



Cybersecurity in Africa: Understanding the Implications of the New Cyber-environment

Introduction

The past 25 years have seen rapid globalization and major changes in the world; the Berlin Wall fell, Communism fell, and the Cold War ended; the USSR disintegrated, and challenges to state unity heightened. Globalization has facilitated rapid inter-connectedness, but with it, deterritorialization and decreased government control, since physical boundaries have diminished in utility. The internet,

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smartphones and apps have made communication instantaneous and more re-spatialized, further eroding government control. Overall, Information Technology (IT) is improving the lives of billions around the world and especially in

Africa. It fosters greater information access, simplified communication, market information, medication access, easier banking etc. However, it has brought new challenges as governments attempt to cut off wholesale access to internet and information (e.g., DRC and Republic of Congo in 2015 and 2016). Government capacity to control and re/direct information to its advantage, or control their citizens' re/actions gets challenged, although provision of public and

administrative citizen services has improved. Further, the relationship between citizen and government has changed and expanded, as has the need for government responsiveness.

For Africa, IT has been a double-edged sword: more people are more connected, easily overcoming infrastructural challenges and using connectivity for everyday purposes. On the other hand, Africa suffers from insufficient physical IT infrastructure – fiber and data networks, net security, physical control of data, legislative and regulatory frameworks. Internet management policies and practices: security, cyber-security, data storage and internet governance have left Africa at the mercy of Western countries and corporations. These own and manage much of the infrastructure, content and proprietary rights to IT products and services used by African governments and their citizens. There is often insufficient, poor and often non-existent legal frameworks, coupled limited technical and technological expertise, meager data security, and critical data and servers often located abroad. The net effect of this is further challenges government control and more broadly, state sovereignty. Countries are left with no recourse in exposure to data breaches, hacks and loss of trade and proprietary information and criminal attacks. The goal of this brief research is to examine the opportunities and challenges procured by internet and information networks in Africa. It focuses on the cumulative effects that the cyber-environment has had on African countries, their governments and citizens, and the implications of dependency on national security, political, social and economic development.

Africa: A (Dis)connected Latecomer to the Cyber- environment

Statistics on Africa's level of connectedness to the global information super-highway show challenge and opportunity for diverse countries. Distribution of world Internet Users by regions in the second quarter of 2014 showed Africa lagging behind the rest of the world with an average 9.8 per cent connectivity rate, or 300 million internet users (World Internet Users 2014). Herein lies a paradox: while fixed landlines, satellite and fiber-optic cable connectivity is marginal, many Africans access the internet through their (smart) mobile phones. Unlike most western countries, Africa's telephony, fiber optic and satellite internet connection infrastructure is in its infancy. For example, the Communications Corporation of Kenya (CCK), in its 3rd Strategic Plan for the 2013/2018 period, launched on 29th November 2013, noted that "the telephony market segment continues to decline as the number of fixed lines dropped from 331,718 in 2002 to 262,761 in 2012" (2013: 14). Internet connectivity often uses the same phone infrastructure. Most houses are rarely built wired for connectivity, non-permanent residential dwellings further challenge installation of necessary infrastructure.

These constraints lead to higher levels of adaptation and use of alternative technologies including cyber-cafes and mobile phones. More than anywhere else except perhaps in Asia, information, communication and technology functions have led to some of the most rapid, highest levels of internet connectivity through mobile phones, with

primarily pre-paid mobile phone subscription increasing from 87 million connected devices in 2005 million connected devices, while in 2018, there were "3.7 billion unique users" (Statista, 2018). In terms of internet access, "as of February 2017, mobile devices accounted for 49.7 percent of web page views worldwide" (Statista 2018). Rather interestingly, the highest percentage of the mobile internet traffic as a percentage of all web browsing, as of January 2018 came from devices in Kenya (83%) followed by Nigeria (81%), and the decidedly more populous India third (79%) (Statista, 2018). Internet connection through mobile phones have been rapid due to the minimal physical infrastructure that users require for connections, i.e. mobile phones.

Africa: Next frontier for Innovation?

Africa has been a harbinger of rather unique challenges, borne out of her history. Her internal developments during the age of exploration and empire-building for Europeans infused local technologies with those out of Africa. Encounters with the West changed social, political and economic systems, including communication; her colonization and subsequent independence continue to be influenced by the west. Challenges such as the lack of extensive physical infrastructure are a result of colonization and evident at independence. For example, at independence, there were "242 miles of bituminized roads in all of Malawi in 1964" (Kalinga 2012: 482); "at the time of independence [...] road mileage of Tanganyika was '20,464'" (*Africa Journal* 1972: 45), and "4,688 motor miles" in the Gold Coast (Bourret 1960: 30; Nungent 2004). The dearth of technical capacity

and trained professionals was similar: “in 1949, Kenya had only fifteen trained African doctors” (Baronov 2008: 118); the DRC had one trained doctor. Overcoming infrastructural challenges is ongoing, but reinventing the wheel is unnecessary. Rather than invest in fixed telephony in vast, rural areas, it is prudent to adopt technologies such as solar powered mobile phones and other appropriate, Africa-specific technologies.

Accelerating globalization has been a major factor in Africa’s present and future. Despite limits of infrastructure and web connectivity, especially the speed and depth, African countries have quickly adopted different IT-based technologies to conditions peculiar to Africa. The adaptation and adoption have facilitated development of other newer technologies whose utility is specific to conditions in Africa and the Global South. Such products include Ushahidi, a crowd-mapping platform (Okolloh, 2009). Perhaps the best-known innovative hybrid product is Kenya’s Mobile Money Platform, M-Pesa (launched by Safaricom in 2007). M-Pesa leverages mobile phones, banking services and triumph over sparse infrastructure to revolutionize access to financial services (Jack & Suri 2011). Such innovations have demonstrated possibilities that adopting newer technologies can portend, recalibrating societal, business, financial and physical infrastructure.

Yet, even as technology opens new pathways to socio-economic development, there are gaps – challenges even, in the integration of technology and legislation. For example, with the expansion of mobile money transfers, there is increased need for ‘legislative and regulatory frameworks geared

towards the increasing adoption and use of mobile money’ (Nyaga 2014:270). This has become one of the major legislative prerogatives of the East African Community (EAC) members. Given that the regional association aims for economic and eventual political association and later integration, it is critical to harmonize legislation that governs ICT and its applications, policies and practices in the region, while taking into account regional challenges such as Somalia’s violent non-state actor group, and the uses to which the group could put such facilities as money transfer.

Africa: New Applications for Technology

Kenya’s M-Pesa has been an innovative application to technology, leading to a snowball effect: Safaricom (the parent company and proprietor of M-Pesa) recorded 4.1 billion transactions in 2015, worth Kshs. 15 billion per day and a total of Kshs. 5.1 trillion (equivalent of US\$ 51 billion in 2018 exchange rates), with a total of 21 million customers (Ondieki, 2016). It has also led to a ripple effect in increasing the numbers of individuals accessing formal financial markets, since banks are also rushing to offer mobile money services where individuals can withdraw, deposit and easily transfer funds between family, friends, businesses and bank accounts, including doing business with the government through the e-government portal, e-Citizen (Ondieki 2016).

Everywhere in Africa, as Wall (2014) highlights, the application of mobile phone technologies (smartphones running apps), have led to recalibration of social, economic and even the

management of pathologies and treatment. Some Africa-specific applications have included robot cops monitoring traffic in Kinshasa in the Democratic Republic of the Congo (DRC), smartphones transmitting images for quick medical diagnosis, particularly from remote areas, medication reminders and mobile payment systems making access to cash easy and instantaneous, yet secure. Other applications include seed accelerator and investment fund apps (Dropifi), cloud computing (angani) and south Africa’s mellowcabs (electric Pedi-cabs) (Tech Republic 2015).

These changes have also portended greater access to and use of information, potentially altering the landscape of life in African countries. The implications surpass finances and health; in terms of improving democracy, access to information has provided new possibilities. Real-time information facilitates citizens holding government and officials accountable, promotes a level of transparency that can expose bad governance, corruption and unacceptable political behaviors persistent in government. Such scrutiny can rework the relationship between the state and its publics. Information access also allows citizens to make better, informed choices about the type of government they will elect.

Information: Access and Challenges to Governance

Access to information has the potential to significantly impact government and restructure politics and government/governance in the African context. Dahl, in his 1971 expanded criteria for democracy explicated in a table titled *Some Requirements for a Democracy*

among a Large Number of People, identifies 'alternative sources of information' as a key variable in all the three major criteria: formulating preferences, signifying preferences and having their preferences weighted equally in the conduct of government (1972: 3). Yet, for a continent with countries ethnically divided, access to information without some level of regulation and control, within the limits of free speech, can cause ethnically-driven conflict (e.g. 1994 Rwanda massacre).

IT outcomes such as globalization has been accompanied by parallel challenges: state fragility and state failure began with the explosion of the ICT revolution. In Africa, starting with Somalia in 1990, followed by Libya, Egypt (to some extent), DRC, Republic of Congo, now South Sudan, among others, the Weberian concept and function of the state has been challenged time and again, undercutting its functions; in Africa this produced new ungoverned spaces that attract terrorists, pirates and other violent non-state actors (Clunan & Trinkunas 2010). These ungoverned spaces have led to the rise of violent transnational actors with criminal agendas including piracy, terrorism and drug trafficking. These actors have leveraged the very functions and benefits of ICT – e.g. use of satellite phones by Somali pirates to demand ransom for hijacked ships – to lead to the growth of instability, and recruitment of terrorists. Terrorist activity has affected other neighboring states as was demonstrated by recent terrorist attacks by the Al-Shabaab terrorist group in Kenya and in Uganda (Anderson & McKnight, 2015).

Globalization has had an impact in changing the landscape of ICT globally, facilitating both positive and negative outcomes through

transnational communication, transport and other aspects. Is the African state ready to confront the challenges, going forward, as the world becomes more globalized? How well prepared African countries are to deal with particularly changes and challenges to the state, which are often supported by unregulated violent non-state actors? How will the African state, still in its relative infancy, be affected by and transformed by ICT especially from the diffusion of authority?

ICT and the State: Conceptualizing Changes

The invention and miniaturization of the personal computer, coupled with communication facilitated by the internet, has changed many traditional concepts that defined and interacted with the state in its post-Westphalian history. Since the 1990s, even as the world changed, interactional terms such as security changed have reflected the cyber frontier – from security to cybersecurity, sovereignty to cyber-sovereignty. Some concepts have become more important even as they transform and adapt to the application of the computer networks to the state. Governance has been transformed and influenced into cyber-governance, one that contributes to global governance. Government has changed into cyber-government, where citizen services can be widely accessed on the internet, gradually diminishing citizens' direct interaction with bureaucrats, closing off avenues for corruption, endemic in large swathes of African countries (Magu, 2018).

Sovereignty traditionally implied control over space and a country's activities inside borders; today it has changed and is less about

physical space and more about global shared norms. Citizens are increasingly considering themselves sovereign in the cyber and physical space, with allegiance permeating to cyber-citizenship rather than traditional states. States are challenged; the linear, top-to-bottom information models no longer suffice. States must be more responsive or face an Arab Spring.

Access to information has also altered relationships between individuals and governments and governance, especially globalizing governance. The recent hunting/killing of "Cecil", the lion by an American dentist, Walter James Palmer in July 2015 in Zimbabwe's Hwange National Park and the ensuing controversy illustrates the changing concepts of norms, of global governance, in this case wildlife preservation (Howard 2015). The more recent picture that went viral, of a Alan Kurdi lying dead on a beach sparked global *angst*, prompting individuals to become more involved in pressuring governments to act (Fehrenbach & Rodogno 2015). Citizens are increasingly becoming more global, and individual space is now a shared digital global space. The role of ICT on altering governments during the Arab Spring in Egypt, Tunisia and Libya, and nearly Syria – per the Dahl criteria of citizens altering governments, demonstrates the power of ICT to propel challenges to the state, blending versions of digital citizenry, cyberdemocracy and cyber-governance with influence on traditional ideas and exercise of power.

A Review of the African State

Most African countries have the dubious distinction of coming into existence as a colonial project. Few of them existed in their current

shape/form before the 1960's, when they gained independence. Even at independence, they faced challenges alien to European and other countries, including pressures exerted by a combination of internal factors: ethnic division, poor infrastructure, underdevelopment, lack of trained manpower, poverty, ignorance, disease, and residual European control and a Cold War (Opondo 2018).

Godfrey Mwakikagile, renowned Tanzanian scholar, finds that some African leaders actively sabotaged the process of nation-building in their own, neighboring and continent-wide states. 'Dr. Hastings Kamuzu Banda of Malawi [...] refused to attend OAU meetings because he saw them as useless' (2009:90) while 'Houphouet-Boigny...refused to attend meetings of the Organization of African Unity (OAU) claiming that he was afraid of flying' (2009:90) but flew annually to France. When newly independent Guinea opted out of the French Community, with Ivory Coast's leader Houphouet-Boigny's urging, "the French burned government files, severed communication links to the outside world and within the country itself, and cleaned out the treasury before leaving Guinea" (2006:91).

In their early independence years, African governments moved to consolidate nationhood, entrench central government rule and pursue socio-economic development. Over time, these unique pressures, compounded by newer challenges e.g. financing socio-economic development and infrastructure, trade and integration into the global markets, and their status as peripheral (as opposed to core) economies, continued to put pressure on the state. Most African countries rapidly moved in authoritarian directions with the

spectrum of one party rule: from military rule to dictatorship. By 1990, only three African countries were classified as democracies: Senegal, Botswana and Gambia; others were facing unrelenting calls for multi-party democracy or low-to-high intensity conflicts (Magu 2016).

The end of the Cold War that also saw the collapse of the Soviet Union ended the hegemonic wars between the US and the USSR. Since there was one hegemon, the call for economic and governmental reforms intensified, backed by the US, its partners and international financial institutions such as the World Bank and the International Monetary Fund (IMF), as conditions for aiding African countries. At the same time, in authoritarian states, the clamor for political reforms often led to governmental collapse, leading to fragile, failing and failed states such as Somalia (Source?).

Some of these conflicts have simmered long: Rotberg writes that "in 2013, hot conflicts of greater danger persist: in the eastern districts of the DRC; in Darfur and in two other southern provinces of the Sudan; in South Sudan... in Mauritania (against al-Qaeda of the Maghreb) ... in Mali... in Southern Somalia... across much of Nigeria from Boko Haram, the Movement to Emancipate the Niger Delta (MEND), and a host of others" (2013: 69). Prospects exist for socio-economic development, poverty eradication and transition from low to middle-income countries as Kenya has progressively done. Yet there remains perennial danger of descending into conflict. Rotberg argues that;

anywhere an African polity does not fulfil the functions of a modern nation-state and

discriminates against some of its own people; anywhere African leaders look after themselves, their lineages, and their kin rather than their entire citizenry; anywhere leaders appear to steal from their people; anywhere in Africa that is consumed by flamboyant corruption and criminality; anywhere in Africa dominated by greed without a social conscience; and anywhere lacking strong separation of powers and rule of law, plus a military subordinate to civilians - any of these locales is at prime risk of a countervailing popular reaction and cataclysmic civil conflict (2013:70).

Even with challenges faced by African countries in their short history, prospects for fulfilling the state's founding purpose, even with the expanded aims, abounds. Over time, there has emerged a "highly complex environment in which state action takes place" (Wegrich and Lodge 2014:283). Further, states by themselves cannot solve existing – and more novel – problems; states often play catch-up to markets and emerging international situations and actors. "The contemporary setting of governing makes hierarchical intervention ever more problematic as states increasingly rely on co-governing and internationalisation, such co-governing is not new, and administration has always been reliant on the acceptance of authority by citizens, firms, and other societal organizations" (Wegrich and Lodge 2014:283). Necessarily, African states, joining the global society only since the 1950s, have to adapt to these changes that continuously define them.

Non-State Actors (NSAs)

Since the dawn of human society and especially organization into states, a multiplicity of actors is

the norm. Reinalda ‘recognizes three types of non-state actors: non-governmental organizations (NGOs), intergovernmental organizations (IGOs) and transnational corporations (TNCs)’ (2011). Neubert articulates the same three primary classes of non-state actors, but identifies ‘local, neo-traditional actors (who) combine elements of self-organisation ... with elements of a local level of authority, which may be in lieu of some state functions on this level. They may even draw their legitimacy from official or semi-official functions delegated by the state. [...] Most of these actors are restricted to a local or sub-national level. Additionally, all of them are somehow located outside the formal institutions of a modern liberal democracy’ (2009: 41). The multiplicity of traditional actors was no less evident in Africa; at the end of the Cold War, a newly assertive non-state actor was beginning to come into focus.

Thomas, Kiser and Casebeer recognize the newer category of non-state actor: one that contests legitimate authority in the state, i.e. the ‘violent non-state actor’ (VNSA). The VNSA’s non-traditional arsenal involves ‘donkey carts laden with rocket-propelled grenades, teenage girls wrapped in nails and explosives, and civilian airlines filled with fuel and travelers: these are the weapons found in the arsenal of today’s most ubiquitous adversary - the violent non-state actor (VNSA)’ (2005:2). In African countries, the increase in contestation of state authority often turns the neo-traditional actor into an instrument of the violent, non-state actor, for example, a militia group, based on their allegiance to and membership of the particular sub-national unit of the state.

While most non-state actors are pacific and make positive impacts –

from providing ‘public goods’ that states are unable or unwilling to provide, to leveraging capacity and resources to meet various social and economic developmental needs, violent non-state actors generally do not. Non-state actors have increasingly adopted technology in order to further their activities, sometimes in support of, but more often in opposition to the state. Corrales and Westhoff argue that ‘technology adoption depends on the characteristics of both the technology in question and the adopting unit. Regarding the former, the key factor is the content/utility of the technology, that is, whether the technology satisfies a particular need of the potential adopters (at the societal level) or the promoter (at the state level)’ (2006:913). Thus, some technologies are easier for the state to control (e.g. TV), and others more difficult (the internet); as such, non-state actors seeking to cause subterfuge to the state are more likely to select this avenue to further their agenda.

Violent, non-state actors have evolved in their purposes and methods, just as technology has made quantum leaps. Baylis, Smith and Owens chronicle the evolution and use by the violent non-state actors (terrorists) of ‘readily available means to permit small numbers of individuals to spread fear as widely as possible’ (2014:360). Violent methods have adapted from assassinations and bombings, to more sophisticated tools and methods. Among factors increasing transnational terrorism was ‘the expansion of commercial travel, the availability of televised news coverage, and broad political and ideological interests among extremists that intersected around a common cause’ (2014:360). Eventually, these evolved to

skyjackings, hijackings, mass-casualty events, including those discussed previously, such as the insurgency in Iraq after the US invasion in 2003.

One of the challenges to the modern state, especially its overall control – arises from NSAs, including Multi-National Companies (MNCs). MNCs are generally involved in economic development, Research and Development (R & D). Their activities especially in free-market economies, can fall outside of government purview, e.g. in developing new products. As independent entities, their activities, practices, research and information, for proprietary purposes, they can be secretive. They facilitate environments where:

control of information of strategic significance may not be wholly in the hands of government. Many multinational corporations are involved both with research and development and with the production of critical components of weapons systems (computers for instance), and it is very difficult for governments of parent countries to be aware in sufficient detail of the operations of subsidiaries (Reynolds 1979:100).

Lack of governmental control and oversight often occurs due to economies of scale, requiring money-saving activities by outsourcing and offshoring of products and services. An example of breach of government data occurred as a result of the outsourcing of state bureaucratic functions to KeyPoint Government Solutions, a subcontractor who was targeted in the June 2015 OPM data breach.

Still, the actions of MNCs are generally positive. However, non-state actors such as guerilla groups, splinter groups and terrorists are nefarious and seek to leverage the

use of systems and processes such as those developed by businesses to subvert the state. They rise for varied reasons ‘such as the decline of governments’ competence, the reduced level of satisfaction with or acceptance of value systems, the development of new loyalties across as well as within state frontiers, the availability or ease of manufacture of means of destruction, the swift global passage of information promoting emulative behaviour’ (Reynolds 1979:100).

Africa has not been spared these VNSAs. From Boko Haram, which rather hypocritically suggests that western education is sin, but utilizes western education produced technology – such as YouTube – to post their messages, to Al-Shabaab, VNSAs are alive and well. The next section briefly looks at their challenges.

Non-State Actors and Cybercrime in Africa

While Africa remains one of the least technologically connected places – in terms of internet and telephone connectivity as discussed elsewhere in this research, Cassim (2011) notes that ‘cybercrime is thriving on the African continent’ in part due to ‘lack of IT knowledge by the public and the absence of suitable legal frameworks to deal with cybercrime at national and regional levels’ (2011). Cassim singles out South Africa, Botswana, Kenya, Uganda and Cameroon as having taken the lead in the introduction of cyber-legislation and developing partnerships to combat cyber-crime (2011).

On the criminal front, violent non-state actors such as the Al-Shabaab group, Nigeria’s Boko Haram and the Movement for the Emancipation of the Niger Delta

(MEND) have become adept at utilizing IT resources – including, for example, Facebook, twitter and YouTube to not only recruit, but also for propaganda purposes, such as posting videos of terrorist activity. The freedom of internet access renders it difficult, if not impossible, to control posting and access to such content and activity. In the absence of stringent control to access to information, such non-state actors are likely to continue challenging existing governments, using ICT to subvert government and coordinate terrorist attacks.

At a time when countries are moving to enact legislation that provides them with more resources to combat non-state actors who are using ICT avenues to recruit, coordinate and execute cybercrime and other crimes, the clamor for ‘network neutrality, against surveillance legislation’ (Hintz 2012:132) have gained traction. Perhaps this is a push against ongoing efforts for example in Canada, where ‘lawful access’ would allow law enforcement and state agencies to intercept and monitor online communication without judicial oversight’ (2012:132); some of these practices are already ongoing in some countries, such as the United States.

Rethinking the Future

Globalization and its attendant consequences – or the end-products of globalization – have brooked significant changes not only in states, but in the relationships between states, states and their citizens, and individuals and other individuals within the state. Some of these changes have been positive and portend the promise for infrastructural development that can lead to social and economic development, better governance,

a higher quality of democracy and better overall outcomes for their citizens. Notably, African countries have begun leading the efforts to solve their problem by focusing technology on confronting the challenges unique to them.

Of concern is the gap between the levels of understanding the new cyber-environment. be it cyber-security, cyber-governance, cyber-sovereignty, cyber-democracy and e-governance. As is the case in other countries in the world, the cyber-environment can be a veritable new frontier in inter-state conflicts; it can embarrass governments, compromise its functionaries and its systems, e.g. the allegations of Russian hacking of US elections in 2016, or the SONY hacking, the stealing of data from the US Government (SF86 security forms, Office of Personnel Management). Individuals, governments and private industry have much to be concerned about regarding privacy, and need to be proactive, rather than reactive, to confront possible future threats to their citizens, systems and infrastructure.

African countries have been slow to develop mechanisms and responses to the potential emerging threats to the African state, especially on the electronic frontier. While the low levels of internet connectivity may be a boon to African countries, since less of their infrastructure is connected to the World Wide Web, there is the potential that the dangers confronting the western world will confront Africa, which is less prepared legislatively and technologically. Additionally, Africa needs to work within the continent and globally, to foster innovation peculiar to itself, but also responses to threats posed by the cyber environment, in conjunction with other countries and regions.

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