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## *Full Length Research Article*

# ON THE VERGE OF THE DIGITAL BOOM: HOW INFORMATION COMMUNICATION TECHNOLOGIES COULD SHAPE AFRICA'S FUTURE

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**ABSTRACT**

The significance of information communication technologies (ICT) for development is well recognized, but Africa seems behind the rest of the regions in the world.Through literature review and semi-structured interviews with relevant stakeholders including African intellectuals, political scientists, development economists, and ICT and education specialists, this paper examines the current state of ICT in Africa andforecasts the forthcoming transformations of the next decades from development perspectives.

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## INTRODUCTION

There currently exist over two billion internet users worldwide and the number of future users will mostly grow mostin developing countries (Cottrell, 2013). Although Africa currently only has an internet penetration rate of less than 20%, with fewer than 200 million users out of billion inhabitants (ITU, 2013), it is expected that the majority of the African population will have the internet by 2025 (McKinsey Global Institute, 2013). Many studies demonstrate that broadband penetration and quality help economies grow (Koutroumpis, 2009; Katz & Avila, 2010; World Bank, 2009) through"improving productivity, accelerating innovation and providing opportunity for new products and services" (Stork *et al*., 2014, p. 1). Ewusi-Mensah (2012), for example, explains that the level and extent of ICT diffusion correlates strongly with the level of national economic and human development. As he summarizes, the economic impact of ICT "on industrial production, commerce, and service industries of a country can be enormous given the pervasive nature of the technology and its consequent influence on how modern information society functions" (p. 268). While the term ICT can be used in diverse contexts (Zuppo, 2012), in this paper, ICT and internet-related technologies interchangeably as the internet plays a central role in promoting ICT. According to the World Bank/IFC report, for every 10% increase in high speed internet connections, there is an increase in economic growth of 1.3 % (World Bank, 2009) for direct economic impact (e.g., broadband infrastructure) and indirect economic impact (e.g., increase of productivity, new products and services).Indeed, as the McKinsey Global Institute (2013) affirms, the internet has contributed over 10% of total GDP growth in the last five years in emerging markets such as China, India, and Brazil.

Broadband internet improvesliving standardsby not only facilitating access to economic opportunities but also social welfare support that was previously inaccessible to the poor (ITU, 2012). The McKinsey Global Institute (2013) describes that the internet will enable Africans to access public information and services, manage their health, and improve their education.For instance, the institute estimates that technology-related benefits in health care could increase from USD 84 billions in 2013 to USD 188 billions in 2025. Cottrell (2013) also points out high correlations between the internet and life expectancy, education, and income, which could also in turn feed into economic growth and development. As Ngwenyama *et al*. (2006) state that "complementary investment in ICT, health and education can significantly increase development" (quoted in Thompson and Walsham,

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2010, p.116). Africa's demographic and socioeconomic predictions indicate opportunities as well. As described later, Africa is the world's youngest region and the youth population continues to grow rapidly. This fact is considered an opportunity given ICT's potential in growing economy and the young people's frequent use of technology (McKinsey Global Institute, 2013). In fact, many African countries such as Senegal and Kenya have increased their iGDP–an indicator of the internet's contribution to the total GDP. Senegal, for example, exceeds France in iGDP.While the significance of ICT for development is well recognized, is the e-performance of Africa improving? If so, will it continue to do so?Through literature review and semi-structured interviews with relevant stakeholders including African intellectuals, political scientists, development economists, ICT and education specialists, this paper intends to examine the current state of ICT in Africa and to forecast the forthcoming transformations of the next decades from development perspectives.

**Rise of mobile technology**

Between 2006 and 2010, African countries such as the Central African Republic, Angola, and Malawi increased internet users by 160%, 106%, and 106%respectively (ITU, 2013). The driving force of the spread of the internet in these countries is mobile technology.

In the last decade, mobile internet has been rapidly replacing fixed internet (ITU, 2013). While the continent was once described as a "black hole" of informational capitalism (Castells, 1998), Africa now has over 700 million mobile phone subscribers, second only to Asia (CNN, 2014) and it has the fastest growing mobile phone penetration rate in the world (Carmody, 2012).

One of the major reasons for such a rapid spread of mobile internet is that it requires "fewer ICT skills than are required to operate a computer, hardware and subscription cost are less, it is available as prepaid, and it does not even require electricity at home" (Stork *et al*., 2014, p. 1).

Mobile phones aretransforming development process in Africa (Etzo og Collender, 2010; Gillwald, 2010). The World Bank estimates that a 10% rise in mobile phone penetration gives a 0.6% rise in GDP growth, a significant increase in productivity (Alzouma, 2008).

Many global enterprises have recently launched initiatives focused on mobile applications in Africa partly because the continent has become the world's second most connected region via mobile subscriptions. For instance, Microsoft launched the 4Afrika project, aiming to improve Africa's competitiveness through different solutions such as the production of user-specific Windows Phones that meet the demands of Africans, especially students and professionals (Microsoft, 2014). Another example is the Konga start-up, a Nigerian online megastore that came up with a security solution for online purchasing. Konga's marketplace puts the buyer's and seller's interests as a core principle by securing their transactions (Amberber, 2014). The future of the internet in Africa appears to be tightly linked to mobile ICT devices.

**Digital future in Africa: e-Opportunities**

Africa demonstrates a massive consumer appetite for technology (Cottrell, 2013). The mobile internet is "likely to take hold on a much larger scale in the coming decade" (McKinsey Global Institute, 2013, p. 1). For instance, mobile revenue is equivalent to 3.7% of GDP in Africa, more than triple its share in developed economies. E-commerce is growing at 30% a year and the internet could contribute some $300 billion to Africa's GDP or 10% of its GDP within a few decades (McKinsey Global Institute, 2013).

Africa is the world's most youthful continent, with more than 200 million people between the ages of 15-25, who are more likely to be technologically literate than other generations (McKinsey Global Institute, 2013). As more people are connecting online as a result of the increase in the use of smartphones, the potential for ICT expansion is promising (Dingle, 2013). Given the above-stated potential of ICT, African governments such as Rwanda, Morrocco, and Nigeria have placed ICT-driven growth policies on the agenda and have ambitious plans to expand high-speed internet access to most of their populations (McKinsey Global Institute, 2013). Four strategic dimensions, where ICT arguably has potential as a significant enabler for transformational development in Africa, are identified: 1) institutional infrastructure; 2) governance, accountability, and civil society; 3) service production and economic activity; and 4) access to global markets and resources (Thompson and Walsham, 2010). So far, positive impacts of ICT have been discussed; however, there remain quite a few challenges to be tackled to fully take advantage of ICT's promotionof development.

**Issues to be addressed toward development**

Despite opportunities related to ICT in Africa, there existsa number of issues to be addressed. One of the most commonly cited issues is the digital divide: e-inequalities between and within countries.

As Yunus Carrim, South Africa's Minister of Communication, claims, "the growth of the Digital Economy in South Africa is significant, but it does not benefit people equitably" (as cited in Dingle, 2013). Colin Powell, the former US Secretary of State, describes this digital inequality as "digital apartheid" (as cited in Graham, 2011, p. 212).

While mobile phones seem to provide the poor with potential to have internet access, Thompson and Walsham (2010) argue, they"may even be opening up a 'competitive divide' between those with and those without access to telephony" (p. 119).

Carmody (2012) agrees with and further develops the statement of Thompson and Walsham:mobile phones might simply put some (overseas) firms at a competitive advantage relative to others, resulting in "a fallacy of composition, where the growth of some firms is the concomitant with the closure of others, and poverty levels remain the same or worsen" (p. 5). He continues that mobile phones may serve as tools of domination and exploitation as mobile phones and their associated infrastructure are developed and imported from elsewhere (p. 6). He concludes that the only indisputable

beneficiaries are the traders. Similarly, the rural-urban digital divide has long been a serious concern. In Africa, the internet mainly remains an urban phenomenon, which highlights an upcoming challenge for ICT companies and African governments: bringing the internet to the country side. Such a challenge has been tackled by firms such as the Ethiopian "Apposite" which offers market price information as well as tips and advice to farmers (SciDevNet, 2013). Initiatives such as this one, albeit still struggling to be completely profitable, are a necessary risk to take that could greatly impact productivity in key sectors such as agriculture. "[I]ntegrating the right applications of ICT in agricultural activities can help increase sustainable food production" (SciDevNet, 2013). Yet, an initiatives like Apposite is rare.

Another commonly cited issue is the lack of highly developed infrastructure for ICT, especially in sub-Saharan Africa. The quality and cost of electricity in most sub-Saharan African countries is substandard compared with other parts of the world, in part because electricity is produced by inefficiently managednational corporations without competition from the private sector. "Erratic electric power supply is a common occurrence, which contributes to high idle time for computer systems, frequent breakdown, and high repair costs" (Ewusi-Mensah, 2012,p. 253-254).Indeed, in Ewusi-Mensah's (2012) study, more than 60% of the respondents had experienced telecommunications failure several times in the previous three-month period.

Illiteracy, in particular ICT illiteracy, is problematic. According to Ewusi-Mensah (2012), a small pool of technically skilled ICT professionals are available in sub-Saharan Africa. He claims that "[c]omputer software provides its own set of complications…the software has, in general, become more sophisticated and requires a high level of expertise to fully exploit its capabilities, thus further adding to the cost of ownership and operation. Unfortunately, the required user expertise of the software may often be lacking in these countries" (Ewusi-Mensah, 2012: 260)

The issue of low internet penetration also needs to be considered. "With the current rate of internet use, it will be difficult to create a genuine information society or to use ICTs as a tool for economic and social development" (ITU, 2013, p. 6). Out of a population of over 1 billion in Africa, 167 million people are internet users, bringing the penetration rate of the internet to 15% of the overall population, compared to 27.5% in Asia, with more than one billion users, 63.2% in Europe, 42.9% in Latin America (Internet World Stats, 2013). While Africa's internet connectivity has been growing rapidly at an unprecedented level, the continent has a penetration rate lower than every other regionin the world (Alzouma, 2008).

One of the major reasons for Africa's low internet penetration is the high user costs. Gillwald (2010) explains that "opportunities for improved well-being are severely curtailed by the high cost of communications for those who do have access to them" (p. 81). While access to mobile communications can be obtained in many African countries with less than USD 20, ICT equipment and devices are expensive:

"[A]t least USD120 has to be paid for a smartphone, which is more than six times the cost of a basic mobile device offered by mobile telephony operators. A tablet, laptop or desktop computer costs at least USD 500. If you have a computer, you must purchase a USB stick for the mobile internet and buy a subscription, which will cost at least USD 30. A monthly flat-rate subscription for a mobile internet connection will cost at least USD 20 a month" (ITU, 2013, p. 24).

Few domestic ICT manufacturing industries in Africa are active, with some exceptionsin Nigeria and South Africa. All products, including software and hardware, are imported (ITU, 2013), which has maintained the high costs of ICT devices throughout the continent. As Alzouma (2008) mentions, "Africans remain essentially receivers and passive consumers of technological productions and innovations made elsewhere" (p. 39).

Some doubt whether ICT leads to economic development (Gillwald, 2010; Mascarenhas, 2010). Kwaku Kyen (2012), for example, states that "standard ICT products such as mobile phones and even personal computers are not necessarily the tools to bring about rapid economic growth" (p. 236). ITU (2010) also describes that there is no explicit relationship between GDP and internet penetration.

Carmody (2012) is skeptical of the role of mobile phones in promoting development and reducing poverty: "they often serve to reinforce the dynamics of uneven development" (p. 1). He further explains that mobile phones have no independent causative power toward development. "What does ICT do? They handle information in digital format. That's all" (Carmody, 2012, p. 3).

Gilwald and Stork (2008) echo Carmody stating thatmobile phones maydirectly contributeto the production of poverty. "In Ethiopia, the poorest 75% of the population who use mobile phones spend 27% of their income on them, reflecting the continued high cost of services on the continent" (Gilwald and Stork, 2008, p. 14).

This literature review illustrates that ICT has potential to be an empowering tool for development; however, forthose who are struck by illiteracy and who do not have any option to project themselves further than their daily struggles, the internet may not appear to be an empowering tool.What do stakeholders such as African intellectuals, political scientists, development economists, and ICT and education specialists working for international organizations think about the impacts of ICT on the continent's future development? The rest of this paper explores this question.

## METHODS

This study employs semi-structured interviews with eight relevant stakeholders from various institutes, who have been involved in ICT issues in Africa, including African intellectuals, political scientists, development economists, and ICT and education specialists. They have belongedto and/or worked for nonprofit organizations, universities, and international organizations such as UNESCO and the World Bank for over a decade.

Their personal opinions are hardly made public. African intellectuals, while highly educated, do not havemany opportunities to express their opinions in press because they are not (yet) professional scholars. Those who work for international organizations are usually not allowed to publish their opinions unless given permission from their organizations. That is why we will not disclose their identities in this study. However, the participants are the ones directly working for and with African beneficiaries. This study does not intend to generalize findings but to add different perspectives about ICT and its impacts on Africa's development.

## RESULTS

With regard to the digital divide among countries, a CEO of an African NPO reported, "only [citizens in] a few African countries such as South Africa and Nigeria have access to ICT. Those who have the access to ICT are socioeconomically developed. If you look at the South African market, for example, they have online business like a developed country. They have smart phones. They can shop online. They are also in the process of developingan online shopping service similar to Amazon.com. However, many Africans, especially those in sub-Saharan Africa, never see computers. In Africa, you need a full time job to subscribe to a mobile phone with the internet. You need to make a contract to the cell phone shops."

The digital divide exists not only among countries but also within countries: e-inequalities between the rich and the poor and between urban and rural areas. A CEO of an African NPO said that many do not have access to the internet in rural areas because there are few places with the internet. "They [people living in the suburb and rural areas] have to go to city centers for internet access. In Cameroon, for example, the middle and upper classes have the internet. Many use the internet for social networking, notably Facebook. This enables them to develop their social capital [which the low income class cannot].

Apart from the digital divide, scarce infrastructure is a major issue.As one respondent said, due to a lack of adequate infrastructure, "electricity gets down often." Also, the internet speed is slow. "You sometimes have to wait half an hour or even one hour to download something."Related to the above-stated issues, the high costs of internet access was indicated. "They are expensive by African standard. Unlimited access is particularly very expensive. Few have it."

While many Africans remain technologically illiterate, interviewees in general were optimistic in this respect. An education specialist from the World Bank, for example, claimed that "as long as they can get a PC [computer] and internet access, African children are eventually able to use them, though the maintenance is necessary and difficult. With internet access, those who cannot go to school can learn online."

As indicated in the literature review, however, some are suspicious about a causal relationship between ICT and economic growth. A political scientist from an Italian University reported, "It [whether ICT contributes to development or not] depends on if they are capable of producing them [mobile phones and the internet]. If not, then they have to import them. It also depends on the number of internet users. Ifthe demand is high, then I guess it could contribute to the economic growth."However, she argues, ICT does not contribute to reduce poverty. "ICT just tells something of the status of a person. For some, ICT is a necessity; for others, it is a luxury. At any event, ICT does not reduce poverty. Only the rich get richer and the poor get poorer. That is the bottom line."

During interviews, some issues that were not mentioned in the literature review were raised. An education specialist from an international organization argued for the power of the internet in social change. "Tunisia, for example, has promoted one laptop per child. The Arab Spring was realized due to SNS." She continues, "the Tunisian government officials want to regulate the internet because they themselves turned over the former government with SNS, but they also know that they cannot control and are scared of the power of the internet."

She also questioned, despite some positive aspects of ICT, whether it really is justifiable to buy expensive facilities such as computers and projectors and use them as textbooks or whiteboards. From her experience, using computers, "students just type what is shown on the screen (e.g. power point slides). It may not be meaningful unless the pedagogy itself has changed."

## DISCUSSION

All aforesaid issues raised by respondents are interrelated. The digital divides and low internet penetration rate are attributable to all the other issues including high costs and a lack of infrastructure, especially in poor countries and rural areas. Interviewees are relatively optimistic about ICT illiteracy. However, the problem is that children are unable to expose themselves to ICT due to the above-stated issues.

The interviewees also reported opportunities as well as issues. A CEO of an African NPO said that the positive side of ICT is that it can create jobs. For instance, even in Africa, shopping malls are full of affluent individuals. However, they might prefer to buy products online: 1) to save time, 2) to have more options/variety, and 3) to not be mugged. Online, he emphasizes, they are physically safe.

An education specialist from an international organization said that in East Africa and the Middle East, the mobile money transfer plays a crucial role in conditional cash transfer (e.g., granting money for sending children to school or mothers going to a clinic for vaccination). Yet, if paid in cash, the money often arrives late and is not sustainable. The mobile money transfer is instrumental in this aspect."

ACEO of an Africa-based consulting firm said that ICT has led to the widespread usage of online banking systems, brokerages, insurance, and financial services in Africa. "ICT has led to an increase in trade performance, due to the speedy delivery of goods and services via the online sales systems.It has also led to efficient financial and payment systems to settle transactions and to the development of trade system at the Nigerian stock exchange market to facilitate efficiency in the capital market."

## CONCLUSION

In sum, there exist both issues and opportunities with the use of ICT for development in Africa.ICT may provide the poor with some opportunities to climb the socio-economic ladder, but it can widen the gap between the rich and the poor as well. Given that the above-stated issues (i.e., the digital divide, inadequate infrastructure, low internet penetration rate, high costs) are interrelated, they have to be addressed holistically and comprehensively. In order to address the issues, the establishment of infrastructure is essential as it is closely related to other important issues such as the digital divide, high costs, and low penetration. However, the African governments do not seem to have been able to achieve this task very well as of yet. For example, many have experienced problems with electricity, internet access, and internet speed. Local private companies, however, are unlikely to successfully replace governments in achieving this task. Currently, only foreign companies have been able to establish ICT infrastructure. It was indicated in the literature review and by interviewees that foreign companies take advantage of this situation and dominate the African market. In this context, has Africa been developed or exploited? Will it continue to be so? The only answer that we have at this moment is that the continent has no other option but to accept, confront, and transform this external pressure into a form of development.

## REFERENCES


Alzouma, G. 2008. Téléphone mobile, Internet et développement: L'Afrique dans la société de l'information. Tic&Sociéte 2(2):36-58

Amberber, E. 2014. Nigerian startup Konga.com raises $25 million series B funding, biggest ever by an African startup. Available from: www.yourstory.com/2014/01/nigerian-startup-konga-funding-african. (Accessed 03/09/14)

Castells, M. 1998. End of millennium. Oxford and Malden, Mass: Blackwell Publishing.

Carmody, P. 2012. The informationalization of poverty in Africa? Mobil phones and economic structure. Information Technologies & International Development 8(3): 1-17

CNN. 2014. Davos Africa mobile explosion. Assessed at: http://edition.cnn.com/2014/01/24/business/davos-africa-mobile-explosion

Cottrell, L. 2013. The emergence of the Internet and Africa.http://www.fas.org/irp/eprint/internet-africa.pdf

Dingle, S. 2013. The new face of policy. FINWEEK 19 September 2013.

Ewusi-Mensah, K. 2012. Problems of information technology diffusion in sub-Saharan Africa: The case of Ghana. Information Technology for Development 18(3): 247-269

Etzo og Collender. 2010. The mobile phone 'revolution' in Africa rhetoric. https://www.zotero.org/coldnose/items/Z87W4M5C

Gillwald, A. 2010. The policy of ICT policy, research, and practice in Africa. Information Technologies & International Development 6: 79-88

Gilwald, A. and Stork, C. 2008. Towards evidence-based ICT policy and regulation: ICT access and usage in Africa. Research ICT Policy 1(2): 1-45

Graham, M. 2011. Time machines and virtual portals: The spatialities of the digital divide. Progress in Development Studies 3: 211-227

Internet World Stats. 2013. Usage and population statistics. http://www.internetworldstats.com/stats2.htm

ITU. 2010. Measuring the information society. http://www.itu.int/ITU-D/ict/publications/idi/material/2010/MIS_2010_without_annex_4-e.pdf

ITU. 2012. Measuring the information society. http://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2012/MIS2012_without_Annex_4.pdf

ITU. 2013. Study on international internet connectivity in sub-Saharan Africa.
http://www.itu.int/en/ITU-D/Regulatory-Market/Documents/IIC_Africa_Final-en.pdf

Katz, R. L. and Avila, G. The impact of broadband policy on the economy. Proceedings of the 4th ACORN-REDECOM Conference, Brasilia, May 14-15, 2010. http://www.acorn-redecom.org/papers/acornredecom2010katz.pdf

Koutroumpis, P. 2009. The economic impact of broadband on growth: A simultaneous approach. Telecommunications Policy 33: 471-485

Kwaku Kyen, P. A. 2012. Is ICT the panacea to sub-Saharan Africa's development problems? Rethinking Africa's contentious engagement with the global information society. Progress in Development Studies 12(2-3): 231-244

Mascarenhas, O. 2010. Broadening the agenda for ICTs for poverty reduction: PICTURE-Africa. Information Technologies and International Development 6, SE, Special Edition: 37-44

McKinsey Global Institute. 2013. Lions go digital: The internet's transformative potential in Africa.

Microsoft. 2014. 4Afrika. www.microsoft.com/africa/4afrika/projects.aspx

SciDevNet. 2013. Radio, mobile phones could boost African farm yields. http://www.scidev.net/sub-saharan-africa/icts/news/radio-mobile-phones-could-boost-african-farm-yields.html).

Stork, C., Calandro, E., & Gamage, R. 2014. The future of broadband in Africa.http://www.researchictafrica.net/docs/The_Future_of_Broadband_in_Africa_webversion.pdf

Thompson, M. and Walsham, G. 2010. ICT research in Africa: Need for a strategic development focus. Information Technology for Development 16(2): 112

World Bank. 2009. High speed internet is key to economic growth and job creation in developing countries. Retrieved from June 6, 2014. http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/,,contentMDK:22231347~pagePK:34370~piPK:34424~theSitePK:4607,00.html

Zuppo, C. 2012. Defining ICT in a boundaryless world: The development of a working hierarchy. International Journal of Managing Information Technology 4(3): 13-22


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