Africa Current Issues

The Future of the Internet, Mobile Phones, and Jobs in Africa

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1.0 Introduction

Africa is poised at the entry of a remarkable period of opportunity for accelerated economic growth. Looking at Africa from the demand side, we see a market of 1.2 billion people, many of whom who have crossed the line from subsisting to consuming. Every year, an increasing number of new consumers will join them. According to a McKinsey report, "Africa's growth is fueled not by resources, but rather by a rising consumer market."[1]

The nexus between internet adoption and infrastructure, foreign direct investment (FDI), financial development, economic growth and job creation in African countries and elsewhere is clear.[2,3] FDI provides the capital needed to build and grow businesses and the infrastructure on which they depend. Rising incomes and population growth fuel increased consumption and drive economic growth. Information technology, in the form of the Internet and its links to mobile data services accessed by smartphones, provides African consumers with new value (such as mPedigree's anti-counterfeiting code protecting genuine drugs and other products),[4] generates increased demand for existing products and services, paves the path for last-mile order fulfillment, and by using real-time information to match the supply of and demand for labor, enables entirely new forms of employment such as those labeled as the gig economy.

The ubiquity of mobile phones, and their relative affordability in both rich and poor countries, provides access to myriad opportunities.[5] Africans adopted smartphones in a big way. However, about 400 million people in the region have no access to mobile broadband services, due to a lack of infrastructure. As this gap closes, and incomes rise, the number of mobile subscribers will follow.[6] According to McKinsey, 122 million Africans actively use mobile financial services, and by 2022, the number of smartphone connections in Africa will exceed 600 million, one for every two persons. But going online is expensive: buying a handset and 500MB of data costs as much as 10% of monthly income.[7]

Yet smartphones are merely tools: what matters for Africa's future is what its people do with them. Human capital development, ready financial access, robust infrastructure, and a conducive business environment underpin the job creation potential of the internet. Access to the internet via mobile phones generates a huge economic impact all around the world. The internet is a net job creator, providing not only new jobs, but transforming existing jobs to improve performance, and enabling firms to outsource jobs to cheaper but more productive locations (Table 1). For every job lost to the Internet, perhaps two new jobs are created.[8]

Table 1: The Effect of the Internet on Jobs

New jobs	Transformed jobs	Outsourced jobs	Lost jobs
Related to the internet and ecosystem (e.g. engineers, networking specialists, mobile app developers, etc.)	Internet transforms work practices in existing jobs and requires learning new skills	Internet allows outsourcing of jobs to specialised locations or workers with cost and productivity gains (e.g. offshoring)	Internet allows replacement of tasks previously carried out by humans (e.g. online travel booking in place of travel agents)

Source: OECD & IDB (2016)[9]

Small and medium-sized enterprises (SMEs) record productivity increases of at least 10% from their internet use.[10] SMEs that use web technologies aggressively grow and export twice as much as less tech-savvy counterparts. Currently, 75% of the internet's impact is in traditional industries, although high-speed internet infrastructure is rapidly creating new ones.[11] Social media platforms like YouTube and Instagram are creating millionaires and generating billion dollar business valuations. As new

industries emerge, disrupting business models and reconfiguring Africa's labour markets, training takes on a transformative role.

Digital payments are now hugely popular in many African countries. *M-Pesa*, a Kenyan mobile money service, is a prominent example.[12] Africans also trade and make purchases with crypto currencies like BitCoin. The Internet is creating new ecosystems. Facebook is about to disrupt even this laudable progress in digital payments with its soon-to-be-launched digital currency called Libra.[13] New employment forms, like in the "gig economy", are also emerging. Unsurprisingly, African governments are beginning to realise the potential of internet technology and its associated ecosystems for boosting economic growth, creating jobs and thus alleviating poverty.[14] Interestingly, even for supposedly advanced spheres of information technology like artificial intelligence, Africa is increasingly seen as the new frontier.[15]

Subsequent sections of the paper highlight the internet-driven opportunities, the factors driving them, and the challenges and constraints for stakeholders. The paper concludes with recommendations on how Africans, their governments and key local and global stakeholders, can manage these variables effectively and sustainably for economic growth and job creation.

2.0 Faster internet connections and smartphones underpin new job opportunities

According to the International Telecommunication Union (ITU), about a quarter of Africans currently use the Internet (see Figure 1 for key ICT indicators), twice the number from only five years prior. With 76% of Africans currently subscribed to mobile phones and falling prices for smartphones, we can expect these two figures to converge. Over the 2012-2017 period, the average price of smartphones in Kenya, Nigeria and Tanzania declined by 44%, 35%, and 52% to US$118, US$121, and US$117 respectively.[16] Mobile data remains relatively expensive, although prices are falling (Table 2).

Africans now perform many of their banking transactions online via their mobile phones. They are able to stream videos on Netflix, a streaming service. Online shopping is no longer a novelty in many African countries. African firms increasingly using the Internet to improve their productivity. Adoption varies by country: Kenya leads the pack in the use of the Internet for managing inventory, online sales and purchases and marketing, with Ghana and Zambia running second and third.[17] This trend applies both to manufacturing and service firms.

Table 2: Average cost of 1GB of mobile data (2019)	
India	$0.26
Russia	$0.91
Nigeria	$2.22
United Kingdom	$6.66
Canada	$12.02
United States	$12.37
Switzerland	$20.22

Source: Forbes[18]

Mobile telephony is linked to inclusion in many African countries. To obtain mobile phone lines, informal economic agents must acquire some form of formal identification. With their new mobile phone line, they can now use mobile money for business transactions and remittances; thus achieving financial inclusion. Kenya and Uganda are prominent examples.[19]

As shown in Table 3, smartphone adoption in sub-Saharan Africa, at 39% in 2018, is expected to reach 66% by 2025. Declining prices for smartphones and mobile internet access for social networking offer new and constantly evolving opportunities for Africans, yet the digital divide with developed countries remains (Figure 1). To maximize the economic and jobs impacts of the Internet, more Africans must use it. This will require training, both for Internet users, and for those holding new jobs created along the value chain.

Table 3: Smartphone adoption

	2018	2025
Sub-Saharan Africa	39%	66%
Emerging markets	56%	78%
South Asia	48%	75%

Source: GSMA[20]

To reach these targets, smartphones and mobile data must become both cheaper and faster. There are already several cheap smartphone initiatives in a number of African countries.[17] In June 2019, Google announced it was building a subsea cable connecting Africa to Europe.[19] Subsea cables carry 99% of the world's intercontinental internet data traffic.[19] Global tech giant Facebook will bring low-cost internet exchange points (IXP) in Africa to its own free African internet access initiative.[20] Although African internet data tariffs remain high, 10 out of the 50 least expensive countries in the world for mobile data are in Sub-Saharan Africa.[21]

Figure 1: Key ICT indicators

Per 100 inhabitants (2018)	Fixed telephone subscriptions	Mobile cellular telephone subscriptions	Active mobile broadband subscriptions	Fixed broadband subscriptions	Households with a computer	Households with internet access at home	Individuals using the internet
Africa	0.9	76.0	29.7	0.6	9.2	22.0	24.4
Arab States	7.7	103.1	62.7	5.1	49.2	51.7	54.7
Asia & Pacific	8.8	109.7	68.3	13.6	40.8	53.2	47.0
CIS	18.8	136.8	79.2	19.0	70.1	75.9	71.3
Europe	35.0	120.0	93.6	31.3	79.8	82.0	79.6
The Americas	23.1	112.8	97.1	20.6	64.5	70.9	69.6
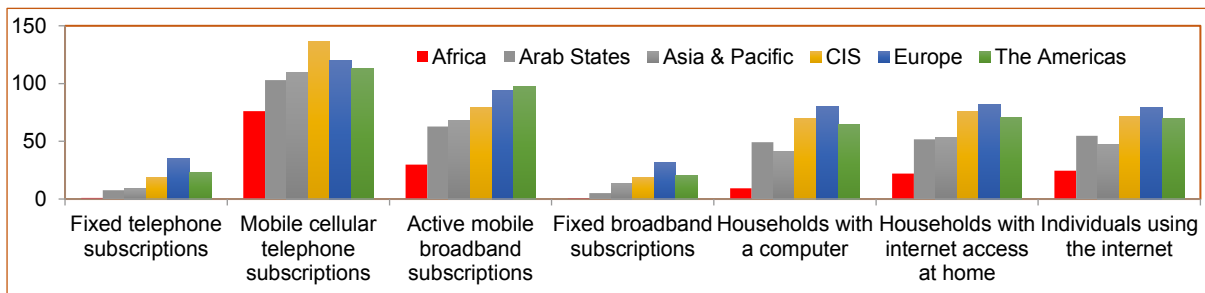
Source: ITU[22]

3.0 Digital IDs will be key

According to a recent study, most Africans use the Internet for online social activity.[23] This pattern is hardly unique to African countries: most of the world's poor use the Internet mainly for leisure. That is not all bad: with about half a billion Africans without official identification, online social activity could become a credible source of verification for personal identification, address, and credit scoring. This is not a pie-in-the-sky idea: visa applicants to the United States are now required to submit their social media account details. [24] Banks could easily do the same for the know-your-customer (KYC) documentation used for opening bank accounts and lending.

Digital identification schemes confer economic benefits, as seen in India.[25] African countries are moving toward digital ID systems. In Ghana, physical addresses have been digitalized. [26] Kenyans began

registering for digital identification numbers in April 2019.[27] In Nigeria, all mobile phone subscribers undergo biometric registration and all bank account holders have a so-called "bank verification number". With digital IDs, Africans will be better positioned to participate in the continental digital economy, estimated to reach $300 billion by 2025.[28] Despite ongoing multilateral efforts to help African countries pick up the pace, progress is slow.

4.0 Africa is leading global mobile money adoption

79% of the growth in global e-commerce transactions in 2018 was via mobile money.[29] As shown in Table 4, 66% of the $40.8 billion mobile money transactions in 2018 were in sub-Saharan Africa. Africa's lead in mobile money makes it well-placed for an e-commerce boom, with a rising trend towards cashless transactions. Banking via mobile phones is now ubiquitous and normalised. Moreover, with the unbanked increasingly able to use digital payment systems, they become financially included. In other words, both formal and supposedly informal economic agents in African countries are increasingly able to participate in the digital economy. If the trend continues, as it seems likely, many of the 300 million adult Africans who are currently financially excluded (without any account) will become formalised.[30]

Table 4: 2018 mobile money statistics				
	Registered accounts (mln)	Active 90-day accounts (mln)	Transaction volume (bln)	Value (US$bln)
Global	866.2	298.7	2.4	40.8
Sub-Saharan Africa	395.7	145.8	1.7	26.8
South Asia	287.6	89.3	0.6	8.8
East Asia & Pacific	94.6	29.8	0.1	3.7
Latin America & The Caribbean	27.0	13.1	0.1	1.0
Middle East & North Africa	48.9	18.6	0.0	0.5

Source: GSMA[31]

Africans owned 46% of the more than 866 million registered mobile money accounts in 90 countries around the world in 2018.[32] 54% of the adult population in Ghana, Cote D'ivoire, Benin and Senegal use their mobile money accounts regularly. However, in the three most populous African countries, Nigeria, Ethiopia, and Egypt, only 30-40% of their combined 242 million adult population have mobile money accounts. Changes in governance are expected to motivate opening more than 110 million new mobile money accounts in the three continental behemoths over the next five years. In October 2018, for instance, Nigeria's central bank issued guidelines for the licensing and regulation of non-bank firms (including telecommunication firms) as "payment service banks."[33]

Universal adoption of mobile money faces constraints, including taxation, KYC (know your customer) requirements, cross-border remittances and data regulation. Almost all African mobile money service providers pay three layers of taxes: value-added tax, general tax, and mobile sector-specific tax. Uganda, Kenya, Zimbabwe, and Gabon tax mobile money transactions specifically, for instance.[34] While digital IDs allow for electronic KYC (e-KYC), not all African countries have digital ID systems. Although remitting funds across borders is expensive, costs are falling. For instance, while a mobile money customer currently pays on average 1.7% to send $200 across borders, this is 40% less than the 2016 tariff.[35] Internationally compatible (yet governance-compliant) operating models might lower costs even more. New data regulation frameworks, while welcome, add to costs. Regulators and other stakeholders will need to achieve the right balance among strong regulation, unbridled innovation, and societal risks.

5.0   E-Commerce to boost growth in retail, transport, & hospitality industries

Online marketplaces are digital platforms that match suppliers of goods and services with customers. The resulting electronic commerce (or "e-commerce") is broadly classified into four types: business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C), and consumer-to-

business (C2B). The huge Africa-focused online retail marketplace Jumia is both a B2C and B2B platform. Airbnb, an online hospitality brokerage marketplace, is a C2C platform. Thundafund, a South African online crowdfunding marketplace for entrepreneurs, is one type of C2B platform. Such marketplaces are disrupting the retail, transportation and banking industries on the continent.[36] Not only are many e-commerce players in these sectors rendering legacy services more efficiently, they are also exploiting previously sub-optimal opportunities in profitable ways, while creating new jobs. Some new entrants are peculiarly African, such as the service in Angola for the online purchase and delivery of goats.[37]

Table 5: New e-Commerce jobs by 2025	
Sectors	**Jobs (millions)**
Consumer goods	1.7
Mobility	0.5
Travel & hospitality	0.3
Other categories	0.4

Source: BCG[38]

Commerce through these digital platforms could create as many as 3 million jobs by 2025: one new job opportunity for every 15 unemployed African youth.[39] While only 100,000 Africans would be directly employed by these online marketplaces, the greater impact would be in the increased economic activities and efficiencies they enable in other sectors. These include the creation of new products, reduction or elimination of supply chain bottlenecks, and expansion of customer bases. As seen in Table 5, 1.7 million (60%) of these new jobs will be in the consumer goods sector, 500,000 in mobility services, and 300,000 in travel and hospitality.

The African opportunity is characterised by the early lifecycle stages of its economic sectors. In retail, for instance, there are 15 formal stores for every 1 million Africans (compared with 930 per million Americans, 568 per million Europeans and 136 per 1 million Latin Americans.).[40] Online retail marketplaces could easily increase market reach, at less cost without need for brick-and-mortar. Additionally, because almost 40% of sub-Saharan African economy is informal, few members of the labour force are unionised or organised. Workers are more amenable to new employment norms, which vary by country and industry. For example, established taxi services are unionised and well-organised in most African countries. This factor leads to stiff resistance to digitally enabled ride/sharing taxi services, resulting in bans or partial bans, in at least seven African countries.[41] Varying levels of resistance appear across African countries: in Nigeria, resistance is mild and the trend is toward collaboration. In South Africa, resistance is strong and can turn violent.[42] Thus, the jobs boost from e-commerce will vary from country to country, as variations in culture and attitudes in each country are huge factors.

6.0   Prospects of gig economy are huge but mixed

Online gig work is short-term paid labour matched with demand via digital employment platforms. The resultant ecosystem is referred to variously as the "on-demand economy", "gig economy", "sharing economy", or "platform economy". Online gig work enables Africans to participate in the global economy, increasing household incomes and alleviating poverty.[43] Despite these advantages, the gig economy has downsides. Wages are relatively lower, working hours longer, and labour protections weak or non-existent. Due to the enormity of the unemployment problem in most African countries, these are not likely to be much of a concern for their eager labour force. The gig economy will help create the more than 18 million new jobs each year Africa needs to employ the 1.3 billion workers expected by 2050.[44]

Digital labour takes various forms: freelance contracting, crowdsourcing, and outsourcing. Freelance contracting workers perform tasks such as web development, book editing, and reporting. Crowdsourcing is a different model, allowing employers to allocate specific tasks (such as logo design) to unknown workers via the Internet, instead of assigning them to employees. Examples of crowdsourcing tasks include intelligence, crowd content creation, start-up funding and microwork. Major crowdsourcing platforms are Amazon Mechanical Turk, CrowdFlower and Microworkers.[45] Outsourcing

vendors assume responsibility for internal client process, such as online customer service, data processing, or HR functions.

Table 6: 10 highest paying gig economy jobs of 2018	
Job	Rate per hour
Artificial intelligence/Deep learning	$115.1
Blockchain architecture	$87.1
Robotics	$77.5
Ethical hacking	$66.3
Cryptocurrency	$65.3
Amazon web services Lambda coding	$51.0
Virtual reality	$50.0
React.JS developers	$40.8
Final Cut pro editors	$37.1
Instagram marketing	$31.2

Source: Investec[46]

Only about 30-40% of the 10-12 million new African workers will find a job this year.[47] Of African workers engaged in non-agricultural employment 77% are informal, and many of these can enter the burgeoning African digital on-demand or gig economy. Although gig economy jobs lack protection for vulnerable workers, they are often relatively better organised and formalized than traditional informal employers. Policymakers face increasing calls for a fit-for-purpose "social contract" to address the current shortcomings of digital employment.

Even as information technology shifts some jobs to the on-demand gig economy, technology is constantly transforming the nature of many other jobs. The job profiles of ICT workers are constantly changing, in response to the adoption of new operating systems, applications suites, mobile apps, and network protocols. Other jobs requiring knowledge of specific technical or regulatory content exhibit a similar pattern. Many new vacancies go unfilled for lack of the specific skills required to carry out the work. Employers report gaps in technical skills such as STEM subject degrees but also soft skills such as communication, teamwork, and punctuality.[48]

The disruption to job requirements is global, and appears in today's African job markets. The reliance of African jobs on knowledge of current information technologies is rising but varies widely: 18% of formal jobs in Kenya have high ICT intensity, compared to only 7% in Ghana.[49] The greatest long-term benefits of ICT intensive jobs in the region are not likely to be in the relatively lower-skilled delivery of digital products or services but in digital design, product creation and engineering. The World Economic Forum report, *The future of jobs and skills in Africa*, recommends that "Africa's educators should design future-ready curricula that encourage critical thinking, creativity and emotional intelligence as well as accelerate acquisition of digital and STEM skills to match the way people will work and collaborate" in the future.[50]

7.0   Challenges and constraints

Moving forward to a job market powered by the Internet will not be easy. Infrastructure remains inadequate, data costs are high, internet penetration of below 40% remains relatively low, logistics can be nightmarish, many Africans remain relatively digitally illiterate, and the regulatory environment is uncertain or even antagonistic.[51] Online marketplaces have been filling the digital skills gap with foreign labour. To manage regulatory and financial risk, major online marketplaces are not only registered outside of Africa but are also tapping foreign capital markets for funding. Both online suppliers and consumers have genuine cause for concern. African governments (and others such as Russia and China)[52] have shut down the internet during elections and protests.[53] The ease with which governments are able to do so exposes the fragility of the internet on the continent. Part of the appeal of the internet is its "borderless" nature. However, when governments stop the usage of the Internet on a whim, they diminish its infrastructural utility to users. External private actors have also been able to shut down internet infrastructure; as in Liberia.[54] Still, many are able to defeat these shutdowns.[55] Legal institutions

have surprisingly proven to be resilient in keeping government overreach in check in some African countries.[56]

Inevitably, there are calls to regulate Internet activities in some form or other.[57] And despite the potential drawbacks of overregulation and censorship, some African governments seek to tax online activity or impose some form of regulatory oversight over the internet in their jurisdictions.[58,59,60] For example, Uganda has imposed a social media tax and announced plans to nationalise its internet data exchange service, raising fears of inefficiency and likely regulatory overreach in the aftermath of this move.[61]

8.0   Training will play a critical role

For African countries to derive value from new technology, they have to build an effective ecosystem of investors, startup founders, mentors, and programs to train workers and foster innovation. The big players –Google, Huawei, and IBM etc. – are well aware of the needs for training and have programs in place.

Search giant Google plans to help bridge the developer-skills gap in Africa by providing access to high-quality, world-class training on mobile technologies over its online platforms. The company aims to train 100,000 developers and aspiring new developers across Africa.[62]

First launched in 2017, Huawei's Authorized Information Network Academy (HAINA) aims to partner with universities to produce skilled workers to drive continued transformation of the economy through technology. HAINA is a not for profit partnership program that authorizes universities and colleges to deliver HUAWEI Certification courses to their students, in support of a subsequent career in the ICT industry. Zetech University signed a partnership agreement with Huawei in May 2018, and received the Best Huawei ICT Training Academy 2018 award during the Huawei ICT Competition 2018-2019 Southern Africa Academy held last November.[63]

The $70 million, "IBM Digital - Nation Africa" initiative deploys a cloud-based learning platform that offers free skills development programs for up to 25 million African youths over five years. This is part of IBM's global push to build the next generation of digital, cloud, and cognitive skills needed for "New Collar" careers, defined as roles in the technology industry's fastest growing fields - from cybersecurity and cloud computing to cognitive business and digital design - that do not always require a traditional degree, but the right mix of in-demand skill sets.[64] The platform will provide a range of programs from basic IT literacy to highly sought-after advanced IT skills including social engagement, digital privacy, and cyber protection.[65]

Meanwhile, small specialised players emerge to fill gaps in African training markets. Harvard Business School graduate Misan Rewane heads innovative training provider West Africa Vocational Education (W.A.V.E.), a Nigeria-based platform designed to transform the mindset of disadvantaged youth and equip them for employment opportunities that enhance their social mobility, yet "ensuring they have the foundational skills (essentially, the ability to learn, unlearn and relearn) to remain competitive as the "future of work" unfolds, and perhaps even shape that future."[66]

9.0   Conclusion

On the supply side of the equasion, cheaper smartphones and mobile data, a mobile money boom, and burgeoning e-commerce on the African continent will spur incremental economic growth and create new jobs. Digital IDs, smart and balanced regulation, and much cheaper smartphones and Internet access are key elements to scaling these achievements. African governments should ensure all their citizens have digital IDs, can make payments digitally, and in collaboration with global tech giants, can acquire locally-made low-cost smartphones to use the Internet at a reasonable cost. This would enable their participation in online marketplaces as suppliers or consumers. Training, focused on building skills needed at every link of the supply chain from network design to helping new smartphone owners sign up, will play a key role.

In India we see an example of how private enterprise and governments can accelerate the process. In this largely cash-based society, entrepreneur Mukesh Ambani's $30 billion plan promises to leverage the country's now well-established digital identity system to include all Indians in the digital economy.[67] Seeing high data prices as a constraint for the poor, the entrepreneur will offer data services on his mobile telecommunication network nearly for free and almost certainly at a loss. His strategy is to formalise all Indians, irrespective of class, in a digital ecosystem that enables them to conduct many daily activities, from socialising to buying groceries, online. Despite flaws in this scenario (especially in light of obvious antitrust issues), this case exemplifies the potential of the Internet and how the digital ecosystem it supports would spur economic activity that creates new jobs.

In tandem with the private sector, government policies should prioritise human capital and infrastructural development. Entrepreneurs should also be able to secure financing easily. Training providers must work with employers to develop and fund stronger education systems, which would include: ensuring the 'future-readiness' of curricula; early exposure to the workplace and career guidance; building digital fluency and ICT literacy skills; and sustaining a culture of lifelong learning.[68] These would only be possible if African governments create a conducive business environment in their respective jurisdictions. The job creation potential of the internet rests on building and maintaining these foundations.

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