

## DATA FOR GOOD IN AFRICA – TOWARDS INCREASED ACCESS AND ENABLING DATA POLICIES

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**Abstract** – Data has been rightly acknowledged as the future oil of the global economy. As a result of the large amounts of data being produced globally by individuals, households, organizations and nations, the potential for mining insights from aggregated big data has emerged, besides other uses of data. The potential multifaceted use of data for private and public good is fueled by super-fast telecommunication networks which power communications and data capture, transfer, storage and processing. However, while developed economies are pressing ahead to harness the potential of data to transform their societies, Africa has lagged behind in the harnessing of data for public good. In many African countries, basic access to data is still a major challenge, and the policy landscape which enables data for public good is largely lacking. This paper gives an overview of the situation in Africa, where the infrastructure and data policy deficit is hampering the continent's efforts towards digital development.

**Keywords** – Access, equality, inclusiveness, information and communication technologies (ICTs), information society

### 1. OUR GLOBAL DATA SOCIETY

The 21<sup>st</sup> century has undoubtedly brought along a data revolution. The amount of data created daily is simply astonishing, as individuals, households, organizations and nations produce data like never previously witnessed in history. It has been estimated that more data was created in the past two years than in all of the preceding history [1]. The sources of this data are as varied and far-reaching as our mobile devices, financial transactions, Internet activity, health records and the rise of the Internet of things (IoT). An estimated 2.5 Quintillion bytes of data is being produced daily [2]. There is no doubt that the massive global proliferation and adoption of telecommunication services is a major factor behind the surge in data production. About 3.5 billion people are connected to the Internet [3], with an estimated 8.4 billion devices and objects or things connected in 2017 [4], and a projection of between 20 – 30 billion connected things in 2020 [5].

Advances in the processing of data and data mining are creating productivity gains in critical economic sectors in developed countries. For example, big data analytics have found important application in the automobile industry's global supply chain

management. Supply chain data can reveal which links in a chain could weaken thereby allowing for proactive and timely countermeasures before a real problem manifests [6]. Also, in healthcare, aggregate societal data has been utilized in large epidemiological studies to forestall the outbreak of diseases [7]. The enormous potential of data to catalyze productivity in major global economic sectors has seen experts dub data as the new "oil" of the global economy [8].

### 2. DATA IN THE DEVELOPED WORLD

The advances and progress of a data-driven economy, as described above, is clearly noticeable in developed economies of North America, Europe and Asia. These economies are backed by an excellent telecommunications infrastructure backbone and policies, which enables a data-intensive society and economy where individuals, households, organizations and nations are always connected to data and information which can be stored, shared, and collated in real time. Advanced economies in these regions are eminently placed to fully harness the potential of the emerging global data economy.

To give an indication of the state of telecommunications infrastructure in advanced economies, we can take a look at some ICT statistics such as Internet penetration, active

mobile broadband subscriptions, fixed broadband subscriptions and average Internet connection speeds. International Telecommunication Union's (ITU) data reveals that 81% of individuals in developed countries use the Internet compared to 41.3% in developing countries [3]. Internet connection speeds reveal a similar great divide, as shown by these examples. As of Q1 2017, the average connection speed of the countries with the fastest Internet in Europe (Norway) and the Middle East and Africa region (Qatar) was 23.5Mbps and 13.7Mbps respectively. Similarly, the average connection speeds of the countries with the slowest Internet in these two regions were 6.9Mbps (Cyprus) and 2Mbps (Egypt) respectively [9]. According to ITU data, mobile broadband subscriptions in the developing and developed world are 48.2% and 97.1% respectively, while fixed broadband subscriptions are 9.5% and 31% respectively [3].

Developed countries do not just boast of better telecommunications infrastructure that support data-intensive economies, they usually also have national or regional policies which support a data-based economy and society. This is particularly true for Europe and North America [10]. The presence of adequate data protection legislation as exemplified by the European Union's General Data Protection Regulation (GDPR) serves to create a framework of trust where individuals, organizations and nations can leverage the potentials of data as an enabler of economic progress and societal development while protecting human rights and values.

### **3. AFRICA'S DATA POLICY AND ACCESS CHALLENGE**

The telecommunications infrastructure challenges of developing countries have already been highlighted in the previous section. Moreover, unlike developed economies in North America, Europe and Asia leading global innovation in the data economy, most African countries do not have adequate data protection policies. Only 23 of the 54 African countries have data protection legislation installed, with a further 15 countries having them in draft [11]. And although the African Union adopted a Convention on Cybersecurity and Data Protection, only 10 African countries have adopted the document. In general, even in countries with data protection legislation installed, there is poor implementation [12].

In an increasingly globalized world where data is becoming increasingly valuable, the absence of adequate data protection legislation restricts the involvement of African organizations in international cross-border transactions in the emerging data economy. Organizations operating in countries with strict data protection laws will face the practical difficulty of evolving novel and complicated regulatory arrangements to mitigate the risks posed by the lax regulatory environment prevalent in much of Africa.

### **4. POTENTIAL REMEDIES**

The reasons for Africa's telecommunications infrastructure deficit are as varied as the continent's many countries. These include the presence of government sponsored monopolies and weak anti-competition policies such as in Ethiopia, which ensures that only one telecommunications provider serves Africa's second most populous country with a population of 101.7 million people. Ethiopia is the most populated landlocked country in the world, which poses a challenge for ICT deployment [13]. In this terrain, expanding access to telecommunication services to citizens is best served where multiple telecommunication service providers work to bridge the access deficit. Ethiopia currently has an Internet penetration of 15.4%, a fixed broadband penetration of 0.6% and active mobile broadband subscription of 5.3%. This situation can however be improved with more access granted to multiple telecommunication services providers in a liberalized telecommunications environment.

In Nigeria, Africa's most populous country (198 million), the situation is a lot more different. Although Nigeria has several Internet service providers, as is the situation in a number of other countries in Africa, policy hurdles such as "Right of Way" charges hinder investment in broadband infrastructure. It has been reported that state governments in Nigeria inflate "Right of Way" charges beyond the official rates [14], thus rendering investment in fibre network infrastructure prohibitively expensive, accounting for up to 50% - 70% of the cost of deploying fibre in the states of the Nigerian federation [15]. In Nigeria, this reality means that although broadband cables with terabytes of data connect the country to the international backbone network through landing points on Nigeria's coast, these "Right of Way" charges constitute an economic

barrier which prohibitively increases the cost of investment in metro and last mile broadband networks and access. Despite the massive capacity of landing cables on Nigeria's coast, this policy hurdle contributes to fixed broadband penetration in Nigeria being just 0.1%, while Internet penetration is 25.7% and active mobile broadband subscription is 22.9%.

**Table 1** – Key ICT statistics (Ethiopia and Nigeria)

ICT statistics (%)	Ethiopia	Nigeria	World
Internet penetration	15.4	25.7	45.9
Fixed broadband penetration	0.6	0.1	12.4
Active mobile broadband penetration	5.3	22.9	52.2

Within the context of international broadband networks, which facilitate the digital society where data is key, reliable fixed and mobile broadband access is the mainstay. It is therefore easy to see in the Ethiopian and Nigerian situations examples of why African societies lag behind in an emerging global digital society fueled by data. Together, Ethiopia and Nigeria account for about a quarter of Africa's population (1.2 billion), yet Internet, active mobile and fixed broadband penetration are quite low. The average Internet penetration, fixed broadband and active mobile broadband penetration rates for Africa are 19.9%, 0.4% and 22.9% respectively. The global average for Internet penetration, fixed broadband and active mobile broadband penetration are 45.9%, 12.4% and 52.2% respectively [13].

For data to really work for good, in Africa, there is a lot of work to be done to overcome these infrastructure and policy hurdles, which limits the utility of data to the widest possible population on the continent. Continuous conversations with policy makers to overcome policy hurdles such as prohibitive "Right of Way" broadband cable fees, resistance to infrastructure sharing policies, monopolistic telecommunication markets, lack of investment in public Wi-Fi, amongst others, are key. Furthermore, in view of the dire need in African countries, we believe that the time has come for conversations on the use of innovative technologies, such as TV white spaces to expand broadband access, to be revived. Delivering broadband services via TV white spaces, which are unused spectrum between television stations, could significantly contribute to bridging Africa's large digital divide. This is because they overcome

the difficulties of rough and hard-to-reach terrains typical of rural areas in developing countries, by reason of their sub-1GHz spectrum band [16], which implies higher wavelengths that reach further, overcoming physical barriers in remote terrains [17]. As a consequence of their relatively lower set-up costs in comparison to the traditional broadband infrastructure of multinational telecommunication companies, they also create the possibility of a business model that allows small businesses to enter the ISP market [18].

Mawingu Networks, based in Kenya, has been a pioneer in using TV white spaces to deliver last-mile broadband access in rural Kenya since 2013 [17]. However, some of the challenges TV white spaces' pioneers have faced include governments' reluctance to allow TV white spaces' spectrum to be used to deliver broadband services due to fear of interference with television signals, and the absence of power grids in most remote locations where the technology is needed. However, there are ongoing conversations between technical groups advancing TV white space technology and government, while solar power has also emerged to solve the power problem in remote rural settings.

Legislative frameworks which underpin societies where the utility of data is realized are also needed in Africa. Currently, there are 38 African countries with cybercrime legislation [12] compared with 23 with data protection legislation installed, revealing the priority of African governments. Contrary to its name cybercrime legislation is typically used to prosecute critics of many African governments and to legalize government access to citizens' data [12].

## 5. AFRICA: MOVING FROM DATA "NOTSPOTS" TO "HOTSPOTS"

With the onset of the rollout of 4G and 5G Internet networks, ongoing and imminent in many parts of the world, we are all rightly excited by the promise of super-fast data downloads and uploads, wider coverage and more stable connections powering a host of applications improving the quality of life of millions globally. In these parts of the world, data is truly becoming a force for good.

However, as this paper shows, Africa is lagging behind in the emergence of a globalized society where data becomes a force for good. Many parts of Africa have become "notspots" [19], a term

coined to refer to areas without connectivity. Data “notspots” are distinct from data “hotspots”, which fuel innovation and creativity around the world. For data to become a force for good in Africa, stakeholders in government, civil society, the technical community and the private sector must work hand in hand to ensure that the infrastructural and policy hurdles limiting Africa’s entry into the emerging digital society are removed.

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