemployment as machines began to replace workers and other forms of fixed capital become antediluvian. This happened alongside rising levels of hunger as cash crops replaced traditional crops grown for subsistence.

Exploitation in the Second Industrial Revolution became grander in scale and, in many significant ways, it was this revolution that cemented the march of imperialism. M Shahid Alam, Professor of Economics at Northeastern University, contends in his study on colonialism and industrialisation that imperialist policies in colonised and dependent countries, largely in Africa and Latin America, worked to concentrate gains from export growth in the hands of foreign factors (1998). This is to say, the underdevelopment of colonised nations was facilitated by European imperial superpowers who repatriated incomes generated from exports of the raw materials of colonised countries to the metropoles. This underdevelopment of African and other countries had devastating effects on women.

Several studies of women's work during this colonial and imperial period, including the seminal work of Iris Berger, demonstrate that the introduction of cash crops led to women losing economic autonomy (2003). In addition to this, the exclusion of women from the global market ensured that international commerce completely benefitted men, who beyond having an unfair footing in this labour and business market, were also able to rely on the unremunerated labour of women. This was especially pronounced in African societies where gender relations had shifted to reflect the heteronormative patriarchal power relations imposed by the European patriarchal division of labour that were imposed on their own often patriarchal systems.

Like the revolutions that preceded it, the Third Industrial Revolution, also known as the Digital Revolution, impacted not just the labour market and global economies, but the social and political constructs of our society. The digitisation of manufacturing and other industries set parameters for a monumental shift in the very nature of the global economy, and South Africa was not left untouched. By the mid-1990s, it was becoming evident that the country's economy was transitioning from being industry-based to being knowledge-based, and that this was having a great impact on the already segmented and gendered labour market.

The evolution of information communications technologies (ICT) in South Africa, a key feature of the Third Industrial Revolution, has been steady and – to a great degree – on par with the rest of the developing world. Computers were introduced as far back as 1921, and the internet was introduced in 1991. But this progress has occurred within the context of heightened inequalities and discrepancies at the level of development between sectors in the economy. Access to information remains a great impediment – according to Statista, South Africa had an internet penetration rate of just 54 percent by January 2019 (Clement, 2019). A study done months prior, by the same institution, found that men made up over 50 percent of internet users in the country (Clement, 2018). When we factor in the racialised patterns of income in South Africa, we can deduce that from the overall lower percentage of women who have

> ❝ Having determined that industrial revolutions have, throughout history, left women (particularly African women) behind, we must necessarily reflect deeply on whether the 4IR can re-write this narrative. But we must do this contextually, ❞

access to the internet, Black women constitute the minority.

The 4IR in Racist South Africa

Having determined that industrial revolutions have, throughout history, left women (particularly African women) behind, we must necessarily reflect deeply on whether the 4IR can re-write this narrative. But we must do this contextually, for we cannot hope to pose a view without an appreciation of the point of view. This is to say, the frame is a type of context, and so in framing discourse around the 4IR in South Africa, we must have a deep appreciation of the country's history and the prevailing material conditions that shape its contemporary realities.

The history of South Africa, like the history of all colonised nations, is a history of dispossession, dehumanisation and de-civilisation. It is a history of colonial conquest and imperial devastation, at the heart of which was the segregation of people. This was done through the instituting of legislation that set parameters for separate development – leading to the further disenfranchisement of the majority of the country's population. The impact of this history on the institutionalisation of poverty and underdevelopment in the post-apartheid dispensation is well documented. For the purpose of this essay, however, there are two specific legacies of this history that necessitate critical engagement in the context of the 4IR. The first is the segmented labour market and the second is the inequalities in higher education.

The South African labour market is reflective of our apartheid past, where White men and women enjoyed preferential employment, while Black men and women were at the bottom of the ladder, both in terms of the remunerative scale and prospects for upward mobility. According to Stats SA, the wage gap between South Africa's racial groups has been on the increase in the democratic dispensation. Not only do Black households have the highest rate of unemployment, they also earn the lowest wages. In addition to this, on average, White people earn three times more than their Black counterparts – even with the same level of qualifications, for the same jobs. White people also have the highest annual median expenditure – ten times higher than that of Black South Africans (Stats SA, 2019).

But the inequalities are not just racialised, they are also gendered. The same report by Stats SA indicates that women earn around 30 percent less on average than men, and that their share of income is significantly lower than that of men, despite them being a demographic majority, at just over 51 percent of the total population. In the technology industry, men are paid 22.9 percent more, and 21.8 percent more in the financial sector. Importantly, the report also found that Black people have the lowest levels of access to the internet and health insurance cover (Stats SA, 2019).

These racialised and gendered inequalities in the labour market are a microcosm of the broader inequalities that Black women in particular must negotiate. They express themselves in education as well. According to a recent report, while South African women outnumber men by a ratio of 3:2 at post-secondary level, women are less likely to enrol for higher degrees. Additionally, while universities admit more women than men at undergraduate level, there are more men at Masters and Doctoral level than women (Department of Women, Youth and Persons with Disabilities, 2015).

But it does not end here. According to a study conducted by the audit firm PricewaterhouseCoopers (PwC), the proportion of men to women who graduate with science, technology, engineering and mathematics (STEM) related degrees is astounding. The ratio of representation in maths and statistics is 4:5, in ICT and technology it stands at 2:5, while in engineering, manufacturing and construction it stands at a low 3:10 (PricewaterhouseCoopers, 2018). The numbers are debilitating when it comes to Black women, who account for less than 30 percent of women STEM graduates. These disciplines are crucial to the economy of the 4IR, and so the realities of the racialised labour market and the inequalities in higher education have great implications for women, particularly Black women. If higher education is not producing the graduates needed to compete in this revolution, and the labour market is not promoting or remunerating Black women adequately, then the 4IR, like those before it, will leave Black women behind.

What Is to Be Done?

The starting point for centring Black women in the march towards the 4IR is to ensure the protection of industries that are dominated

> ❝As argued, the 4IR is not just about industry and economics, it is also ideological. As such, the solution to the potential crisis of the 4IR leaving Black women behind lies in the transformation and decolonisation of higher education.❞

by women, as these are the biggest victims of automation and mechanisation. These include the retail and hospitality sectors, as well as the agricultural sector in Africa. While we cannot halt the march of time and technological developments, and therefore must accept that some jobs will be rendered obsolete by the advanced technologies of the 4IR, our government must make concrete choices about regulations to protect worker's rights. Companies must be compelled, legislatively, to contribute to social protection, so that workers are not reduced to a state of vulnerability. In addition to this, companies must be encouraged to equip their workers with skills that can be marketable and useful in the 4IR economy.

As argued, the 4IR is not just about industry and economics, it is also ideological. As such, the solution to the potential crisis of the 4IR leaving Black women behind lies in the transformation and decolonisation of higher education. Institutions such as the National Research Foundation (NRF) and other funding bodies must develop gender-biased quotas in terms of post-graduate funding, to ensure that Black women in particular are given the needed financial and academic support to excel. The ways in which knowledge is created in the age of the 4IR must also change. In this regard, we must look to solutions as provided by such scholars as Professor Tshilidzi Marwala, who has introduced an African module in Artificial Intelligence at the University of Johannesburg, in order to develop solutions to African problems using technology that recognises the phenotypes and languages of African people (Molele, 2019). This is an example of the decolonisation of technology, and it must be at the centre of efforts to include Black women in the 4IR.

But it is not higher education alone that requires transformation. 4IR technologies must also be transformed. Joy Buolamwini, a researcher at Massachusetts Institute of Technology (MIT) Media Lab, discovered that facial recognition technology does not see dark-skinned faces accurately, and as a result established the Algorithmic Justice League to advocate for more humane uses of technology and to call for legislation to protect against racial bias in algorithms. Work of this nature must be supported, and scientists must be encouraged to approach science with a conscience and a moral obligation to fashion a higher civilisation.

In addition to this, the Department of Labour must aim not at the reduction but rather at the criminalisation of the gender and racial pay gap. Like the European country of Iceland, paying men more than women must be made illegal, and companies who continue the practice must be heavily fined or forced out of business. This is the only way in which capital can be held accountable for its continued facilitation of income inequality. Ultimately, we must fashion a 4IR that bestows upon the historically marginalised and disenfranchised women of South Africa the greatest gift possible: a more human face. ∎

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POLITICAL ORGANISING AND MOBILISING IN
THE AGE OF THE FOURTH INDUSTRIAL REVOLUTION

A Reflection on the
Gauteng Young Communist League
of South Africa

By Kgabo Morifi

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What does the Fourth Industrial Revolution (4IR) portend for the future of political organising and mobilising? As "a way of describing the blurring of boundaries between the physical, digital, and biological worlds...a fusion of advances in artificial intelligence, robotics, the Internet of Things, 3D printing, genetic engineering, quantum computing, and other technologies..." (McGinnis, 2018), the 4IR is primarily concerned with the inchoate transformation of the production of goods and services, resulting from the application of a new wave of technological innovations. Definitions such as these cement the narrow idea that the 4IR is principally about industry, when in reality it is a revolution that goes beyond economic activity concerned with the manufacturing of goods and services.

The fusion of advances in technological innovations has implications for how we construct space, and – perhaps most importantly – how we organise society. While research on the implications of the 4IR on businesses is surging, there is little on its impact on political organisations, especially as it pertains to mobilisation and organising. Using the Gauteng Young Communist League of South Africa (YCLSA) as an example, this article fills this

void by demonstrating the ways in which political mobilisation and organisation have been impacted by the 4IR, and offers ideas on how political organisations can sustain their relevance in an age where traditional mobilising and organising methods are fast losing relevance.

The 4IR and South Africa

Inevitably, the 4IR has become the mantra of every policy initiative and political event in South Africa. So central is this idea to our current political and economic discourse that the President of the Republic, Cyril Ramaphosa, established a Presidential Commission to "identify relevant policies, strategies and action plans that will position South Africa as a competitive global player" in the context of the 4IR (The Presidency, 2019). While the Department of Communications, Telecommunications and Postal Services is the Coordinator of the Government's 4IR Programme, all national departments have – to varying degrees – incorporated it into their work. The South African Government has also dedicated resources towards Research and Development, with the 4IR at the centre of initiatives and businesses that are being funded and incentivised through mechanisms such as tax reduction.

But while the labour and trade union movements, as well as the political forces of the Left, recognise the inevitability and necessity of the march of technological advancement, they have posed various important questions about what the implications of the 4IR will be on labour and the working class if no intervention is made to protect the poor. In its statement at the Sixth Plenary Session of the 14th National Congress Central Committee, the South African Communist Party (SACP) conceded that new technologies have the possibility to "advance productivity, release humanity from repetitive toil, improve living standards, reduce the working day and provide innovative solutions to many developmental and social challenges" (2018). However, the statement also contented that – in the context of capitalist-driven profit maximisation – the competitive struggle for hegemony in the 4IR is likely to widen inequalities, reduce net employment, and relocate value-added production to the major areas of consumption in the developed world. Similar arguments have been made by various academics and political commentators

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Evidently, much of the support and criticism of the 4IR centres on industry and the economy. This narrow focus distorts the totality of the impact of 4IR on humanity. More than this, it does not reflect meaningfully on how the 4IR has impacted on the organisation of society, and how this organisation has significant implications for the present and future of South Africa and the global community. The Gauteng YCLSA provides an important glimpse into how advanced technologies have impacted on the nature of political mobilisation and organising, and how such changes challenge the complexity of political work in our evolving society.

Political Mobilisation and Organisation in the Context of the 4IR

Political organisation is a significant feature of South Africa's apartheid history and, just as significantly, its present reality. Our resistance and liberation struggles were anchored on the establishment of national liberation movements that mobilised masses of the oppressed and organised communities into a fighting force against repressive regimes. Because of the nature of South African society in the apartheid era, as well as the elementary stage of technological advancement at the time, political mobilisation depended largely on personal and physical recruitment and engagement. Strategies such as door-to-door campaigning, which are still being used today, were the primary methods of mobilisation. Organising was also wholly dependent on political activists making direct personal contact and using physical spaces as assembly points.

These mobilisation and organisation strategies entailed significant challenges. The apartheid government instituted various mechanisms to crack down on political organisers, including but not limited to the establishment of legislation

attacking the right to assembly, as well as the banning of political organisations. This effectively weakened the capacity of political organisations, but they nonetheless utilised creative means to mobilise people and mount resistance campaigns and initiatives. In post-apartheid South Africa, political organisations continue to utilise these traditional methods of mobilisation and organising. A specific example of this is the YCLSA.

Like all component structures of the mass democratic movement, the YCLSA has its roots in the struggle against colonialism and apartheid. Officially formed in 1922, the YCLSA was banned in 1950 (along with the SACP) under the Suppression of Communism Act. After more than five decades of inactivity following this ban, the YCLSA was relaunched in 2003 in Vanderbijlpark. At this 1st National Congress of its re-establishment, the organisation adopted a Constitution which would be amended several times. My reflections for this article are based on the latest constitutional amendment.

Section 6 of the YCLSA Constitution states that every member, irrespective of position, "must be organised into a branch, cell or other specific unit…and must participate in regular activities of the YCLSA". In terms of duties and responsibilities, members of the organisation are expected to "maintain close ties with the masses of young people, disseminate the views of the YCLSA and SACP among them, and consult with them when problems arise, keep the YCLSA informed of their views and demands and defend and revolutionise their legitimate interests". The Constitution also outlines a key responsibility towards effective organisation as participating in the "discussion of questions concerning YCLSA policies at YCLSA meetings and in YCLSA publications" (2013).

The Constitution of the YCLSA recognises

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that members of the organisation must keep close ties to the masses of young people, thereby making allowance for the possible use of advanced technologies in the administration of the organisation's political work. However, such a possibility is not concretised. In fact, the contention that YCLSA members must be organised into branches and other specific units is reflective of traditional political mobilisation and organising. Branches, which are basic units of political organisations, are constituted through organising groups of people within the same geographic locales. These are determined by administrative boundaries, which ironically largely continue to resemble the colonial and apartheid legacy of segregated human settlement. Herein lies the problem.

The 4IR has rendered obsolete the definition of community as people living within the same place. The advance in information communication technologies (ICTs) has made communication easier and more flexible. The Internet of Things (IoT), a key feature of the 4IR, has further obliterated traditional geo-political boundaries. We live in an age of interrelated computing devices, mechanical and digital machines, objects, animals and people that are provided with unique identifiers (UIDs). We have the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction, effectively allowing people who are continents apart to co-exist as if they were living in the same room.

In this evolved society, the idea of a branch must necessarily be revisited. Ronald Lamola, South African Minister of Justice and Correctional Services, has argued that the various engagements happening on social media platforms such as Facebook, Twitter and WhatsApp are calling for a change in the way that the ANC organises. Lamola has also pointed out that traditional ways of meeting are withering away, and that this necessitates the organisation devising innovative ways of capturing the imaginations of the people – particularly young people who are deeply invested in the arena of technology (2019).

Minister Lamola is correct. The implications for mobilisation and organising are particularly significant for an organisation like the YCLSA, which is devoted to the interests of the young people it seeks to mobilise. Research suggests

that the youth are the biggest consumers of technology, and therefore the use of technology should necessarily be a key strategy in mobilising this sector of society. Perhaps of greater importance, the use of advanced technology can also address one of the greatest dangers to South Africa's young democracy: young people's dissociation from voting.

A recent report by GroundUp investigated the reasons why nearly 10 million eligible voters (more than 6 million of whom are youth) did not cast their ballots at the 2019 general elections. Dissatisfaction with the lack of service delivery was at the top of the list for most, but the lack of technological flexibility was another contributing factor. One interviewee stated that he did not vote because he needed to be at work on voting day, but that he would have voted if technology had made allowance for him to do so.

The discussion around the use of advanced technology for political mobilisation in the context of voting is not new. Professor Bruce Watson, Head of the Department of Information Science at Stellenbosch University, has argued in the past that South Africa needs to introduce e-voting. Stellenbosch University is one of five universities that are part of the Centre for Artificial Intelligence Research, a research network which has investigated the role of Artificial Intelligence (AI) in elections. Professor Watson contends that AI could increasingly be used to identify voters at polls through facial recognition (Omarjee, 2019). Additionally, AI could also be used for data analytics to identify any strange patterns in voting outcomes at a voting station.

Big data could also play a crucial role in elections. The term 'big data' refers to analysing, systematically extracting information from, and dealing with data sets that are too large or complex for traditional data-processing application software. Predictive analytics could aid us in the development of models that could encourage political engagement amongst people who would otherwise not participate in political processes, thereby strengthening and safeguarding our democratic aspirations and future.

However, as cautioned by Mashupye Maserumule – Professor of Public Affairs at the Tshwane University of Technology – technology as a tool can optimise voting experience, but should

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not be conflated with what really makes people vote. Maserumule argues that "the reason to vote is a function of consciousness" (2019). In other words, galvanizing youth to vote should entail mapping their social reality. Messaging should attract young people, and technology should be used to communicate political messages. Technology from this point of view can be seen as a means, not an end. This should not be misconstrued as underplaying the role of technology in politics, but rather as an attempt to underscore its significance in influencing political organising and mobilisation. As pointed out earlier, the context for this reflection is the YCLSA in Gauteng, based on my experience as its provincial secretary.

Why should Gauteng's YCLSA be at the forefront of using technology for political organisation and mobilisation?

Gauteng is the nerve centre of South Africa's economy – contributing to a third of the country's economic output in 2018. According to Stats SA, the province's economy is roughly the same size as that of Morocco, if we use nominal Gross Domestic Product (GDP) figures as a comparison. If Gauteng were to become its own independent state, it would have the seventh biggest economy on the continent – surpassing regional economic powerhouses such as Kenya and Tanzania. Gauteng's income per capita surpasses that of Nigeria, Africa's biggest economy and most populous country (Stats SA, 2019). Gauteng's economy, however, has transitioned from being industry-based to being knowledge-based (as can be said for the rest of South Africa), and therefore cannot be understood without an appreciation of technology and its evolution.

The birth of Gauteng's industrial economy can be traced back to the Minerals Revolution, specifically the discovery of gold at the

Witwatersrand ore fields that straddle the former Transvaal and Orange Free State provinces. The emergence of industry-scale mining that emerged from this revolution not only resulted in significant demographic shifts owing to migrant labour, but also to the re-organisation of space. It can be correctly argued that the Minerals Revolution set parameters for the establishment of colonial- and apartheid-era cities in Gauteng, which gave birth to the post-apartheid cities in which we negotiate our existence today. But another reality of this revolution is that it introduced new technologies that would ultimately change the nature of the economy and land use.

There are two critical points arising from this brief history. Firstly, the Minerals Revolution led to industry-scale mining that necessitated the use of migrant labour. The migrant labour system was the birth of urbanisation in Gauteng as we know it today. The YCLSA, an organisation that is internationalist in orientation, has the unique opportunity of recruiting in a province that is cosmopolitan, with a demographic make-up that is reflective of a long history of migration. The use of technology can tap into this critical human resource. But such technology must, first and foremost, be cemented as an alternative to traditional forms of mobilising.

Secondly, it is important to note that the development of infrastructure was critical to the rapid development of the Gauteng economy – a development that continues today. The South African economy has transitioned to being knowledge-based, with the economies of urbanised provinces such as Gauteng being characterised as post-productivist. A post-productivist economy is characterised to a great degree by a decline in the primary sector and a growth in the quaternary sector, comprised of industries such as e-commerce, research and development, media, information technology, financial planning and design. This shift in the economy has greatly impacted the construction of space in Gauteng. The middle-class population that works in the quaternary sector has unique demands in terms of housing, transport and other services. The growth in security in the city's residential areas is reflective of this.

In a province where traditional methods of political mobilisation, such as door-to-door canvassing, are being undermined by security

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estates and gentrified neighbourhoods, technology is the only option for mobilisation and organising. Our work as organisers in the YCLSA has indicated that in a province like Gauteng, so advanced in its economy and its technologies, political mobilisation must evolve if the organisation is to maintain relevance. More innovative use of technologies – including but not limited to information technologies, big data and IoT – must be explored, or we run the risk of not just being left behind by the young people we seek to mobilise, but being rendered an extraneous organisation. We are grappling with this reality with the full awareness that technology is a means to optimise political processes. However, we must also bear in mind that it cannot be used to abdicate our political responsibility to map social realities and galvanize young people into political participation. ∎

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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

> **❝ 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. ❞**

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.

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

> 66 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. 99

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.

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

> 66 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. 99

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.

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

> 66 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. 66

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.

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. ∎

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Assessing a
Common
Currency
in Africa

By Anton M. Pillay

Introduction: An Overview of African Common Currencies

A common currency is a necessary condition for the realisation of the benefits of integration. The adoption of a single currency exposes domestic markets to foreign markets, thereby increasing competition between member countries and enhancing the competitiveness of national industries (Saka, Onafowokan and Adebayo, 2015). A common currency is the signification of an economic community and a united and developed people.

The importance of African economies in global trade is not going to be judged by the power of each country's individual economy, for there is none, so far, or by the stability provided by the benevolent hegemony of a colonial master. Rather, the power of African economies lies in the actual share of the proposed currency in world official foreign reserves, its liquidity in international trade, and its role as a competitor against the exorbitant U.S. dollar.

Africa's experiments with common currencies are not a new phenomenon. The "Colonies

Françaises d'Afrique", or "French Colonies in Africa", better known as the CFA zone, have existed in West and Central Africa since 1945. Prior to that, the French West African Franc, as well as the British West African Pound, served as the region's official currencies. Similarly, the East African Shilling was the currency for colonial Kenya, Uganda and Tanganyika, and even before that the Indian Rupee served as the currency for the British East African states. In the 1960s, East Africa was close to developing a regional currency, but the project was destabilised by the rise of nationalistic projects like the one of General Idi Amin Dada. In the contemporary era, the region has been struggling to implement the "East African Shilling", which was last delayed in 2015 and is now expected to be released in 2021. In Southern Africa, the Southern African Customs Union (SACU), the oldest regional economic bloc in the world, pegs the currencies of Swaziland, Lesotho and Namibia to the South African rand. Besides the pegging and Common Monetary Area (CMA), the SACU has not sought to make progress towards a real common currency. West Africa, however, in the form of the Economic Community of West African States (ECOWAS) is leading in terms of common currency progress with its "ECO." Though first expected in 2003 and postponed a good number of times, the ECO is expected to be finally unveiled in 2020 (Mosegbon, 2018). In December 2019, the ECO made its strongest step with the CFA Franc (West) opting out of certain ties with France to align itself more with the ECO. Many critics, however, consider this transformation to be nothing more than a name change.

There have been varied results to the African common currencies projects. Their potential and steady progress have been hampered by a lack of political will and unfavourable economic indicators. For example, despite the CFA (Central and West) zone having existed for over 70 years, its states have remained some of the poorest in the world. Likewise, Swaziland and Lesotho have steadily featured on the list of the poorest states in the world, while Namibia is considered to be one of the most unequal states in the world with a 57.6 Gini Co-efficient in 2015, ranking it with the likes of Haiti and the Central African Republic. What is clear from both the CFA and SACU systems is that a higher power appears to be benefiting from the

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arrangements: France in the case of the CFA, and South Africa in the case of the SACU.

Why are African common currency arrangements not developing their respective regions? What is happening at the regional level that is hampering real progress? Using the CFA and the SACU as case studies, the following section seeks to answer the above questions.

A Close Examination of the CFA and the SACU

There are both advantages and disadvantages to the CFA currency. The CFA franc is used in 14 African countries, with a combined population of about 150 million and $235 billion of gross domestic product. The main problem with the CFA is that it is seen as a symbol of neo-colonialism. Critics, such as those leading the anti-CFA movement, say that true economic development for the 14 states can only be achieved by getting rid of the currency (Konkobo, 2017). These critics argue that in exchange for the guarantees provided by the French treasury, African countries channel more money to France than they receive in aid. They also argue that they have no say in deciding key monetary policies agreed to by European countries, which are members of the Eurozone.

Luigi Di Maio, Italy's foreign affairs minister, backed up the anti-French view, noting that "France is one of those countries that by printing money for 14 African states prevents their economic development and contributes to the fact that refugees die in the sea or arrive on our coasts" (Signé, 2019). Chad's long-serving President Idriss Debby in 2015 stated that the CFA pulls down African economies and that the "time has come to cut the cordon that prevent Africa to develop". He called for a restructuring of the currency in order to "enable African countries which are still using it to develop". Debates over the persistence of the CFA franc zone also focus on African states'

independence and sovereignty. Metaphorical armies of unemployed youth throughout sub-Saharan Africa—which may reach over 350 million over the next two decades—are often the loudest opponents of the CFA zone. Other pro-democracy movements, like *Y'en a Marre* in Senegal and *Le Balai Citoyen* in Burkina Faso, consider the dismantling of the CFA zone as essential to their campaigns to reform their countries' respective governments. Other protestors have included Kémi Séba, a Benin-born French activist who was charged with burning CFA notes in Senegal before being deported.

Landry Signé – author of *Innovating Development Strategies in Africa: The Role of International, Regional, and National Actors* – examines the political economy of the performance and economic development strategies of CFA franc zone states from 1960 to 2010 (2019). The empirical evidence he provides showcases the CFA as both an enabler and barrier to development. For example, he notes that Guinea stands as a prime example for CFA supporters. Guinea – which has its own currency – frequently experiences currency shortages, and has a Central Bank that does not have sufficient policies to ensure stability. In this case, the ever-present CFA offers a serious solution to this conundrum. A few hundred kilometres to the east, in Ivory Coast, President Alassane Ouattara has on numerous occasions contended that the CFA zone states are better off than the Anglophone states due to growth and low inflation, whereas the poor are disproportionately affected by unpredictable inflation in Anglophone countries. Outtara has stated that the CFA is solid, well-managed, and a stabiliser for African economies (Signé, 2019).

Signé's data shows that, in terms of trade, the CFA's fixed exchange rate to the Euro has led to a

> 66 On the other side of the debate, and besides the already-mentioned political arguments against the CFA, the empirical evidence provided by Signé shows that the CFA Franc zone as a whole has had very limited success in intra-regional trade, especially in Central Africa. 99

greater facilitation of trade, through the reduction of uncertainty and the stabilisation of domestic prices. The logic of fixed exchange rates can be traced back to the Bretton Woods period, when 63% of developing countries had their currency pegged to that of an industrial country. The potential problems with a fixed exchange rate are mostly offset in Central African Economic and Monetary Union (CAEMU) countries, due to these countries' high levels of excess liquidity from oil revenues. However, West African Economic and Monetary Union (WAEMU) countries have experienced declining liquidity since 2004, thus suffering from the volatility of a fixed rate amidst external shocks.

Signé is of the opinion that the monetary policies in the CFA have been effective in achieving real exchange rate depreciation, which resulted in a reduction in government expenditures. As a positive effect, the unlimited convertibility of the CFA franc to the Euro has generally reduced the risk of foreign investment in CFA countries. According to Coppola, the CFA is so closely related to the Eurozone that foreign exchange risk can be negligible on trade between CFA economies and the Eurozone (2019). Although the two versions of the CFA franc are not yet integrated, they are both worth exactly the same in Euro terms, and the hard peg to the Euro means that their external value is also identical, since their foreign exchange rates float up and down with the Euro. So for nearly all intents and purposes, the 14 countries in the CFA franc currency union use the same currency, and that currency can be regarded as a version of the Euro (Coppola, 2019). This has helped the CFA zone states to survive recent falls in the price of oil and commodities without currency collapse, inflation spikes and fiscal distress.

On the other side of the debate, and besides the already-mentioned political arguments against the CFA, the empirical evidence provided by Signé shows that the CFA Franc zone as a whole has had very limited success in intra-regional trade, especially in Central Africa. The CFA zone has also been highly dependent on producing and exporting a limited number of primary commodities, and it also has a narrow industrial base. These two factors mean that the zone faces high vulnerability to external shocks. Some critics argue that the strength of the Euro may have

discouraged exports and encouraged imports, benefiting Eurozone economies – especially France – at the expense of CFA zone countries.

The December 2019 decision to rename the West African CFA franc as the ECO and thereby cut "some of the financial links with Paris" was welcomed by many Heads of State, but the reliance on France remains in the details. The new ECO will remain pegged to the Euro, but the states in the bloc will not have to keep 50% of their reserves in the French treasury, and there will no longer be a French representative on the currency unions board. To George Ott, the transformation from CFA to ECO was largely symbolic and cosmetic, as the maintenance of the Euro peg will continue to dictate the scope of regional monetary policy decisions (2020).

The CFA's transformation into the ECO is all but theoretical, given that the ECO must first circulate in the other non-CFA states to be considered a true ECO.

Three key challenges have prevented this from happening. Firstly, there is inconsistency in decision-making by the heads of governments of member states. Over the years, new governments, new policies, *coups d'état,* or simple invasions in the case of Ivory Coast in 2011, have delayed true ECO circulation. Secondly, non-CFA zone states (i.e. WAEMU members) have not satisfied the convergence criteria for the adoption of the new currency. Key criteria such as maintaining a budget deficit of less than 3% of GDP; a public debt ratio of less than 70% of GDP; an annual inflation rate of less than 10%; and a minimum of three months of import cover mean that it appears unlikely that the majority of the WAEMU countries will meet all these criteria by the very ambitious inception date of July 2020 (Ott, 2020). Thirdly (and quite surprisingly in the context of anti-colonial sentiments), it appears that in the face of the demise of the CFA franc, its benefits become more clear. The CFA is tied to fixed rates, which works well with the undiversified cash crop economies of the CFA. Booms and busts and other fluctuations in the market mean that the exchange rate of the CFA is relatively unaffected. Even in the face of political and election instabilities, the CFA remains unaffected. So, while often labelled as a neo-colonial system, the economic rationality of the CFA franc cannot be ignored.

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Regarding the SACU, the penultimate question to ask is whether SACU members really aspire to the next level of economic integration. Overall, the SACU is about protecting South African interests, which dominate the region. Intra-SACU exports in 2017, which accounted for $14 billion, were dominated by South Africa, which accounted for 71% of total exports. South Africa also accounts for 87% of SACU's exports to the world (Chidede, 2018).

Except for Botswana with its stronger pula, all SACU members are part of a Common Monetary Agreement (CMA). In a CMA, there exists an anchor currency that is accepted as a medium of exchange within the monetary area. This anchor currency is accompanied by rules that govern a CMA's operations, such as limiting the mandate of local central banks within a CMA (notably the financing of fiscal deficits through monetary expansion, so-called quantitative easing); maintaining sound macroeconomic performance; and uniform guidelines for prospective and existing members. Other rules relate to the governance of inflation rates – both current and expected – and keeping a CMA's internal exchange rates within the margins of the de facto currency. In the case of the SACU CMA, the South African rand acts as the anchor currency, and the policies of the South African Reserve Bank (SARB) are widely influential among the CMA states of Namibia, Lesotho and Swaziland. Botswana is the only member of the SACU to stand outside of the CMA, instead managing its currency based on a basket of currencies, of which the South African rand holds an approximate 60% weighting (Nene and Patroba, 2013).

This "unfair weighting" is natural given that Lesotho, Swaziland and Namibia combined

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provide less than 4% of the total GDP of the CMA region. At the same time, their financial systems lack the high level of sophistication of the South African financial system (Van Zyl, 2003). This means that South Africa's monetary and exchange policy is transmitted across the SACU (Chidede, 2018). Despite the fact that the CMA is not a full monetary union because members do not have a single currency and single central bank, monetary integration in this CMA is considered high, with CMA members generally able to withstand shocks. While stronger monetary cooperation within the Southern African Development Community (SADC) will be a slow process, this integration initiative will eventually create a major challenge for the CMA. It remains to be seen whether the CMA has a pivotal role to play in the larger SADC initiative. Monetary cooperation in the SADC could eventually entail an entirely different framework, or it could come about by extension of the CMA arrangements to include more SADC countries, as and when they are willing and able to join. Expanding the membership of the CMA would be more complicated than in the past, because new members would not share the history of the South African currency being legal tender. The CMA arrangements have, however, in the past proved to be very flexible and this could be a big advantage (Van Zyl, 2003).

SACU summarises Africa's ventures in common currencies. It highlights the uncertainties of whether the benefits of deeper monetary integration outweigh the cost and the precaution of hegemonic dynamics which are common in Africa's regions. Linking a local currency to an anchor currency can improve macroeconomic stability, as opposed to operating under a flexible exchange rate. Under a flexible exchange rate regime, commodity prices often become unstable, and can in turn create disturbances in smaller economies, particularly if their currencies are depreciating, thereby resulting in general price-level volatility. However, although a CMA would have a better capacity to cope with these disturbances, it would have less capacity to deal with the idiosyncratic shocks and development challenges that might only occur in certain member states, which would have lost their capacity to tailor monetary policy to their needs through the centralisation of monetary control. Individual countries could face the effects of differentiated external shocks due to differences in their production, consumption and expenditure patterns; market characteristics (monopolistic/ competitive); and level of openness, among others. Asymmetric shocks could cause havoc to individual economies under independent currencies (Nene and Patroba, 2013).

The institutionalised framework of trade, financial and other non-economic links, such as infrastructure, binds SACU states ever closer to South Africa and, in doing so, limits their scope for independent action (Mingst, 2008). The progress in SACU is slow due to a lack of authority within these forums, overlapping membership, and political turmoil in some countries (Cox, 1996). This creates an ideal platform for South Africa to push its agenda. It is of paramount importance that the Botswana, Namibia, Lesotho and Swaziland (BNLS) states be stable in all facets (socially, politically and economically), so as not to impede on the South African economy. While this dependency can, to an extent, be taxing on South Africa, it also works to its benefit because it provides viable opportunities for investment, trade and migrant labour in and from those states.

According to Van Zyl, in view of the progress already realised by the CMA under SACU, it could be worthwhile for countries to move towards a full monetary union by using a single currency. South Africa, particularly the SARB, could then continue to play the leading role in this process, capitalising on the experience of the CMA (Van Zyl, 2003). Nene and Patroba also back up this view, noting that it would be beneficial for SACU to establish a monetary union. In such a case, the SARB could continue formulating a monetary policy for a possible SACU monetary union. A key challenge in obtaining this goal is the disparity across SACU member states and their poor

macroeconomic performance over the years (Nene and Patroba, 2013).

Conclusion

In sum, there is potential for African common currencies. According to Oladele, a common currency can be created with a lot less difficulty than our African leaders have so far led us to believe (Mosegbon, 2018). In an empirical study by Karras, it was concluded that African states like Uganda, Ghana and Guinea have a lot to gain from a monetary union, but also a lot to lose from it. Economies like Morocco, Ivory Coast and Gabon have little to lose by adopting a common currency, but also have little to gain from it. Nigeria is a more promising candidate for membership in an African monetary union than Kenya, and Zambia is an unambiguously better candidate than either Benin or Mauritius (Karras, 2006). The mix of benefits and constraints is visible in both the CFA and SACU. Overall, both these unions have shown incredible durability in highly unstable or unequal regions. This seems to validate many of the benefits of such unions, with the regions showing consistently low and stable inflation rates.

In surveying the literature around African common currencies and their dynamics, the most important details to success are well-coordinated monetary and fiscal policies. The coordination of such policies is a necessary foundation. A strong emphasis needs to be put on reducing the fiscal deficit of states seeking to join a monetary union. Reducing inflation and debt levels and increasing reserve holdings will also ensure that the benefits of monetary integration outweigh the costs. Okafor suggests that to benefit from economic and monetary integration, regions need to deal with the sources of fiscal policy distortion through better management of their economies (2013).

Using the CFA and SACU as yardsticks, an African

> ❝ The appeal of an integrated African Monetary Union is the tremendous potential to increase intra–regional trade and encourage domestic production capabilities. However, another monetary union may lead to problems of dependence, such as those experienced by countries in the CFA franc zone. ❞

Monetary Union would be most challenging to implement and would require countries to adhere to strict fiscal rules, similar to those in the CFA zone, until stability was achieved. This strategy requires significant investment and capital mobility to ensure a strong exchange rate union and currency convertibility. Movement of labour and capital are necessary to spur economic growth and stabilise relatively different economies. The appeal of an integrated African Monetary Union is the tremendous potential to increase intra-regional trade and encourage domestic production capabilities. However, another monetary union may lead to problems of dependence, such as those experienced by countries in the CFA franc zone. ∎

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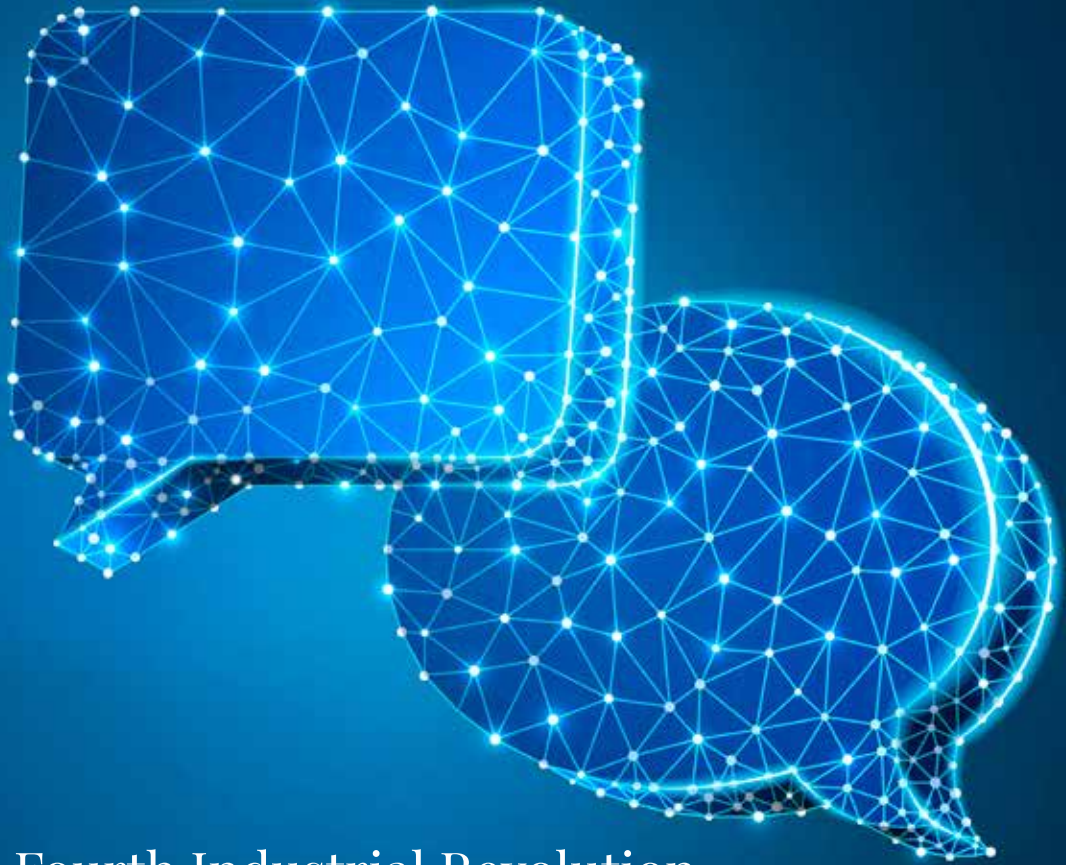
The Fourth Industrial Revolution
and the
Importance of
Disagreement

By Alex Broadbent

Introduction: When Everyone Agrees, Something Is Wrong

In healthy dialogue, there are always people who disagree, even if they are eccentric flat-Earthers. Something about human psychology seems to require that some people always take up a contrary position to the majority on any substantive idea, and empirical evidence always permits this, because it always underdetermines the conclusions we draw from it. When there is no disagreement on a certain idea, therefore, we have to consider that we're either not assessing the idea properly, or not entertaining all opinions. If we were, some of us would come to different conclusions.

My concern is that there is too much agreement about the Fourth Industrial Revolution (4IR), which is far less well understood and confirmed than the idea that the world is round. We've

heard so much about what's going to happen, and why. How carefully have the bases of these claims been tested? How seriously have we asked ourselves about the most likely scenarios in which the 4IR does *not* happen— because it is derailed, or because we have "topped out" already in our latest phase of industrialisation, or for some other reason? In short, have we asked: what could possibly go wrong (Broadbent, 2011)?

The 4IR Story

"The Fourth Industrial Revolution" is a tag-line for a hypothesised major change in how society is organised, driven by the availability of new technologies. These are fundamentally driven by the growth of computing power, enabling smaller and faster devices, and the implementation of artificially intelligent systems. Combining small and intelligent systems allows a much tighter cyber-physical interface. Growing biological knowledge, especially of the human body, enables the cyber-physical interface to include the cyber-human. As a result of all these new technological possibilities, the story goes, we're going to see huge changes in the way people work, interact, govern, travel, think, play, and quite generally live. Moreover, these changes are already occurring. Finally, it's characteristic of the 4IR story to emphasise that the exact changes we will see in society are not easy to predict and are under our collective control. Emphasis is therefore placed on the importance of awareness, embrace, preparation, and a focus on protecting values such as equality and privacy.

This article argues that most of this story is false, insofar as it says anything at all. I will outline several reasons for this statement. I could frame my argument as "probably" false, but I'm more confident than that, and would like to instead propose that it is mostly false, from start to finish.

Fitting Your Data to the Theory

The 4IR story is constructed with little or no reference to the accumulated work of people who have thought about the nature of society and the reasons for its changing shapes. The historical literature does not make place for three prior industrial revolutions, but for one. Moreover, that one Industrial Revolution was not a global phenomenon, nor even a template, model or trope

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of some repeatable event-type that may occur anywhere and anytime with the right conditions. Rather, it is a particular and very complex historical episode taking place in particular countries at particular times.

It's easy to see why most historians think in particulars when one considers the tangles that the 4IR story gets itself into in the context of countries that are still in the process of industrialisation. In many countries, smart phones, the internet and social media exist alongside agrarian societies that continue to use rudimentary technologies. The question of needing a dependable energy source for the 4IR is important to consider, and many countries have uneven societies where, arguably, only some people are participating in the 4IR.

It's easy to retro-fit your hypothesis to new evidence. However, if that were the way scientists did their work, we would not have smartphones. It doesn't work in the empirical sciences, and it doesn't work in the social sciences either. When you retro-fit a hypothesis to fit new data, your predictions don't come true. You can alter your hypothesis some more to explain this failure away, but explaining away your errors today doesn't help you to be right tomorrow.

Foxes and Hedgehogs

There's clear empirical evidence for this assertion. The psychologist Philip Tetlock, who worked on understanding what makes the difference between predictive failure and success, argues that the key differentiator is cognitive style (Tetlock, 2005; Tetlock and Gardner, 2015). Tetlock conducted multi-decade studies in which he interviewed a wide range of people about socio-political events, such as election outcomes, wars, the collapse of the USSR, and many similar, more fine-grained events. These studies are ongoing. Based on his research, Tetlock identified two

types of people. So-called "foxes" are tentative, entertain complex and qualified hypotheses, and change their minds—or at least consider doing so—in the face of new evidence. "Hedgehogs", on the other hand, have a view that makes sense of the world, and sees all evidence either as confirming this view, or else as invalid and irrelevant.

This gives us what philosophers would call a second-order argument that predictions around the 4IR are false. The argument doesn't engage with any of the first-order details of the 4IR hypothesis. It simply points out that most of what we hear about it sounds very hedgehog-ish.

In his book *The Fourth Industrial Revolution,* Klaus Schwab mentions that fox-like thinking will be needed in the 4IR, but in my opinion it is a hedgehog's book, through and through. The apparently round-the-corner creation of "smart-dust", very small computers that can "arrange themselves" into networks for particular purposes, is extrapolated to the prospect of a medical panacea, in which the dust is injected into us and computers arrange themselves to attack viruses or release "healing medicines", without any consideration of the various possibilities that might prevent this result (Schwab, 2016). I read something similar in my early teens, in a science-fiction book from the 1960s. In that book, details forgotten, there was a machine on a spaceship that was able to overhaul or service a person. Afterwards, the protagonist "felt like he had been oiled". Admittedly, this was a machine and not smart dust, but the idea is basically the same, and the differences in detail reflect the science of the day, rather than differentiated predictive exercises. In my opinion, neither case is a decent prediction; both are mere projections.

That's exactly what foxes don't do: project. They look around for other ways that things might go, that are not more of the same. There's precious

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little of this in Schwab's book, and many excited talks, videos, op eds, and so forth that I've failed in my efforts to avoid. Room is made for the possibility that the 4IR could turn out in more than one way, but this is always within a framework of predictive certainties: the continuing growth of computing power and data, increasing connectivity, and, most importantly, continued technological advances, on an exponential trajectory. The world's response to this trajectory is allowed to be uncertain, but the trajectory is treated as a certainty. Technology marches on, and society must respond, like it or not.

Getting Causality Wrong

So much for second-order arguments. Let us now turn to first-order considerations: the evidence and arguments for the 4IR hypothesis.

The overarching problem with the considerations advanced for the 4IR hypothesis is that they get causality all wrong. They see technology as marching along more or less under its own steam, thus driving change. They don't see the reverse causal direction, which is also important: society driving technological change. In truth, both technological development and societal change are caused in very complex ways, including by each other, and the causal model set up by 4IR proponents is nowhere near complex enough to be credible.

For example, a 4IR enthusiast might wonder why the "first" Industrial Revolution occurred in England and not India, which is more populous, and thus more likely to stochastically throw up great ideas. There's nothing in Schwab's book, for example, to explain this. The question presupposes that invention is more or less a random occurrence, perhaps a confluence of genius with adequate social traction, which is therefore more likely to occur in a larger society. There's a further assumption that societies which are broadly similar in complexity and some basic structures, such as class-like stratification (a feature of all the complex societies I can think of), will respond to such sparks of innovation in much the same way. Then it's natural to ask: why did the spark of the "first" Revolution occur and catch in the small, soggy island of Britain, and not in much more populous India?

Of course, the assumptions are false. There are

> **❝ There is another, perhaps deeper, reason for why many researchers get the wrong answer: an underlying lack of appreciation of the nature of change in the world of ideas—including technological ideas. ❞**

complex reasons for the initiation of the Industrial Revolution in Britain. It may be that good ideas are more common than we realise (I certainly suspect they are more obvious), but even if a spark of genius is part of the story, conditions need to be such as to educate the genius enough to have a relevant idea—and then the spark has to catch.

Despite being damp, Britain's and especially England's eighteenth-century development was such as to make it flammable for good ideas. Although a class-stratified society, English classes rubbed shoulders with each other to an extent that French visitors found quite strange, as Roy Porter remarks (1990). The squire would joke with the stable boy. In Russia, by comparison, the stable boy might be a serf, a virtual slave, and the nobleman might well choose to address his peers in a language the stable boy would not understand, such as French. In England, for further historical reasons, a large body of English-language literature was available, and English readership of all kinds of material—books, pamphlets, posters—was far higher than in continental Europe. A political culture of debate was evolving, and while riots were common, the general development of politics was towards an inclusion of more voices and away from the violent assertion of power. None of these things could be said of European neighbours, nor indeed of eighteenth-century India. Eighteenth-century England was no paradise: it was violent, cruel, unfair, scourged by gin, debt and gout; it was miserable for many. And I fully concede that merely mentioning the factors I've mentioned hardly amounts to a case for England as a tinderbox for innovation. Nonetheless, it was clearly a socio-political context that cannot be ignored when asking why the Industrial Revolution happened in England rather than, say, India.

Such considerations do not feature at all in the reasoning of Schwab's book, either as regards the unfolding of the supposed previous three industrial revolutions, nor as regards projections for the fourth. It's not so much that socio-political factors are ignored; I'm sure he would admit that they matter. It's rather that their complexity is underestimated. Entire academic disciplines (history, sociology, anthropology, psychology, philosophy) devote huge energy to understanding the shape and development of human existence. Even if one doesn't think much of these efforts, one can't ignore the fact that the shape and progress of humanity has proved remarkably tough against the intellectual blade.

The Beginning of Exponential Growth, or the Edge of a New Plateau?

There is another, perhaps deeper, reason for why many researchers get the wrong answer: an underlying lack of appreciation of the nature of change in the world of ideas—including technological ideas.

Progress across many fields of human inquiry seems to display two related properties. It occurs in step changes, and its direction is unanticipated. Together, these features explain the embarrassing history of big-picture predictive narratives, which is that they are nearly always wrong. The direction of development is usually unanticipated, and usually the point at which wild projections are made represents not the start of a dizzying climb, but the cusp of a new plateau.

Travel is a great example. Space travel to the moon was a highpoint; Concorde was eventually decommissioned in favour of massive lumbering disappointments. There were other remarkable technological developments in the following decades, but they had little to do with high-speed or long-distance travel; instead, they concerned communication and computation. And even there, developments have not produced the conscious computers with which the science fiction writers of the 1960s equipped their interstellar spaceships. Sadly, we still do not have robots that can gain consciousness and take over the world.

Thomas Kuhn argued compellingly that science does not proceed in a smooth accumulation of knowledge, but in a series of step changes, or "paradigm shifts" (Bird, 2000; Kuhn, 1962, 1977). There is a lot more to this much-abused notion, but what matters here is that the model of continued

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and accelerating development is not one that we generally see in knowledge acquisition. Even before science, the Scholastics famously developed Aristotelian and Christian thought for centuries; and, while they certainly made intellectual innovations, the basic framework was not challenged until the Renaissance and the Enlightenment. Newton upset the apple cart of Aristotelian physics, and Einstein did the same for Newtonian physics, but there was not a steady growth of innovation between the two. Medicine, after years of frustrating curative impotence, went through a step-change in effectiveness in the twentieth-century, which saw it come to grips with infectious diseases – then mount a new plateau, returning to a shallow trajectory of incremental improvements. Of the top ten causes of death in 1900, six remained in 1998, and the number of deaths per 100 000 had risen in several of these (Rockett, 1999, p.8).

It is therefore a mistake to see physics, medicine, or any of our other great human achievements as an accelerating, cumulative curve. The projection of sharp recent upward trends has always been a tempting method of predicting the socio-political future, but has never yet proved successful, because of the stepped nature of progress.

The Real Value of the 4IR

I want to finish by talking about what I find valuable about the 4IR story. As Executive Dean of Humanities at UJ, I've been extremely active at "readying" the Faculty for the 4IR. In particular, I've pushed a complete overhaul of the undergraduate offering. Where we offered 13 degree programmes with a further four specialisations, we now have an interdisciplinary BA, to be rolled out in 2020. We've reduced lecture time, increased small group contact, and trained our entire Faculty in blended delivery and contemporary pedagogy.

We're moving away from traditional assessment practices in many cases. It's the biggest change the Faculty's teaching offering has ever gone through, and it's all related to the "4IR".

I mention this to prove that I'm not a Luddite. I welcome the conversation about the 4IR when it's done well, as a call for thinking carefully and openly about the future. Especially for Africa, there's huge value in the call to look outwards and forwards, to reorganise workplaces and bureaucracies, and to train different skills. These are valuable messages for an isolated region, mired in its past.

I don't see the 4IR story as an entirely benign fiction, because many commentators go beyond contingency planning and make fantastical assertions about what *will* happen, which I then worry may become the basis of terrible decisions. My worry about the 4IR is that it may influence the making of specific decisions on an inadequate basis: in policy, investment, curriculum design, and many other areas of collective decision-making. There is no doubt that change is occurring (indeed, occurring is change's favourite pastime), and there's a need for Africa in particular to wake up and respond. Africa tends to be isolated, forgotten, ignored, inward-looking; it tends to be mired in its past and to lack clear, realistic hopes for its future and plans for how to get there.

The 4IR discussion is a wonderful wake-up call for this region. My worry is related to the specifics. We must not start building a future based on fiction, even science fiction. We cannot design curricula to teach inaccurate soundbites. Most importantly, if we're to teach critical thinking, we must imbue the entire 4IR ethos with that approach. My hope is that this article will encourage a dose of healthy scepticism, giving rise to reflective pause before basing decisions on bold predictions. ∎

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GOOGLING THE US ELECTORAL CYCLE, 2004-2016

South African Insights

By Bhaso Ndzendze

Introduction

The US electoral cycle is one of the most closely watched political events in the twenty-first century. Indeed, in each successive year, new records are broken for expenditures on advertising by the campaigns. The digital sphere has become the main arena in which the various campaigns reach out to potential voters. By one 2019 estimate, "spending for political ads will reach $10 billion, an increase of 59% from the 2016 election year when an estimated $6.3 billion was spent. This represents a potential 16.5% of total local broadcast TV advertising revenue for 2020. Digital media is forecast for 21% of political ads, cable TV 14% and radio nearly 5%" (Adgate, 2019). This disproportional share for digital spending is indicative of what scholars have termed as the rise of computational politics, defined by one study as "the application of digital targeted-marketing technologies to election campaigns" (Chester and Montgomery, 2017: 1).

Modern political campaigns, in the US and elsewhere, rely on the toolbox and data offered by technology corporations such as Facebook and Google, which are leaders in the online advertising industry. As explained by Wakabayashi

and Goldmacher: "The campaigns have been able to cater different messages for potential voters based on signals such as political leanings, what articles they have read, what videos they have watched and what things they have searched for. Instead of blanketing an entire city with a costly TV spot, the so-called microtargeting of political ads has become controversial because it allows advertisers to seek out specific voters and perhaps avoid broader scrutiny of their messages" (2019). In the wake of this, in October 2019, Twitter made the announcement that it would ban all political advertising from its platform. In turn, Twitter's decision was widely interpreted as a response to the controversy caused by Facebook when it refused to de-platform a reportedly false video issued by the Trump campaign accusing a family member of a Democratic candidate of improper business conduct in Ukraine (Wakabayashi and Goldmacher, 2019). Twitter's decision also led to Google's own decision to do the same in November 2019.

Many of these studies thus look at the US elections from within the US domestic context. Among internationally-minded studies, the interest is on the role of international dynamics on the actions of incumbents during the electoral cycle. For example, Chiozza (2015: 3) "assesses whether US presidents' major responses in international crises reflect the variability in audience costs in an analysis of 66 international crises between 1937 and 2006". The conclusion is that tying-hand commitment strategies (i.e., the creation of audience costs (potentially unpopular decisions) that will suffer after the fact if they fail to commit to the threat or commitment made (Fearon, 1997: 68)) were most preferred when presidential elections were approaching. This indicates that foreign policy is designed with re-electability in mind, lest unpopular foreign policy decisions lead to negative repercussions and loss of political

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office (Chiozza 2015: 3). The same findings on the foreign policy-electoral cycle nexus were identified by Gadarian (2010). Gadarian's paper makes use of data over the 1980-2004 period to demonstrate that opposing political candidates in the US system are faced with different incentives for mentioning foreign policy during their campaigns. The paper effectively illustrates that American voters connect their own views on foreign policy when evaluating Republican candidates, while a lack or presence of similarity in foreign policy views has no impact in their evaluations of Democratic party candidates. Additionally, Gadarian's paper proves that during times of external threat, US voters tend to not only be inclined towards hawkish candidates/ incumbents, but are even more likely to severely punish candidates who are perceived as holding dovish positions (Gadarian, 2010: 1046).

In this regard, in 2016, CNN conducted interviews with 10 journalists from outside the US "for their take on the race so far, and what their country might be hoping for in America's next president". Analysing the responses, I note them to be mostly split between pro-Democrat (Canada, South Africa, Iran and Japan) and neutral (United Kingdom, Venezuela, Israel, and Lebanon), with only two international journalists expressing indifference (India) and pro-Republican sentiment (Russia) (CNN, 2016: January 29).

Among the participants was South African journalist and noted editor of some leading national newspapers, Ferial Haffajee, whose contribution centred on the probability of a Trump victory: "Donald Trump? After Barack Obama? For those South Africans paying attention at this point in the U.S. presidential race, the primary campaign has prompted furrowed eyebrows. Indeed, the word "incredulous" best describes the response here to Trump's howl-a-minute, holler-a-minute, horror-a-minute bid to become the Republican nominee" (Haffajee in CNN, 2016). She further expands, noting that: "Now the same country that elected Obama seems to be toying with the idea of electing a comb-over king who doesn't seem to like Muslims and Mexicans very much, leaving some here to wonder what he feels about black Americans and Africans" (Haffajee in CNN, 2016). If subsequent Pew numbers are any indication, this may indeed be the case, as post-election approvals in South Africa declined with

the election of Donald Trump.

The second section is a breakdown of the methodology utilised in the article, as well as the electoral cycles of the US. The third section concludes the article, highlighting some areas for further research based on the findings.

Methods

This article traces Google queries in South Africa over the 2004-2016 period for American presidential frontrunners, eventual winners and incumbents. Within-country differences are also noted in this regard; the data will be broken into geographical concentrations, with the magnitude of each American candidate's Google searches ranked by South African provinces. Simultaneous worldwide Google searches will be used as a control group for each search trend per candidate to note whether interest in each candidate was on par, below, or above the global average. Importantly, this is a generative study and as such no proposal of cause-and-effect relations is made in this article. Rather, findings will generate working hypotheses and areas for further study.

Election cycles in the US

American presidential elections occur every four years and are dominated by two parties: the Democratic and Republican parties. With the system dominated by the two parties, their nomination contests can begin a year prior to the national election. Two of the party conventions of the election cycles took place in July of each year (i.e., 2004 and 2016), whereas in 2008, the parties had conventions in August (Democratic National Convention [DNC]) and September (Republican National Convention [RNC]). In 2012, the RNC was held in August and the DNC was held in September. Upon the parties nominating their candidates (along with their vice-presidential running mates), the party-to-party contest runs from their party conventions until the first Tuesday of November, which is the election day. As such, the dataset will capture and compare data for the electoral years from January to December of each year (i.e. 10 months prior to the election and one month after).

Findings

All data utilised in this article is obtained from Google Trends, a publicly available dataset of worldwide Google searches since 1 January 2004. All charts were generated by the author from sorted data. The Google Trends data are values that are calculated on an index that places scores from 0 to 100, "where 100 is the location with the most popularity as a fraction of total searches in that location, a value of 50 indicates a location which is half as popular" (Google, 2020). Importantly, a score of '0' indicates a location where there was not enough data for this term. The timeline for both variables is 2004 to 2019.

South African searches for US presidential candidates

In 2004, the South African population searched

Figure 1: South African Google searches for US presidential candidates, 2004
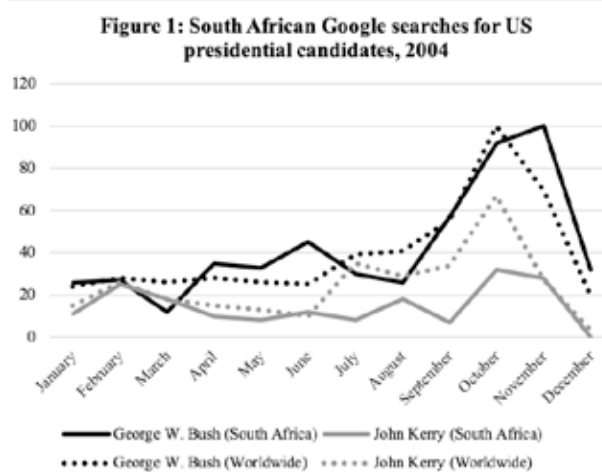
for the Republican incumbent and eventual winner George W. Bush throughout the year. Whilst the Democratic nominee John Kerry surpassed Bush in March of 2004 when they declined, Google searches for Bush in South Africa subsequently grew between April and July. In the decline in August, searches for Bush still outweighed those of Kerry. Google searches for Bush subsequently grew to new peaks in September, October and November respectively, before subsequently declining in December of that year. Noticeably, searches for both candidates reached their peak in November. South Africa's search frequency for George W. Bush during November was above the worldwide average, although the worldwide average search for John Kerry was above South Africa's in the same month. The majority of the searches occurred most in the North West province and the least in the Gauteng province. Bush's share of searches was highest in North

West (100%), and lowest in KwaZulu-Natal (KZN) province (at 60%, to Kerry's 40%).

In 2008, South African Google searches were

Figure 2: South African Google searches for US presidential candidates, 2008
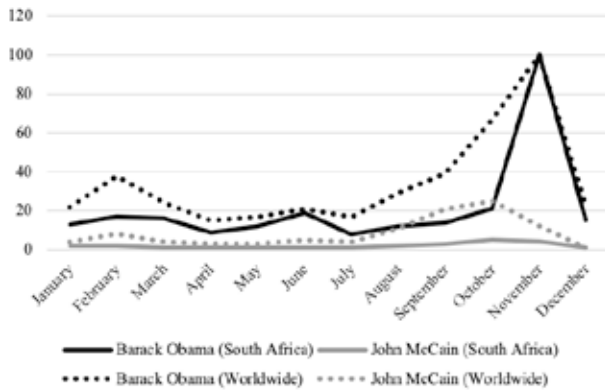
overwhelmingly for Barack Obama, the eventual winner of the election, though below the worldwide average until November, the month of the election which was once again the global peak. The majority of the searches for the candidates occurred most in the Gauteng province and least in the Northern Cape (NC) province. Barack Obama's share of searches was highest in Free State (100%), and lowest in the Eastern Cape (EC) province (at 97%, to McCain's 3%).

In 2012, South African Google searches were

**Figure 3: South African Google searches for US presidential candidates, 2012**
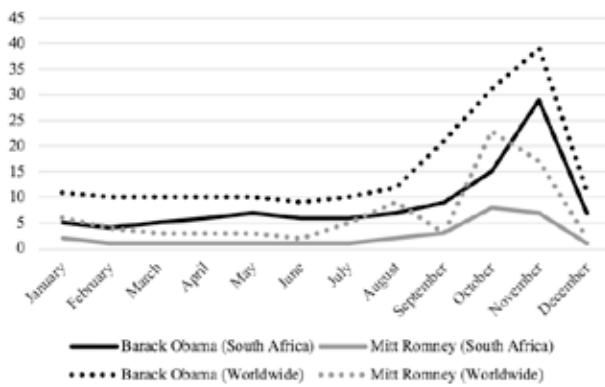
once again tilted towards Barack Obama, who was running for re-election, though the search frequency was now lower than the worldwide average. This diminished search frequency was also true of November, with the worldwide average outperforming South Africa's by a difference of 10

points. Worldwide searches for Mitt Romney were consistently higher than South African searches for Mitt Romney, with searches for Romney outranking South African searches for Obama in October 2012. This marks the only incident in the dataset in which a search for an unsuccessful candidate outranked the South African searches for Barack Obama. The majority of the searches for the candidates in 2012 occurred most in the Gauteng province and least in the Northern Cape province. Barack Obama's share of searches was highest in the NC province (100%), and lowest in the Western Cape (WC) province (at 96%, to Romney's 4%).

In 2016, South African online searches for

Figure 4: South African Google searches for US presidential candidates, 2016
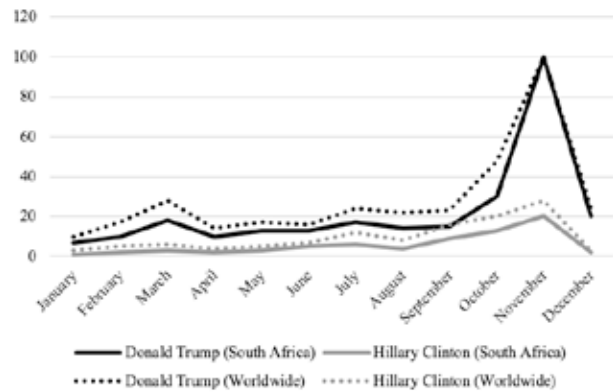
Donald Trump outranked those of Hillary Clinton for the entire course of the year. South African searches for either candidate were below the worldwide average. Searches for both candidates peaked in November, though searches for Donald Trump matched the worldwide average, whilst searches for Hillary Clinton were below the worldwide average. The majority of the searches for the candidates in 2016 occurred most in the WC province and least in the FS province. Donald Trump's share of searches was highest in the WC province (100%), and lowest in the FS province (at 91%, to Clinton's 9%).

Conclusion

The paper has generated some insights in terms of the search trends of American presidential frontrunners in South Africa, using the worldwide search average as a control group. Most notably, all individual candidates who were the most

searched were the ones who went on to win the election. Nonetheless, there persist some areas for further research. Given variations in searches across the two countries, questions arise as to the causes of these. Do searches by either side act as proxies for forms of asymmetry, for example? More precisely, can we read into them notions of cultural hegemony, digital inequality, soft power, or diasporas on either side? Perhaps a combination of these may be at play. Perhaps none. Importantly, this need not coincide with traditional understandings of western preponderance as in these online dimensions, the global South can, as in no other sphere, exhibit patterns of some sovereignty. Yet, some scholars can read into the very ubiquity of Google as the preferred engine of the majority of the world as a sign of US dominance. Nonetheless, the modulation of search results to local geographies indicates that the relationship between Google and the consumer base outside the US is not unidirectional and its terms of operation are not dictated by the multinational corporation (Nahai, 2012). At the same time, within-country differences in search patterns also showcases the level of splintering of interest that should challenge any notion of homogeneity in South African political perceptions of the United States. ∎

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THE RUSSIA-AFRICA SUMMIT AND ECONOMIC FORUM

An Unprecedented Event in the History of African–Russian Relations

By Alexander Mezyaev

The Russia-Africa Summit and Economic Forum was held on 23-24 October 2019 in Sochi. This was an unprecedented event in the history of Russian-African relations, and was especially noteworthy in light of the almost total abandoning of Africa by Russia in the last thirty years.

A brief history of Russian-African relations

To understand the significance of the Russia-Africa Summit of 2019, it is important to begin by briefly discussing the history of Russian-African relations. Tsarist Russia did not have any possessions in Africa and never engaged in the slave trade. Moreover, the Russian navy repeatedly participated in maritime convoys to prevent the transportation of slaves from Africa across the Atlantic, after the adoption in July 1890 of the General Act of the Brussels Conference on the African Slave Trade.

Though Russia took part in the notorious Berlin Conference of 1885, it never took part in the colonial division of the African continent. Moreover, Russia was categorically against the project that provided the German colonial zone in Morocco in 1911. In 1898, Russia established diplomatic relations with Ethiopia and provided assistance to Emperor Menelik II in his fight against Italian aggression in 1895–1896.

Russian-African relations became especially strong after the Great October Socialist Revolution of 1917 and the creation of the USSR in 1922. The establishment of the Comintern by the first Soviet leader, V. Lenin, was aimed at the liberation of all oppressed people of the world, with particular attention to the liberation of colonised countries and peoples. Some scholars have rightly pointed out that there were some difficult discussions between the Comintern and the South African Communist Party (Davidson et al., 2003), but those differences were about matters of tactics, and not about overall strategy.

The USSR introduced the principle of equal rights and self-determination of peoples into international law (Peters, 2017) – thereby strengthening support for oppressed peoples all over the world, including in Africa. Under Soviet initiative, on December 14 1960, the United Nations adopted the "Declaration on the Granting of Independence to Colonial Countries and Peoples".

The adoption of this instrument ensured the legal base for decolonisation and the creation of independent states in Africa. The relevance of this Declaration in the present time was confirmed last year by the International Court of Justice (ICJ) in the case of the Chagos Archipelago. In its advisory opinion, issued 25 February 2019, the ICJ stated that the United Kingdom is under an obligation to bring to an end its administration of the Chagos Archipelago as rapidly as possible. The position of the ICJ almost fully reflected the position of the African Union and the official statement made by the Government of the Republic of South Africa on this matter (ICJ, 2019).

In 1960, the USSR had economic relations with four African countries. By 1970, this number had risen to 20, and in the early 1980s it had risen to 37 states. The priority fields of cooperation were the industry and energy sectors.

Between 1960-1984, the foreign trade turnover with African States increased by 13 times. By the mid-1980s, the share of African countries in Soviet imports amounted to: in bauxite – about 60%, in manganese – total ore – about 56%, for cobalt – 100%, for cocoa – about 64%, for valuable wood – about 58% (Deich and Kukushkin, 1988). Soviet assistance was provided, as a rule, under specific conditions: the share of preferential or gratuitous lending was not lower than 40%, and investment loans for a period of 10 to 15 years were provided from a calculation of 2-3%, with a grace period of one year up to three to four years (Tarabin, 1977).

In total, by the mid-1980s, the following had been achieved with Soviet help: about 300 industrial enterprises built, 155 objects in the agricultural sector, and about 100 educational institutions, including 10 higher and 80 secondary and vocational schools. 480,000 Africans received professional training in the USSR, more than 150,000 workers and specialists were trained in the construction and operation of objects of cooperation, and more than 80,000 Africans received Soviet diplomas of higher education (Koshelev, 1981).

The enterprises that were built by the USSR in Africa produced 4.6 million kW of electricity, 4.1 million tons of cast iron, 4.5 million tons of steel, 3 million tons of oil products, 3 million tons of bauxites, and 1620 metal cutting machines per year. The broadest and most diversified assistance

"To understand the significance of the Russia–Africa Summit of 2019, it is important to begin by briefly discussing the history of Russian–African relations."

was provided to Algeria, Egypt, and a number of countries in Sub-Saharan Africa, namely Angola, Nigeria, Ethiopia, the Republic of Congo, Mali and Guinea (Institute for African Studies, 1976).

After the destruction of the USSR, Russian-African relations drastically decreased. In 1985, the USSR trade turnover with African states amounted to $5.9 billion. In 1995 it fell to $0.98 billion, and in 2000 it grew to just $1.6 billion.

This decrease in economic relations was accompanied by a decrease in political relations. During Vladimir Putin's first presidential session (1999-2008), the African continent was not in the interest of Russian foreign policy. During the presidency of Dmitry Medvedev, Russia's internal and foreign policy was completely subordinated to ensuring the interests of global (external) capital. For example, the Russian vote in the UN Security Council on Resolutions #1970 and #1973 on the situation in Libya led to a $10 billion direct economic loss for Russia, not counting the loss of the cancelling of future contracts. President Medvedev's policy towards Libya provoked the first and only public clash between Putin (who was then Prime Minister of Russia) and Medvedev (Top News, 2011).

During the Russia-Africa summit in Sochi in October 2019, Putin announced a $20 billion debt relief to African states. In many instances, the reason for such a relief is in fact an insolvency of states, but Libya's debt had nothing to do with this decision – contrary to most African states, Libya was Russia's most accurate debt payer.

New Russian-African policy

The revitalisation of Russian-African relations is in a big part a result of the general change of Russia's position in the world. The sharp aggravation of relations between the West and Russia has its cause in Russia's attempts to defend

its national interests (or the interests of its national capital), after Putin's second presidential session. As a result of these attempts, the West imposed hundreds of different (and illegal) sanctions against Russia. Relations between the centre states (using the World-Systems terminology) and the periphery and semi-periphery states are not based on the principle of equality, but essentially on dictatorships. The destruction of the USSR put Russia in – at the best – the semi-periphery. Russia's attempts to claim its interests therefore provoked a fierce reaction from the centre (imperialist) states.

The aggravation of the relations with the centre states forced Russia to change its almost exclusive orientation to the West. In one of his first interviews at the beginning of the 2000s, answering the question of whether he would like to visit Africa, Putin answered: "Yes, I would love to visit Kenya. For safari". When the orientation to the West failed, Putin's understanding of Africa radically changed.

Russia's African policy is defined very shortly in the *Concept of the Foreign Policy* adopted by the Decree of President Putin in 2016. Paragraph 99 of this document states the following: "Russia will expand multidimensional interaction with African States both in bilateral and multilateral settings by improving political dialogue and promoting mutually beneficial trade and economic ties, stepping up comprehensive cooperation that serves common interests, contribute to preventing regional conflicts and crisis situations, as well as facilitate post-conflict settlement in Africa. Promoting partnership ties with the African Union and sub-regional organizations is an important element of this policy" (The Ministry of Foreign Affairs of the Russian Federation, 2016).

This statement should be read in the light of inferences based on an analysis of the Russian diplomatic practice of the last few years (Putin's second presidential session, beginning in 2012). Based on such an analysis, we can conclude that Russia's current policy towards Africa may be defined as total and unconditional support of the African position when it is presented as a common position of the AU.

The Minister for Foreign Affairs, S. Lavrov, often uses the famous formula "African solutions for African problems" to define Russian-Africa policy

(The Ministry of Foreign Affairs of the Russian Federation, 2019). Implementation of this policy involved Russia going into conflict with the West – this gives us a clear understanding that Russia's involvement is more than simple support of Africa, but rather a principled war for a more just world.

Some of the first steps towards this policy may be traced back to as early as 2008. For example, the open conflict with the USA at the 5933rd meeting of the UN Security Council (UNSC) on 11 July 2008, when Russia vetoed the draft resolution on sanctions against Zimbabwe. The draft resolution's sponsors were: Australia, Belgium, Canada, Croatia, France, Italy, the Netherlands, New Zealand, UK and USA, as well as two African states: Liberia and Sierra Leone. It is interesting to note the division of African members of the UNSC on the voting: Burkina Faso voted in favour of the draft and Libya and South Africa voted against (United Nations Security Council, 2008).

Permanent Representative of the USA, Mr. Khalilzad, even threatened Russia by saying that "[t]he Russian performance here today raises questions about the Russian Federation's reliability as a G-8 partner" (United Nations Security Council, 2008). Later on, Russia was expelled from the G-8.

Interestingly, Medvedev – who succeeded Putin as President of Russia in 2008 – immediately corrected the Russian Concept of Foreign Policy. It was amended by the notion that Russian-African policy is based on "multi-dimensional cooperation", including on the G-8 platform. After Putin's reinstatement in 2012, the reference to G-8 in the African policy section was removed.

Some African states interpreted Russia's position towards Africa as a readiness to defend the continent from the West's aggressive policies. For example, President of Sudan, Omar al-Bashir, during his trip to Moscow in November 2017, asked Russia to "defend" his country from the aggressive policy of the USA (RBC, 2017). A number of the international treaties on military assistance concluded recently between Russia and African states should be regarded in this context, at least partially. In 2019, several treaties on different types of military assistance between Russia and African states entered into force – namely, with the DRC, Zimbabwe, Rwanda, Sudan and the Central African Republic. Several African countries with terrorist activities found themselves in an unusual

situation when they were denied arms on the Western market, but were able to get ammunition from Russia.

An example of Russia's readiness to go into direct conflict with the West by defending African interests was its position on the African Union request to the UN Security Council for the deferral of the cases against Kenyan government leaders in the International Criminal Court (United Nations Security Council, 2013). The request was supported by seven states, including the Russian Federation, while all eight Western permanent members and their allies abstained (thus rejecting the AU request).

The Representative of the Russian Federation in the UNSC was diplomatic but unequivocally clear on the position of the West: "African countries presented very compelling arguments. Indeed, at such a critical time for Kenya, when the military contingent of that country is playing a key role in combating terrorism in Somalia, and when Kenya itself has become a target for terrorist attacks, the democratically elected President and Deputy President of that country should be able to remain in their country and resolve the pressing tasks faced by their Government" (Security Council Report, 2013). It is important to add that, several years later, these so-called "Kenyan cases" at the ICC all collapsed when the Prosecutor accepted the fact of no evidence against the President and Vice-President of Kenya.

It is important to note *how* Russia supported the common African position on the International Criminal Court (ICC). Russia acted jointly with African states to implement the "Withdrawal Strategy from the International Criminal Court", adopted by the African Union in 2017. This strategy included the withdrawal of member countries from the ICC Statute. The peculiarity of this decision is of a dual nature. On the one hand, a withdrawal of this

> 66 It was at this very time, when the practical implementation of the AU "Withdrawal Strategy" began, that Russia announced its own withdrawal from the ICC Statute. Legally speaking, Russia did not *withdraw* from the treaty, but revoked its signature. 99

nature should legally be carried out individually (based on Article 127 of the ICC Statute), but – on the other hand – politically, this withdrawal should be implemented collectively, that is, coordinated in time. This duality makes it particularly difficult to enforce this decision, because from the point of view of international law, the withdrawal procedure is the same for all states, but from the point of view of national law, the procedure is different.

For example, the Republic of Burundi ensured the international law part of the withdrawal procedure, together with its parliament, effectively finalising the whole process. The Republic of South Africa carried out the withdrawal procedure without the participation of parliament. This approach was recognized by the Supreme Court of Appeal of South Africa as not compliant with the Constitution, significantly slowing down the process of withdrawal (International Criminal Court, 2019). A few short comments here: firstly, it seems that the judgment of the Supreme Court of Appeal is not convincing enough, because it is based not on specific legal norms, but on assumptions. Nevertheless, the conclusion that the non-participation of the Parliament in the procedure for withdrawing from the ICC Statute is "unconstitutional" looks like an excessive exaggeration. The country's Constitution does not contain direct requirements on the participation of Parliament in the procedure for withdrawing from an international treaty in general and the ICC Statute in particular. Secondly, doubts arise about the legality of the court decision on this issue. According to the principle of separation of powers, each branch – particularly the judiciary – must act strictly within its competence. Thus, the very fact of a legal assessment of the court in relation to the actions of the government within its exclusive powers to implement foreign policy may raise questions about the court acting *ultra vires*.

It was at this very time, when the practical implementation of the AU "Withdrawal Strategy" began, that Russia announced its own withdrawal from the ICC Statute. Legally speaking, Russia did not *withdraw* from the treaty, but revoked its signature. Using the words of the Vienna Convention of the Law of Treaties, Russia "made its intention clear not to become a party to the treaty" (Art.18).

In addition, the Russian Federation also supported individual African states that were under attack by the ICC. When in 2015, the South African government refused to implement the ICC judge's order to arrest the President of the Sudan, the ICC threatened to report South Africa to the UN Security Council. At that time, Russia supported South Africa in the UN Security Council, by confirming that the legal position of the South African government (not the judiciary) was correct.

The Russia-Africa Summit in Sochi

The Sochi Summit of 23-24 October 2019 was a culmination of the year's events of the revitalisation of Russian-African cooperation. One of the biggest events in that chain of events was an annual meeting of the African Export-Import Bank's (Afreximbank) shareholders. Moscow's choice was unusual, because this was just the second case in the history of the bank when such a meeting was held outside of Africa. Afreximbank was established in 1993, and its founders are the states of Africa (today – 51, i.e. almost all the countries of the continent). Afreximbank's shareholders include governments, central banks, regional economic organisations, international financial institutions, and export credit agencies.

In December 2017, the Russian Export Centre acquired a stake in Afreximbank and became its third largest shareholder among non-African financial institutions and organisations. Russia's biggest banks (Sky Export Centre, Sberbank and Vnesheconombank) allocated an amount of 5 billion euros for financing Russian exports to Africa. Russia participated in the meeting of shareholders at the level of then Prime Minister D. Medvedev.

It should also be noted that, in September 2019, Russia initiated the special UN Security Council meeting on Africa at the level of foreign ministers. At this meeting, the Russian Minister for Foreign Affairs, S. Lavrov, said: "Nevertheless, since then African States have continued to face serious challenges to their sovereignty… Africans themselves, at the recently held meeting of the African Union Peace and Security Council dedicated to foreign military presence on the continent, condemned foreign military interference in the continent's affairs and appealed for foreign partners of Africa to respect regional initiatives. Russia provides assistance to uphold peace and security in Africa in accordance with international law, including the principle of non-interference in the internal affairs of States enshrined in the Charter of the United Nations, and only with the agreement of host countries. Such assistance is aimed at building countries' own capacities to deal with crises" (United Nations Security Council, 2019).

The Summit and Economic Forum in Sochi received the highest level of representation from African leaders. All African states were present at the Summit. 48 states were represented by the Head of States and Government. Only a few countries were represented by persons of a different rank, and in these cases, there were perfectly valid reasons for this. For example, the delegation of the Republic of Burundi was headed not by President P. Nkurunziza, but by the Second Vice President of the country, H.E. Joseph Butore, who spent many years in Russia (where he graduated and defended his Ph.D.) and obviously was the most reasonable representative at such a meeting.

Another important feature of the Summit was the participation of the leaders of the seven largest African regional organizations: African Union, the Southern African Development Community (SADC), Maghreb Union of Nations, Big Five Sahel (G5 Sahel), Economic Community of Central African States, Economic Community of West African States and finally, the East African Community. The leaders of these organisations participated in the meetings of heads of states, but also had a separate session with the Russian President.

Attention is drawn to the conclusion of an agreement between the African Union and the Eurasian Economic Union (EAEU). It should be noted that the All-African Free Trade Agreement

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came into force a few weeks ago, in which all countries of the continent participated. This provides unique opportunities for agreements on the principle of "integration association - with integration association" and on the principle of "integration association - separate states". An agreement on the creation of a free-trade zone between the EAEU and Egypt is approaching.

The agenda of the summit included economic integration, the problems of doing Russian business in Africa, cooperation in the field of education, exploration, projects in the oil and gas and nuclear industries, security on the continent, ensuring economic sovereignty and many more.

One of the most impressive examples of the best practices of Russian-African cooperation presented at the Forum was the Russian industrial zone in Egypt. This zone includes an area of 525 hectares in the East Port Said area of the Suez Canal Economic Zone, exploited jointly by governments, government agencies and private business. The project has no analogues in terms of state investment and the mechanism is being created to support the withdrawal of interested companies in foreign markets. Framework agreements have already been concluded with 25 resident companies working in the field of biochemistry and fertilizers, building materials and metal structures, composite materials, agricultural machinery, electrical and oil and gas equipment, port equipment, and so on. Tax incentives and preferences will apply for companies, customs duties on exports and imports, staff costs and the payment of passage through the Suez Canal. There is the possibility of 100% repatriation of the proceeds, while there will be no requirements regarding the presence of an Egyptian partner

Another big issue discussed at the Summit and Forum was the development of the energy sector, especially nuclear energy. The largest Russian energy project in Africa is again in Egypt. The nuclear power plant in the city of Ed-Dabaa off the coast of the Mediterranean Sea, near Alexandria, will have four power units, with a capacity of 1.2 thousand MW each.

There are still a lot of problems to resolve. In absolute terms, the trade turnover between Russia and Africa is still low: a little more than $ 20 billion in 2018 (The Ministry of Economic Development of the Russian Federation, 2018). Hence, African

markets occupy an extremely insignificant place for Russia, at just about 2%. Moreover, 70- 80% of trade with the African continent falls on the countries of North Africa. The same applies to the dynamics of development. According to the agreement concluded with Egypt this year, Russia will invest $12 billion (2019-2014) in the industrial freedom zone.

In African countries south of the Sahara, a quarter of the 50% of trade comes from only four countries: South Africa, Angola, Nigeria and Côte d'Ivoire. In absolute terms, this is $3.5 billion (2017) – which is so far negligible. At the same time, growth over the past decade has more than tripled.

The trade turnover structure is also not diverse. Food, agricultural products and raw materials account for a quarter of Russian exports and for nearly 65% of imports. Fuel and products of its distillation make up 25%, and mineral products about 8%. High-tech goods, primarily machinery, equipment and transport, make up only 0.7% of exports and 1.9% of imports. The only exception here is the arms trade. About a third (27%) of tropical Africa's imports of weapons come from Russia.

Another problem with the Russian-African cooperation is trade imbalance. For example, Russian exports account for 99% of its trade with Sudan. In 2018, trade between Russia and Sudan amounted to $510 million, while more than 80% of Russian exports ($417 million) are cereals.

Despite the fact that African countries are waiting for Russian investment, so far there are very few instances of this. There are, however, some positive examples. For instance, the Russian company Alrosa announced its intention to invest between $500 and $700 million in a new diamond field in Angola.

Conclusion

The change in Russia's African policy has been drastic. The Russia-Africa Summit and Economic Forum demonstrated the return of Russian interests in African countries. This, however, will be accompanied with challenges. The very idea of holding a summit was subjected to a fierce attack from the Western mass media. The Foreign Ministry Spokesperson Maria Zakharova addressed this in an official statement: "We

understand that this is being orchestrated by someone. I would like to address the US media: you cannot allow yourselves to be used like this. We have a complete picture of what is going on. We have the impression that officials of respective agencies in Washington are resorting to desperate attempts to discredit Russia's policy in Africa using media outlets and government-related NGOs. This is being done specially and directly on the eve of the summit. News agencies and so-called "experts" are now routinely blaming Russia for any transgression, in this case with regard to the African continent – for supporting the "wrong" regimes by supplying them with arms and military equipment, for interference in elections, and for corruption. A narrative is being pushed through that Moscow is "attempting to hammer together an anti-West front to smear the positive role of the US and its allies." This is an example of a quote that the world audience is being offered with respect to the Russia-Africa Summit in Sochi. One has to ask: Why? In view of such awkward attempts to manipulate public opinion, Washington is apparently afraid that the Russia-Africa Summit will strengthen Russia's trade, economic, political and diplomatic relations with the countries of this continent, including those that the US sees as its backyard, unaware of the fact that the nations of the region can select partners by themselves. I believe it is time to admit that neo-colonial approaches, attempts to impose their will on sovereign states, are being rejected by the overwhelming majority of the world community. Most African nations support a multipolar system of international relations and are quite capable of determining their own future" (The Ministry of Foreign Affairs of the Russian Federation, 2019).

With such fierce resistance from those who still consider African countries as operating within their sphere of influence, the return of Russian-African cooperation will be a difficult task. But Russia has something that the West does not have: a real model of relations with Africa, based on principles of equality and mutual respect, together with the experience of its real implementation during the time of the USSR. In the case that the new era in Russian-African relations will be based on that model, we can expect that the new dawn will be successful. ∎

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Mohamed Enver Surty's
In Pursuit of Dignity

By Hussain Savant
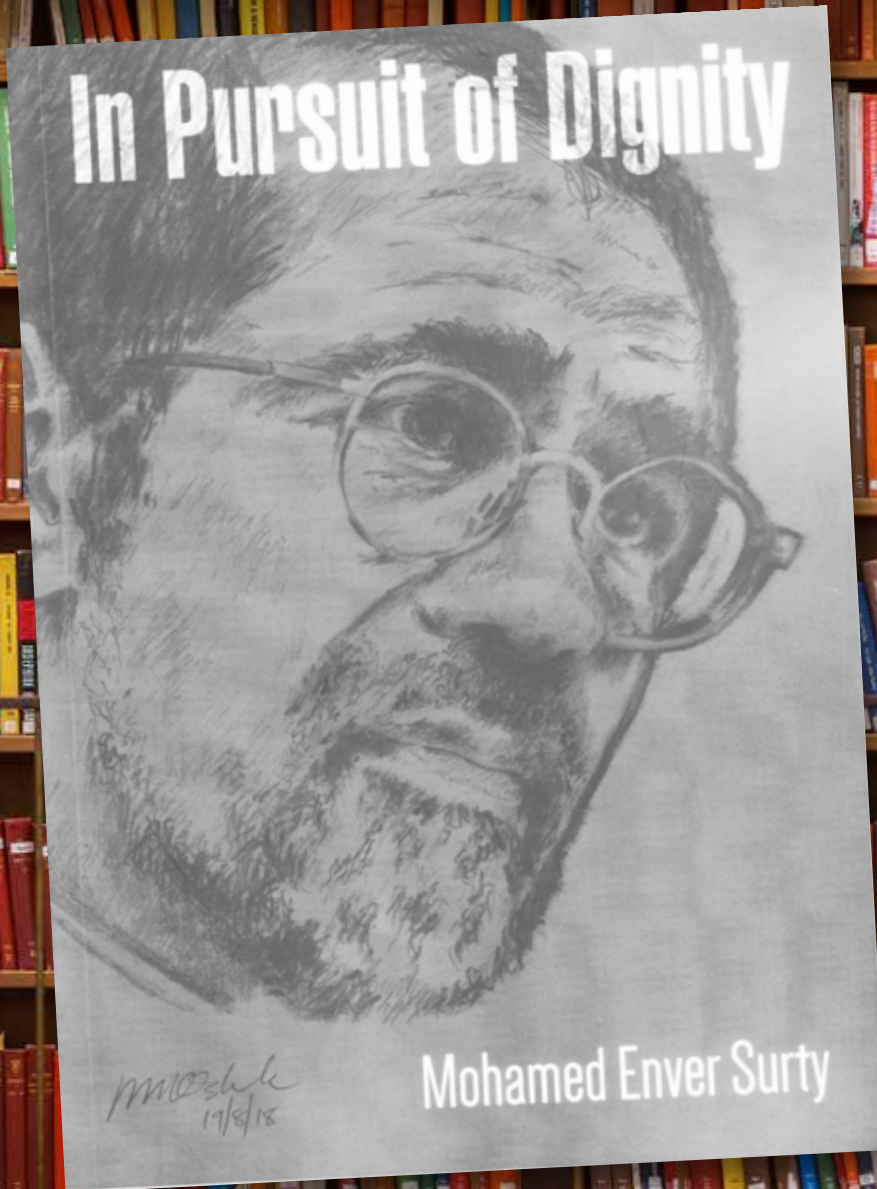
In *Pursuit of Dignity* is the unusual autobiography of our erstwhile Deputy Minister of Basic Education, Mohamed Enver Surty. The author served in government for twenty five years with distinction, and can be justly proud of a distinguished career both as a lawyer and as a government minister.

The autobiography is a staid and prosaic account of the author's life story and his contribution to the Bill of Rights, which was successfully embedded in the South African Constitution, representing the nation's ideal of a non-sexist, non-racial and just society. By all accounts, he has done sterling work in this regard.

The notion of "dignity" in the book's title operates on the existential, the constitutional, and the political levels simultaneously. In the new South Africa, it does not exist in a vacuum and must be understood in terms of its "pursuit". "Pursuit" here refers to the legal attempts to embed this notion of "dignity" in the new Constitution. In the chapter entitled "Human Dignity as a Pre-eminent value", we learn that it was the late Dullah Omar who recommended the inclusion of "dignity" in the Constitution, and that it was Surty who advised that "...it would best serve as an overarching value over all rights. It would also be included in the limitation clause and the interpretation clause and in so doing permeate all rights" (2019).

Surty displays extraordinary emotional intelligence throughout his various careers as a lawyer, politician, and government minister. As a Muslim, his faith informs his book and the values that he espouses. There is also no doubt that his behaviour as a lawyer and politician has been shaped by his Islamic beliefs.

As far as autobiographies go, *In Pursuit of Dignity* is a highly original book, with a specifically postmodern narrative technique and structure. Whilst Surty does not share the postmodern doctrine, the composition of his work leaves no doubt that he has espoused its method. The book's introduction lays bare both the intention of the work, together with a brief outline of its structure. Surty hopes that his "...stories will reach the children of the Constitution because they carry the hope of a new world and they are the final arbiters of the legacy that his generation has bequeathed them" (2019).

A lawyer by profession, Surty also completed an LLM in Constitutional Litigation as well as a Postgraduate Certificate in Higher Education. An official description of Surty's career on the South African Government's website states that: "He was a member of the Management Committee of the Constitutional Assembly and negotiator for the ANC on the Bill of Rights for the period 1994 to 1996. In Parliament, Mr Surty participated in the following select committees: Justice, Safety and Security, Constitutional Affairs, and Local Government and Administration" (2020).

Surty prefers to describe his experiences as "stories". This is probably his way of not only distancing himself from the atheistic postmodern

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movement, but also of fulfilling a deep desire to become a writer, springing forth from his early years.

Whereas the writer of fiction often transmutes his personal experiences into stories, the writer of autobiography sometimes inevitably transmutes his stories into personal experiences, although this is not true in Surty's case. Fiction is occluded in such a case, "mixing memory with desire" (in the famous words of T.S. Eliot), as Surty struggles to transmit his life story onto the printed page.

Accordingly, the book is divided into three distinct sections. As Surty outlines: "In the first section I reflect on my early learning years – school, university, finding love and the confusion that overtakes the search to understand my place in the world...The second section deals with moments in my career as a lawyer and my participation in civic affairs in my hometown of Rustenburg. This formative period did much to prepare me for the gruelling public life made so much easier by the fond embrace of comrades...The third section looks at some of my memorable times in politics, first in the making of the Constitution, then in Parliament a Senator and later Chief Whip, and finally in the executive as Deputy Minister and former Minister of Justice" (2019).

It should also be mentioned that Surty is a grandson of Suliman M. Nana, former Head of the Transvaal Indian Congress during the 1930s and

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40s. Surty is thus the inheritor of an innate political and constitutional talent, of which his amazing grandfather would have been justifiably proud.

Surty's narrative plunges into the remote past at the most appropriate and unexpected moments, thus surreptitiously weaving together with delicate artistry the stories of his childhood, youth and manhood, in an artistic attempt to achieve a sense of the unity of a life already lived, without any perceptible hiatuses between the various events of his life.

Surty has therefore not written a straightforward, linear autobiography, but has instead utilised a structure to mirror his consciousness of his life's events in order to faithfully express the facts that have made up the salient features of his life.

Chapter 2 ("Swearing In") provides an excellent example of Surty's narrative technique. In it, Surty writes about travelling to Cape Town with his family, on the occasion of his swearing-in as a newly appointed Senator. The transition from this past reminiscence to an even deeper past is skilfully executed: "I felt a great sense of relief after I had taken the oath. I was more than ready to take up the new challenge. I was forty and brimming with energy. The chamber was spotless, not even a speck of dust could be seen on the furniture or on the floor...It was then that my mind turned to my childhood years..." (2019)

The perception of an absence of dust in the Senate Chamber makes Surty think about his childhood years in "Mosenthal, also known as Bosspruit...some twenty km north-west of Rustenburg", an area where there was a plenitude of dust (2019). This description is then followed by vivid descriptions of his childhood and early youth which are a delight to read.

In Section Two of the book, we find Surty ensconced in his own legal office in the city of Rustenburg during the height of the apartheid era, living amongst members of the Indian Muslim Community. Here we are provided with three examples of his excellent litigation technique and a strong affirmation of the need for consultation, whether at the pre-trial stage or with members of the then Nationalist government. He comes across as a highly skilful and intelligent lawyer and a respected member of his community, without any self-conceit. In these passages he projects humility, self-confidence and dignity, underscoring the title of his book.

The book also details how Surty managed to persuade the then Department of Community Development to authorise the building of a shopping centre on strategic parts of the Rustenburg mosque property, thereby allowing members of the Indian community to rent premises that were to be allocated to Whites only during the apartheid era. This is reminiscent of similar successes carved out by his maternal grandfather, Suliman M. Nana, and makes highly interesting reading. Surty, like his late grandfather, demonstrates an inability to be flustered. Moreover, his great secret as a human being and his success as a writer is the result of his respectful, humble and dignified tone towards whomever he may be addressing. Added to this is his uncompromising integrity, as well as his self-confessed "pragmatism".

The third section of the book deals with his political career, giving readers unique insight into the inner workings of government. As Minister of Basic Education, Surty openly declared that Outcomes Based Education (OBE) was "dead". As an alternative, he declared that more emphasis was to be placed on "Literacy and Numeracy", as these were the foundational cornerstones of any successful education. He is to be commended for this. He also correctly perceived the philosophical underpinnings of OBE, without mentioning the names of the philosophers who had provided the impetus for the movement.

For those keen on Constitutional Law and the inner workings of the South African government, this book is an excellent introduction to the confluence of Law and Politics. ∎
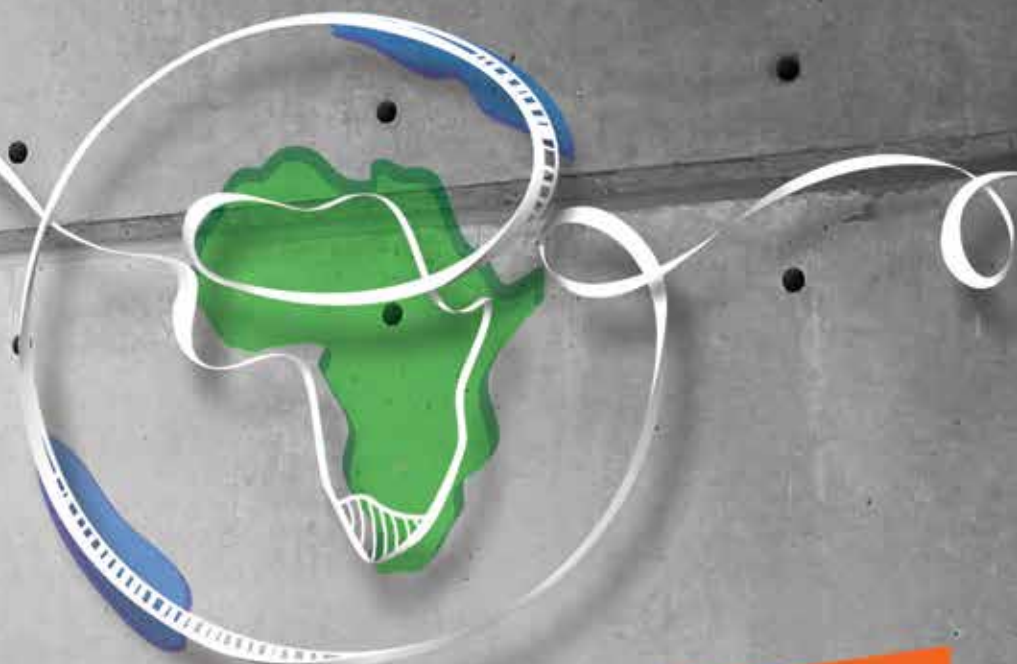
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