



MOBILE LEARNING IN SUB-SAHARAN AFRICA: PANACEA FOR DRIVING INCLUSIVE DEVELOPMENT

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ABSTRACT

Evidence from the literature reveals that the quality of the populace affects the level of development; hence, education is a vital ingredient because of the role it plays in improving the quality of people. Less developed regions, however, have not been able to tap adequately into the opportunities provided by education to improve their people's quality. Some of the factors responsible for this include non-availability, limited access and high costs of education. This study, therefore, explores the possibility of facilitating inclusive development via mobile learning in Sub-Saharan Africa (SSA), considering the level of possession of mobile devices in SSA and the opportunities to provide information and knowledge affordably via the platform.

JEL Classifications—I25; L96; N17; O14; O15; O30

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1. INTRODUCTION

The need for welfare and sustainable development has been a driving factor in ensuring that nations commit to making required investments in their various economies. More so, we are in the knowledge revolution where knowledge is the currency and there is need to invest immensely in human capital development to enhance the capacity of the populace to contribute to the development process (Majgaard & Mingat, 2012; Oluwatobi, Olurinola, Alege, & Ogunidipe, 2018). Evidence from the literature reflects that knowledge is the difference between development and underdevelopment as well as between poverty and prosperity. Bridging the gap and catching up with advanced economies will, therefore, demand education and an environment that enables learning. South Korea, Singapore and the East Asian economic miracle in general are pointers to the fact that empowering the people through education, formal or informal, translate into economic advancement (Page, 1994; Naseem, 2003; Page, 2016). These, thus, suggests that inclusive development can be achieved through education. However, the concerns are the availability, accessibility and affordability of education.

Over 60 percent of the population in Africa live in the rural areas (Min-Harris, 2009). Not creating opportunities for their development is depriving them of their capabilities, which can be hazardous to them and the society. But why are they not educated? As identified in the literature, this large group of people are not educated because of certain factors, which include the rising cost of education, which rural residents may not be able to afford, and the lack of proximity to schools. This study argues that these two hindrances can be addressed with the aid of technology—mobile technology—in other to achieve inclusive development.

UNESCO report reveals that a significant amount of children lack access to basic education coupled with teachers, who lack the motivation, qualification and experience to train and cultivate minds. The outcome of these is the millions of children lacking basic writing, reading and numeracy skills in Africa (UNESCO, 2012). And where education is accessible to them, a large portion of them are not able to afford it. The cost of education has been a limiting factor for restricting a good number from accessing the opportunity of education (OECD, 2012; Masino & Nino-Zarazua, 2016). Statistics SSA has the highest rate of education exclusion, with about 60 percent of those within the ages of 15 and 17 years of age not in school (UNESCO, 2018). Sow (2017) validated this by reporting that less than 7 percent of late primary school students are able to read while about 14 percent are proficient in Mathematics. While basic education is free of charge in some African countries, report shows that the education services provided are, in most cases, poor in quality (Oketch, 2016; UNESCO, 2018). In the case of SSA, not all can afford formal education (O'Kane, 2018); however, this does not mean that learning cannot take place. These issues, hence, clearly shows that efforts need to be made to remove the barriers and make education available, accessible and affordable.

1.1. The Possibility of Mobile Learning

Nigeria, the most populous nation in Africa, has been identified as the largest market for mobile devices in Africa, having over 160 million subscribers and 84 percent penetration rate (Anammah, 2018). While Egypt has a population of 82.1 million people, there are 92.6 million mobile phones in its economy. This constituting 112.8 percent of the population. However, this is not to be compared with Morocco (113.6 percent) and South Africa (117.6 percent) to mention a few (Kiregyera, 2015). Given such capacity, it is expedient to leverage on it instead of wasting the potentials it provides. Mobile technology puts the world in the hands of people; thus, information and knowledge can easily and cheaply be transmitted via it. The use of mobile phones by the excluded and rural dwellers means that they can be

educated formally and informally. Various sectors have taken advantage of this opportunity to impact people in rural areas with viable services such as education and financial services as in the case of M-Pesa. For instance, Aker and Mbiti (2010) reported in their study that farmers in the rural areas of Ghana get agriculture-based education by sending request text messages through mobile technology to learn about prices of agricultural products in the city of Accra, which is hundreds of kilometres away from rural areas. In Niger, unskilled workers are able to call relatives in far distances about employment opportunities without incurring transportation costs. Residents in trouble spots are able to report violence and crime more readily without the limitations of protocols (Klick, MacDonald, & Stratmann, 2012; Mwiya, Phiri, & Lyoko, 2015). Rural dwellers in Africa, which make up to 60 percent of Africa's population, and who may not be able to afford the rising cost of formal education neither can locate an institute of learning at close range, can be empowered with knowledge given the rising number of mobile phones, mobile phone subscription in Africa, and the opportunities made available.

Addressing the concerns of accessibility and affordability of education is therefore possible using mobile technology. The possibilities here include saving the costs of transportation and avoiding extra costs of education—hostel rental, library charges, utilities, administrative costs, staff wages to mention a few. This technology can, therefore, enable learning from where they are. This study, however, is not about whether mobile technology will affect learning in SSA; rather, it is about how mobile technology will improve access to education in ways that are more accessible, more affordable, more efficient and more effective in driving inclusive development in SSA.

The rest of this paper is structured as follows: Section two is a review of literature on the subject of mobile learning and how it affects inclusive and sustainable development while section three presents an overview and some stylized facts on mobile learning in SSA. Section four presents some case studies to validate the role of mobile learning as a strategy for addressing the concerns of accessibility and affordability of education in SSA and section five presents the concluding remarks.

2. LITERATURE REVIEW

Various studies have been carried on on the subject of mobile technology and how it can be used to provide service and improve lifestyle, wellbeing as well as the economy as a whole. Some other category of literature have also enriched understanding as to how mobile technology makes information more accessible, thus, enabling education (Mayisela, 2013; Fojtik, 2014; Montrieux, Vanderlinde, Schellens, & Marez, 2015; Shyshkanova, Zaytseva, & Frydman, 2017; Peart, 2017). Fewer studies, however, have addressed how mobile learning can drive inclusive development. This section reviews some of them.

Mobile learning simply refers to the use of portable electronic tools and devices anywhere for activities that can be termed educational (Traxler & Leach, 2006). It can, thus, enable the storage of information, reception of knowledge and transmittance of knowledge. Since the device itself is a tool for communication, teachers and students can interact remotely. Its portability also suggests that learning can be done anywhere and anytime. It can, therefore, be posited that mobile learning will scale the level to which education can be accessed. As discovered from the study of Ileri and Omwenga (2014), however, mobile technology is a tool and enabler; it is not a teacher on its own. Teachers are needed to provide information and teach to educate; the technology is not the teacher; nevertheless, the technology enables the process of teaching and scales the teachers' efforts. While their study seeks to find out whether learners entry behavior affected the intended learning outcome with the use of mobile technology, they discovered that varied learner entry did not determine the intended learning outcome.

Hashemi, Azizinezhad, Najafi, and Nesari (2011) examined the definition of mobile learning in the knowledge economy context as well as their capabilities and the challenges that may arise via that platform. They defined mobile learning as the acquisition of knowledge and skill through mobile technology irrespective of time and location. Hence, with mobile learning, learning can be done anytime from anywhere. This suggests that with mobile learning, where the learner goes learning goes. However, according to them, mobile learning is simply another way of learning as a result of the availability of mobile technology instead of a replacement for traditional learning.

Forty percent of people in SSA had mobile phones as at 2016 (The Economist, 2017). In a number of SSA countries, a lesser fraction has access to electricity; thus, suggesting that mobile phone holders in SSA outnumber the amount having access to electricity (The Economist, 2017). Goksu and Atici (2013) asserted in their study that the rapid growth and developments in mobile technologies and the increasing accessibility and usage of mobile phones is driving the need for mobile learning. This suggests that the infrastructure for delivering education, through mobile technology, is no longer the issue but utilizing it to deliver services such as education. The possession and usage of mobile phones by the marginalized, as well as those in remote areas, suggest that education can be delivered to them (Oluwatobi, Efobi, Olurinola, & Alege, 2015).

Crompton and Burke (2018) embarked on a systematic review of the use of mobile learning in order to provide the scholarly community activities and the synthesis of mobile learning research from 2010 to 2016. They found out that most studies focused on the impact of mobile learning on the students achievement. This suggests that mobile learning can expand the learning experience beyond the classroom. This is consistent with a similar study they conducted earlier, which reveals that students engage in more knowledge consumption through their mobile devices (Crompton, Burke, & Gregory, 2017).

Mobile learning is not limited to a particular area. Evidence shows that it can be used for both formal and informal learning as well as in virtually all disciplines. For instance, Pimmer, et al. (2014) investigated whether nurses engage mobile devices as effective educational tools in remote and marginalized areas. They interviewed sixteen nurses and analyzed their data using qualitative content analysis technique. Their findings reflect that mobile phone usage by the nurses facilitated and aided authentic problem-solving, lifelong learning, emotional support and belongingness, accomplishment of unpredictable teaching situations, and reflective practices. This result clearly shows that mobile phones are effective tools for connecting with learners in remote and marginalized regions; hence, mobile learning can drive inclusive development.

Concerns may arise, however, as to how mobile learning can be used to teach subjects such as mathematics, which some students may have phobia for. This concern moved Taleb, Ahmadi and Musavi (2015) to embark on the study on how mobile learning will affect learning and understanding mathematics. They conducted the study in Tehran on 2353 school teachers from nineteen districts during the 2012/2013 academic session. First, they discovered that mobile learning has a direct impact on motivating the students to learn mathematics. They also discovered that it enabled their participation and understanding of mathematics. Further, they found out that there exists a significant positive relationship between mobile learning and other training methods.

With such progress made with the use mobile technology to enable learning, one concern could be what would happen to the traditional model. Idrus and Ismail (2010) tried to examine this by exploring learning institutes and the possibility of how they can be involved in the adoption of mobile technology that delivers rich content with no barriers to time or location. They revealed that people already engaged with mobile learning daily once they use their

phones to make or receive calls or text asking for directions or seeking for information or engage their calculator. Hence, the issue is not whether education is formal or informal; but the challenge of improving the accessibility and affordability of education

Those in rural, remote and marginalized regions, such as rural farmers, may not need to leave their farms for formal education, if they can get periodical short text messages that show them tips on how to improve the growth of his crops and preserve them from pests and rodents (Banks, 2012; Henze & Ulrichs, 2016; Sanga, Mlozi, Haug, & Tumbo, 2016; Allahyaria, Atashi, & Dunn, 2018). These are clear indications of the possibility to bridging the poverty gap by affordable means to deliver education. It is also apparent from these that text messages through the mobile phone is an effective means of transmitting knowledge. Swaffield, Jull and Ampah-Mensah (2013), in their study, examined how mobile phone texting can enable the delivery of education in Ghana. They discovered that weekly text messages to the learners had the potential to sustain their commitment, improve their study hours, enhance their understanding and boost their learning.

The extensive use of mobile phones, the internet and the social media in SSA indicates the opportunities that are available in enabling health, agriculture, disaster management, food security, civic responsibilities, and education. Moreover, it supports the availability, accessibility and affordability of education. The possibilities here are that learning opportunities can be extended to remote and marginalized areas, thus, enabling learning to such groups and facilitating inclusive growth and development (UNESCO, 2012; The Economist, 2017; Aluko, 2017).

3. SOME STYLIZED FACTS

Some statistics have shown that Africa will continue to be left behind on the pathway to educating its people if it depends mainly on the traditional model of education. 42 percent have access to textbooks in primary schools in Africa, while the acceptable standard is at least 85 percent. Cut in education spending, as a result of rising education cost, has put almost 4 million children out of school (UNESCO, 2012). All these can be addressed by remodeling the avenue through which education is delivered. Evidence from a five-year study by the Ambient Insight (2013) shows that Africa has the largest mobile learning growth rate in the world with a compounded annual growth rate of 39 percent.

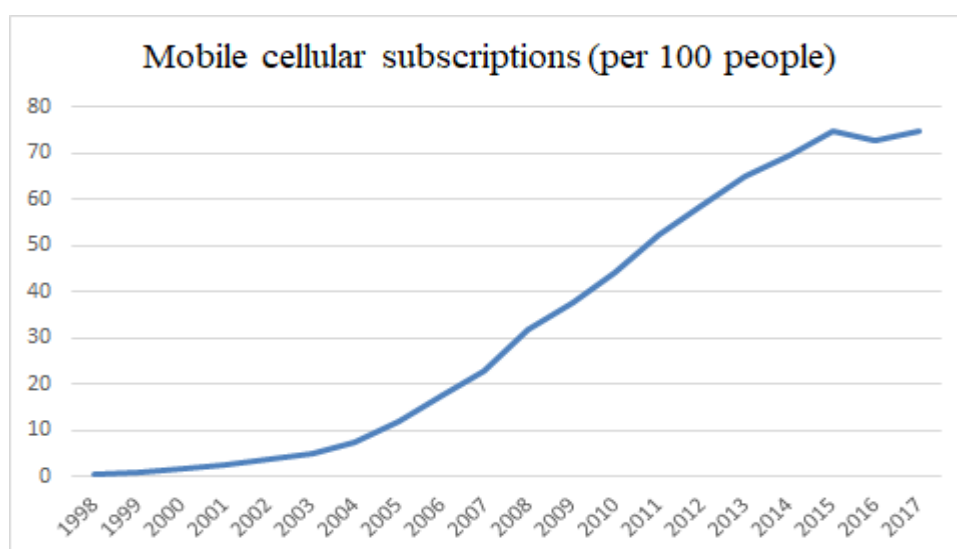


Figure 1: Mobile Subscription per 100 People in Africa

Source: World Development Indicators (2017)

Data from the ITU (2015) shows that mobile subscription in Africa grew to 625 million in 2014 from 87 million in 2005 indicating 618.4 percent growth in the period while the population in Africa grew by 23.7 percent in the same period. These indicate the increasing dispersal of mobile technology and subscription in Africa, thereby setting up the required frameworks, networks and channels for the delivery of education. Figure 1 shows the trend of mobile technology penetration in Africa. The trend shows that the percentage of those using mobile technology in Africa has been on the increase. The amount has risen to almost 70 percent as at 2017.

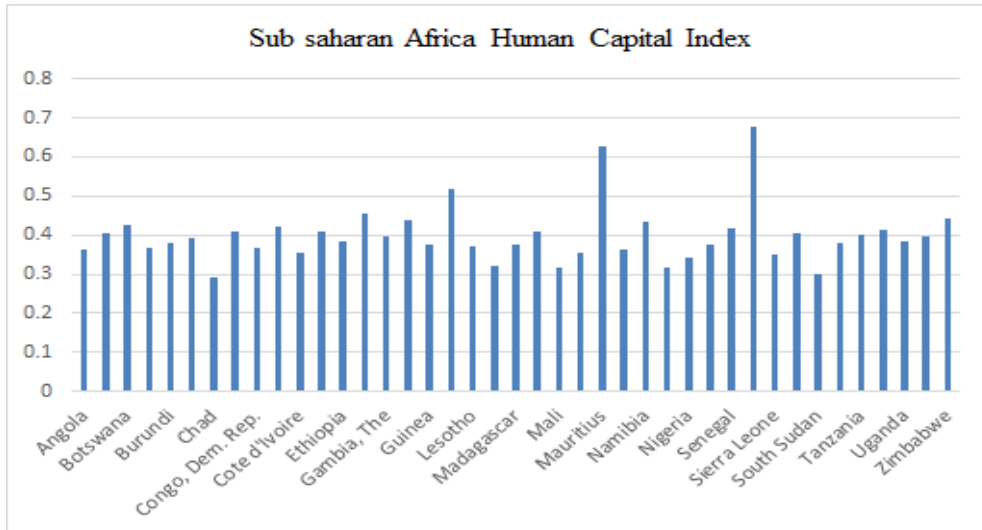


Figure 2: Human Capital Index (...)

Source:

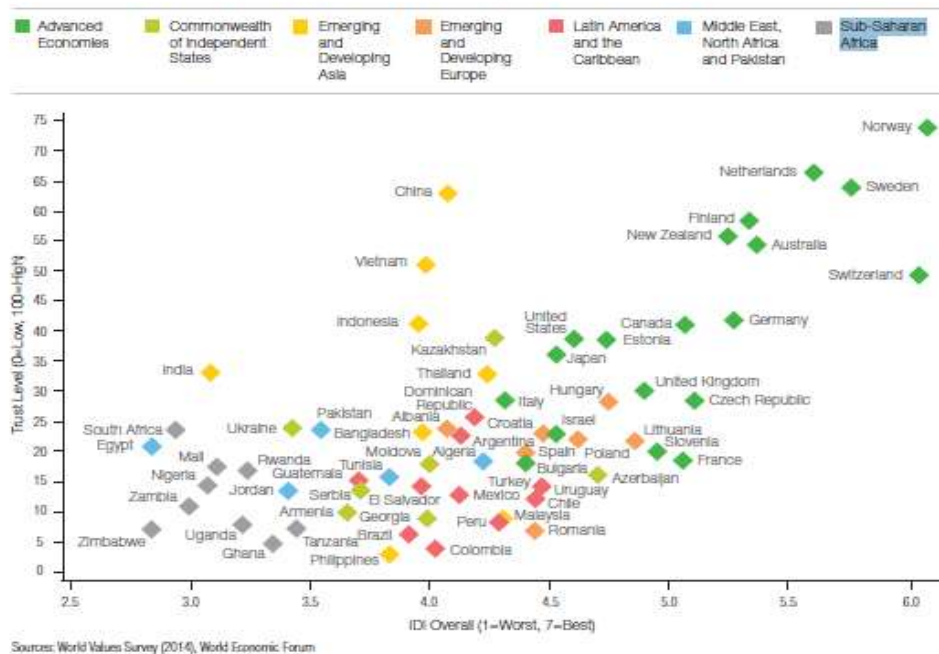


Figure 3: Inclusive Development Performance (2018)

Source: World Economic Forum

This persistent rise in mobile subscription per a hundred people in Africa is the opportunity to educate more people with lesser costs. From the Human Capital Index reflected

n Figure 2, the value of human capital in SSA is within the average of 0.4 out of 1. With the capacity and opportunity provided by mobile technology, this can be improved to achieve sustainable and inclusive development.

As seen in Figure 3, SSA countries are yet to experience inclusive growth and development. Mobile learning, therefore, can be explored to give SSA the advantage of acceleration.

4. CASE STUDIES

This study is validated by three case studies in Africa, which have employed mobile technology to educate African's more affordably and improve on their capabilities to contribute to the development process. These cases are Mobile Alliance for Maternal Action, Eneza Education and Praekelt Foundation. Each of them are discussed in this section.

4.1. Mobile Alliance for Maternal Action

Mobile Alliance for Maternal Action (MAMA), a Public-Private Partnership initiative in South Africa, is helping to use mobile education to solve the critical challenges faced by women in South Africa. Though a middle income country, about 30 percent of pregnant women are HIV positive, 25 percent have been victims of rape, 77 percent are single mothers, and of every 100,000 babies born 310 of them die out of which 180 are HIV related. All these are as a result of lack of health education. MAMA solves these problems by sending mobile text messages to new and expectant mothers to educate them on what to do, things to avoid, medications to take to prevent HIV transmission to the baby and how to be good mothers. The program has served more than 350,000 woman and their families since its commencement in May 2013. This is an attestation of how mobile learning can enable capabilities and contribute to sustainable development (Speciale & Freytsis, 2013; Coleman, 2013; Nurmatov, et al., 2014; Mobile Alliance for Maternal Action, 2014).

4.2. Eneza Education

Eneza education is a startup enterprise in Kenya aimed at solving illiteracy problems in Africa using mobile technology. The high student to teacher ratio does not enable learning hence many students do not make it through to high schools. Only 32 percent of students make it through. Since the lack of quality teachers will not solve the large student to teacher ratio, a cost-effective means that puts the learner at the centre of education was pertinent. Eneza, thus, provides the solution by using text messages to actively engage students, deliver interactive study contents. In addition to this, they developed a solution to help teachers and parents evaluate and monitor the performance of students. The outcome from the use of Eneza shows that students who use it have increased their study period by at least 2 hours per day. The startup is therefore helping African break out of poverty (Manske, 2014; iHub, 2014; Eneza Education, 2015).

4.3. Praekelt Foundation

The Praekelt Foundation is a non-profit organization in Africa aimed at educating young people in Africa through mobile technology so as to improve their living standard and get them out of poverty. The ideology behind this is that education liberates people from the poverty trap. Primarily, they employ mobile technology to provide essential information on relationships, sex education and HIV/AIDS to curb the spread of the virus through mobile learning. Hence, users can easily locate the nearest health centre and request information using text messages on a basic phone at low cost. A child in a remote community and lack of access to textbooks can read for free from his mobile phone. Those advanced in age can get

text message reminders of their medication. As an entrepreneur and consultant, the founder, Gustav Praekelt, discovered the increasing spread of mobile technologies in Africa and leveraged on the opportunity to educate remote communities and deliver services to the poor cheaper, better and more accessibly (Labrique, Vasudevan, Kochi, Fabricant, & Mehl, 2013; Wikimedia, 2014; Praekelt Foundation, 2015).

5. CONCLUSIONS

It is apparent that development is an achievable outcome where the people have the capability to drive development. While understanding that the people are vital factors in driving inclusive development, it is also necessary to pay attention to the quality of the people. As reflected in this study, the greater the quality of the population the greater the economic performance. And as noted, education is one of the vital means for improving the quality of the people to facilitate development; however, education has not been available, accessible and affordable to many in SSA, particularly the rural dwellers, who constitutes a significant portion of the population.

This study, thus, clearly reflects how technology can be used to address the gaps of availability, accessibility and affordability. More specifically, it shows that the use of mobile technology will enable the availability, accessibility and affordability of education. And since, records reveal that a significant percentage of SSA dwellers possess mobile phones, transferring knowledge via such means will help improve human capital and the quality of the people at large. SSA countries can, therefore, invest in mobile learning to drive inclusive development. This will help to increase the capabilities of a number of persons to contribute to the development process, thus, achieving inclusive growth and development.

The traditional model for delivering education has translated into increasing cost of education, which deprives the capabilities of those who cannot afford the costs. This study, thus, contributes to existing literature by justifying the possibility of driving inclusive growth and development in SSA by empowering people, particularly those in the rural areas, through mobile learning, which improves the availability, accessibility and affordability of education.

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