What is Digitalization?

Opportunities and Challenges in East-Africa

Contents

Please note: The following information is publicly available and does not necessarily reflect the opinion of FES Rwanda.

1. Introduction

Digitalization is transforming the world in almost every aspect of life during the last few decades. The access to internet, increase of people using mobile phones, social media and other ICT services changed the way people interact, communicate, learn and work in almost every country (Laura Schelenz 2018); (Parviainen, et al. 2017).

African countries have the potential to benefit from digitalization in various development domains. For such development, it is required for the African states (as well as for the rest of the world) to take measures for a digital future (Banga and Velde 2018), to facilitate a digital enabling environment, (Velde 2018) and to enhance learning, discussion and exchange platforms[1] about the opportunities, engagement and challenges of digitalization in Africa. These platforms can give a strong basis for any action and initiatives in digitalization (Laura Schelenz 2018). At the same time, a mutual shared understanding on the meaning of digitalization is not self-evident. According to (Parviainen, et al. 2017), "the term digitization refers to "*the action or process of digitizing; the conversion of analogue data (esp. in later use images, video, and text) into digital form*." It can be considered in a common sense that digitalization means the integration of digital technologies into everyday life at processes, organizational, business and other society domains. Often the specific role of digitalization on business models is emphasized. Then digitalization focuses on the adoption and the use of digital technology by the key market players and other key players including distributors, producers, consumers, film practitioners, associations, policymakers and politicians. This paper seeks to give a general overview on the challenges and opportunities of digitalization in the African context and it will focus on several societal aspects such as labor, agriculture, education, media, gender, etc. Although none of these topics will be dealt in details, but the paper can give a broader overview of the possible wide-ranging effects of digitalization in Africa. Finally, the case of Rwanda will be highlighted in order to give some current insights of concrete digital development.

2. Rational for this brochure

Digitalization is affecting all aspects of everyday life, decent work, employment, business, community development and the whole economic development. FES Rwanda has embarked on supporting Civil Society organizations, Trade Unions and young professionals on understanding the current effect of digitalization on the global trends of development and communication. In this regard, this paper provides a broad overview of the opportunities and challenges of digitalization in different domains of the society in Africa.

The Friedrich-Ebert-Stiftung (FES) is a non-profit German foundation funded by the Government of the Federal Republic of Germany and headquartered in Bonn and Berlin. It was founded in 1925 and is named after Germany's first democratically elected President, Friedrich Ebert. FES is committed to the advancement of both socio-political and economic development in the spirit of social democracy, through civic education, research, and international cooperation. Friedrich-Ebert-Stiftung is the oldest political foundation in Germany. The main objective is to provide capacity-strengthening to relevant organizations and promote citizen education and participation by bringing together representatives from different sectors of society and policy makers with the objective to strengthen the development and comprehensive coverage of social policy initiatives and therewith support Rwanda to achieve its commitments as set out in the Second Economic Development and Poverty Reduction Strategy (EDPRS 2)[2].

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[1] http://www.smartafrica.org/IMG/pdf/sas_magazine_final.pdf

[2] www.fes-rwanda.og (March 2020)

3. General Information on Digitalization in Africa

In 2013, the AU (African Union) founded the SMART Africa initiative, which aims to achieve socio-economic development through ICT's (Information and Communications Technology). It involves the strengthening of broadband connections and the implementation of e-government features. These include electronic services for citizens, electronic IDs, unified communication and a cloud-based infrastructure through a digital government platform. The member states also commit to promote and fund e-applications, e-education, e-health, e-tourism, e-agriculture and e-commerce. The goal is to harmonize policies and frameworks, to generate more demand for goods and expand markets, to attract large-scale investments and to create new industries and jobs.

Considering of economic development, the newly created African Continental Free Trade Area (AfCFTA) also commits to widen its free-trade approach to the digital sphere by pursuing data flow across national boundaries[3]. Digitalization has transformed Africa also in the use and access to the financial services, retail payment like mobile money transfers and based payment and digital transport has been increased in recent years as well. It is also important to acknowledge the impact of digitalization on development of sustainable business model and revenue administration. However, adoption of effective policy can facilitate digital associated investment and promote tax incentives to encourage innovation (Njuguna 20018).

4. Digitalization and the Labor Market

Production of goods and industrial revolution had gone through different stages associated with labor market, productivity, demography and income per capita (Vries 2008). After the mechanization in the 18th to 19th century, in the late 19th century, single manufacturing was replaced by mass production due to assembly lines. In the second half of the 20th century automation and the first use of computers caused a third transformation of production (Degryse 2016); (Xu, M.David and Kim 2018).

Now, in the beginning of the first half of the 21st century, many people talk about a fourth industrial revolution, also called industry 4.0 (Xu, M.David and Kim 2018). It implies digitalization and data exchange in manufacturing technologies, robotics, artificial intelligence and the overall digitalization of businesses. It opened new opportunities but also presented challenges for the labor market (Banga and Velde 2018). For example, use of mobile phones and the emergence of new applications such as Uber in transportation, improved opportunities for new jobs and efficiency in service delivery (Degryse 2016).

On one hand, a digitalized economy is the rise of robotization and artificial intelligence in production that has the potential to increase productivity and, in some ways, replace human workforce and affects employment in different services in the economy[4]. On the other hand, new sectors like e-commerce and other digital business models emerged as new digital economic platforms to perform as matchmakers between demand and supply on the market and therefore new market opportunities (Banga and Velde 2018). Research acknowledged that changes brought by new technology and digitalization brought about new innovations in production, manufacturing and service. Not only is digitalization affecting the labor force and accessibility to jobs but in some cases, robots also replace brains. From consumers, producers and workers perspectives, it implies a wide range of novelties. This requires countries and Trade Unions in Africa to find new adaptation strategies, new education systems[5] and digital skills development that integrate new changes in the economic development (Christian Bührer 2017), (Banga and Velde 2018).

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[3] http://www.smartafrica.org/IMG/pdf/sas_magazine_final.pdf (March 2020)

[4] https://www.fes-connect.org/trending/technology-changes-the-future-of-work-in-sub-sahara-africa/ (March 2020)

[5] https://www.africa-ontherise.com/2019/07/developing-africas-youth-to-respond-to-the-challenges-of-digitization/?fbclid=IwAR0iWXSYuFg_HApmLlkeSgjjyCVktxrjklG6fQ1xyYq3pU36tchFzTwosjI (March 2020)

4.1 Digitalization as an opportunity for the African Labor Market

Digitalization and digital business can have several impacts on the African labor market. Digitalization processes often promote more efficiency, since they replace workers or employees from forms of routine of human workforce to automated processes, (Moavenzadeh 2015); (Vries 2008).

Though digitalization in goods and services production seems to reduce jobs when it comes to human capital, the emerging African market is relying on export, thus e-commerce increases employment opportunities with the creation of new services and new jobs (Master Card 2019) (Blix 2015); (Ibrahim, et al. 2019). Furthermore, employees could shift from their work to a more creative, cognitive work. By the use of digital communication platforms and intranet, some jobs are not bound to a certain location anymore. This can enable employees to work from their homes, to travel less for work and to combine different jobs and such incentives proved to improve efficiency and productivity (Ibrahim, et al. 2019).

However, negative impact on labor market has been also highlighted; for example the difference between decrease in return to labor and increase in return to capital investment (Ibrahim, et al. 2019). Some employment sectors are more at risk to experience job losses than others. Simple (manual) labor, which can be replaced by computers, robots, and other digital technologies are more in danger than jobs that rely on creativity, knowledge and human interaction.

Overall, the services sector in Africa accounted for one third of formal employment during 2009–2012. If the informal sector jobs were included, the relevance of services would be even higher.[6] More recent statistics show that the African service sector, automation and the digitalization of work practices have not negatively affected employment in low-income jobs. The decline in employment was mostly experienced in middle-income jobs.[7] The rise of more and more tech companies creates a whole new market and therefore new opportunities and jobs. The African Development Bank reported in 2016 that two million jobs would be created in the ICT sector in Africa by 2021.[8]

The mentioned improvement by digitalization can only occur, when governments are willing to invest in digital infrastructure such as broadband internet and ICTs. In Africa, this poses a challenge, as many countries still cannot provide stable internet access to its citizens. While Western and Eastern Africa only have an internet penetration of 39% and 27%, in Southern and Northern Africa 49% and 59% of the population have regular access to internet. Africa also presents the highest growth rates of Internet users with 20% more users compared to 2017[9], (Perci and Kojo 2013), hence, digitalization can be considered for Africa, as an opportunity to participate in the global digital economy (Ibrahim, et al. 2019), (Prakash 2019).

4.2 Young generation: an opportunity for Africa to benefit from digitalization and enhance innovation

Africa has a young population who has grown up in a globalized and interconnected era that offers huge potential to become a significant force in the upcoming decades of digital learning and working. (Degryse 2016); (Blix 2015) pointed out that, with the experience of industrial revolution, some jobs disappeared while others were emerging. Changes brought by digitalization would not only be seen in the loss of jobs, but also in the long run trends of production and economic growth. Those trends include the impact of aging or young demography in the economy and their adaptation and engagement in the digitalization.

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[6] https://unctad.org/en/PublicationsLibrary/aldcafrica2015_en.pdf , p. 11

[7] https://www.fes-connect.org/trending/technology-changes-the-future-of-work-in-sub-sahara-africa/ (March 2020)

[8] https://www.newtimes.co.rw/section/read/227213 (March 2020)

[9] https://static.euronews.com/articles/43/12/431267/1024x576_bonus-internetpenetrationbyregion.jpg (March 2020)

Young demography in Africa has more potential to benefit from digitalization by their engagement in innovative entrepreneurship, job creation, integration in the global competition and inclusive economic growth. Entrepreneurs and young professionals can enter their skills or products on the same platforms no matter if they are from developed countries or not. They are not bound to traditional value chains, local markets or the costly employment of distributors anymore.

It is therefore essential for Africa states to prepare and respond to the digital economy and invest in their young generation to prepare them be part of a digitalized world; to encourage their innovative entrepreneurship and to provide to them with the required tools and confidence to enter into the global value chain (Ibrahim, et al. 2019), (Master Card 2019), (Prakash 2019).

As a digital generation, if they are well trained, they can deal more efficiently with new technology and can therefore integrate themselves in the digital economy. This is not a straight line; it requires African Countries to adopt strategies and supportive policies that attract Foreign Direct investment (FDI) related to ICT and digitalization[10]

4.3 African Trade Unions in a Digitalized Labor Market

For trade unions, the digitalization of the labor market entails a variety of challenges. Artificial intelligence and robotization cannot only cause the replacement of workers by machines, but they can also change their roles as part of the production process. The role of trade unions would be to support and facilitate digital networks and industrial cooperation through social dialogues. Trade Unions can develop education programs that include research and policy brief to inform policy makers and influence policy change or adoption of new ones. Trade unions should ensure that, the transition to digitalization should be fair with attention to social justice and economic inclusiveness and increase of new job for workers.

This requires for Trade Unions to build the capacity of workers in digital economy, encourage development of related platforms that support information sharing about workers' rights, benefits from digitalization, review workers' organizations and their representation to enhance social protection especially for low level workers and fostering incentives (tax waiver or reduction) to support new digital initiatives.

Environmental protection and efficient use of resources should not be forgotten by encouraging entrepreneurship in recycling, land restoration and reduction of CO_2 emission, (Trade Union Advisory Committee for Organization, 2017); (Degryse 2016, Degryse 2016). In the development of the 21 century, trade unions bear the responsibility to fight for sustainable industrial policies, education and social programs that empower and allow workers to embrace and benefit from the new era of digitalization, rather than bearing its costs (Degryse 2016).

New applications such as Uber don't require high level skills, it is simple and affordable by many people. This example has proved that trades unions should look into simple and appropriate ways to allow and engage workers in e-commerce and digital economy (Degryse 2016); (Ibrahim, et al. 2019). According to (Blix 2015) "*Improvement in technology led to higher demands on labor, which in turn improved output and generated real wage growth" and* added that in the past, there was a key role of trade unions in balancing power between factory owners and workers.

Another aspect is that trade unions need to fight against the trend of deregulation and the efforts to bypass social and working legislation when it comes to digital service platforms. Workers who provide the offered services often work in parallel and insecure labor structures that do not always have policy and regulations that provide legal, protective and encouraging working environment. Trade unions need to

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[10] http://www.africa.undp.org/content/rba/en/home/blog/2017/8/7/africa_defining_challenge.html (March 2020)

urge governments, investors and other stakeholders to fill these loopholes in order to prevent illegitimatized and unprotected employment. Trade unions can play a critical role in bridging those gaps between government, the private sector and workers.

5. Digitalization and Agriculture

The African agriculture sector could benefit from digitalization to improve production and food security. In the face of global climate change and high population growth, digitalization can offer broad solutions needed by African farmers. Digital technology can enable automation processes to increase production and to create learning communities for farmers through mobile technology. Small holders learned how to restore soils using crop rotation, though in some countries this is a traditional method, but with new technology, farmers learn types of crops to alternate. Digital Green Organization transformed agriculture in India and Ethiopia using technology. Smallholder farmers have been integrated in digitalization using mobile phones and videos for training and education in local languages (Annan, Conway and Dryden 2016).

Like in any other sector, digitalization makes it easier for farmers to connect, to access and share information. Through special designed apps, farmers can create a knowledge-based community in which they share information and learn from each other. In order to increase farmers´ productivity, other apps have been developed to measure and analyze soil data like temperature, nutrients and vegetative health by images taken from satellites or drones. Weather forecasts and soil sensors make it possible to manage crop growth in real time and provide information on how to use the right fertilizer and optimally irrigate farms (Annan, Conway and Dryden 2016); (Trendov, Varas and Zeng 2019).

In a long-term perspective, this might also be able to help to consolidate interests and form a common voice that can express issues towards other actors such as national governments. Youth have the opportunity to learn from the past and initiate agri-preneurs to play a role in transformation of agriculture, related investment and agribusiness (Trendov, Varas and Zeng 2019).

Similarly farmers can benefit from new digital services with access to the information about market, price, products, distribution and sell of crops using mobile phones. Access to information could also remove price asymmetry between farmers and buyers; digital payment opens new markets to farmers who could not participate before. Other start-ups offer banking opportunities and credits to farmers who don't have access to the classic banking system. Digital technology can even allow smaller players to be integrated into the value chain, for instance through e-commerce platforms.[11]

6. Digitalization and Information

Digitalization could have an equalizing effect on societies. The valuable good of accessing and creating knowledge that has been available only to the privileged for centuries, is now widely offered to everyone with a web-enabled device. Never have so many people had access to general and specific information. In spite of different cultural or economical backgrounds, education or geography, everyone can gain information if they have access to a device that can provide an Internet connection.

The www (world wide web) is an inclusive place that provides the same services to anyone. However, inclusive Internet Index 2019 pointed out that for internet to be relevant to all and to contribute to the socio-economic development, the following factors should be measured: *"Availability: quality and breadth of available infrastructure required for access and levels of Internet usage. Affordability: cost of access relative to income and the level of competition in the Internet marketplace. Relevance: existence and extent of local language content and relevant content. Readiness: capacity to access the Internet,*

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[11] http://www.fao.org/e-agriculture/news/how-digital-technology-changing-farming-africa (March 2020)

including skills, cultural acceptance, and supporting policy" The Inclusive Internet Index 2018 listed Tanzania, Rwanda and Uganda as part of the top 5 of low-income countries regarding their Internet inclusivity. Especially for Rwanda, access to the Internet has increased unprecedentedly.

The proportion of households with Internet access grew by 490.8% from 2017 to 2018 (Economist 2018). In low-income countries, cost of mobile connectivity is falling.[12] From a more specific approach, the digital access to information can, for example, help to solve some of Africa´s education problem: many children don't attend a secondary school. E-learning and digital educational programs could bridge this educational inequality.

For instance, a Kenyan start-up allows users to access learning materials using various devices. They can access courses and quizzes via text messages for only 10 USc (US Cents).[13] The amount of accessible information has grown to a extent like never before.

This knowledge can have a liberating effect on its consumers. Internet usage can help people gain individual independence, as almost 60% of Sub-Saharan Citizens state that they have become more self-determined since they started using the internet. The access to information and knowledge from the World Wide Web has the potential to transform African citizens into self-determined and responsible actors in their societies.

The confidence that comes with the use of the internet can be channeled into private and public engagement and can transform societies from within. It has never been easier to publish own perspectives and opinions. Through the variety of digital media outlets and the possibly to distribute content for free, everyone can tell their story from an individual perspective. The digitalization of media can give the opportunity to change the discourse about Africa, from a troubled continent, as which it is often perceived in the Western world towards a discussion about the potential and prospects it actually bears.

However, this uncontrollable amount of information and the fact that everybody can contribute and add creates potential risks. As the internet itself does not censor any information, there has been an unfiltered rise of dubious news outlets. The term *fake news* has established itself in the last years as verifiably false or misleading information. Especially when their purpose is to deceive the public, they can have immense consequences. Causes for the rise of misinformation and disinformation are the loss of confidence in traditional media and the rise of new sources for information, especially social media and private outlets such as blogs and podcasts.

Fake news can have several influences on societal and political stability, especially when they target minority groups or try to affect political elections. No matter whether the purpose of false information is merely inaccurate research or intended manipulation for a certain (political) cause.

Especially in social media, the original source is hard to identify as people pass information by sharing it on their accounts. They often focus rather on the validation and response from their peers on the shared story than on its accuracy. In order to distinguish fake news from serious journalism, digital literacy is necessary. As discussed before, this responsibility primarily lies in the public educational sector.

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[12] https://theinclusiveinternet.eiu.com/assets/external/downloads/3i-executive-summary.pdf, p.13 (March 2020)

[13] http://uis.unesco.org/sites/default/files/documents/fs48-one-five-children-adolescents-youth-out-school-2018-en.pdf, p. 5 (March 2020)

Tips to find out about the reliability of news:

6.1. *Excursus: How to identify fake news?*[14]

1. Consider the source: What is the mission of the source? Check the author and the medium where the news are posted from.
2. Read beyond the headline: Especially flashy headlines can cause a lot of attention, but the article often reveals a less outrageous story.
3. Look for citations: Find out about the sources being used for the article, such as quotes and reports. A serious media outlet provides links to other supporting sources.
4. Check for supporting stories: Check if other media outlets also report on the story.
5. Check the quality of the publication: if you find any spelling errors, all caps or dramatic punctuation, it might be a clue that this is not a trustworthy news outlet.
6. Check your bias: Maybe you want to believe the story as it correlates with your beliefs and convictions, yet that does not make it true. Especially in social media, we receive information that is designed particularly for us, which is why it is especially important to check one´s initial attitude and emotion attitudes towards a story.
7. Ask the experts: Several sites free proved fact-checking services, such as africacheck.org, FactCheck.org, International Fact-Checking Network (IFCN).

7. Digitalization and Gender

Digitalization can bridge the gender gap and establish inclusive ways of access and creating knowledge and information sharing. Looking at the status quo, the current access to ICT shows the discrepancies between men and women in the digital world. Systemic inequalities based on gender are mirrored in the digital sphere and leave many women, especially the poor and the rural behind in Africa's tech transformation. In Sub-Saharan Africa, women only make up 13% of owners of a smartphone.[15]

Women are 50 percent less likely to use the Internet than men, which makes Africa the continent with the widest gap internet use between men and women[16], which is referred as the *Digital Gender Divide*. Reasons include gender inequality associated with power relations, politics, and socio-economic and cultural norms. Women often have less control over their household´s finances; girls do not receive the same education as boys including the digital sphere (Laura Schelenz 2018) (Mariscal, et al. 2019). As a result, the United Nations want to tackle this problem until 2030 and to made it part of their Sustainable Development Goals and increase access to technology by women (UTU 2017).

There are several areas where women can benefit from digitalization using for instance mobile phones, mobile money and platforms [17]. One of them is healthcare. Through text messages, mothers can be educated on what to expect when they are pregnant or how to make health decisions for their children. Other apps help to educate young women about their reproductive health, issues of family planning which otherwise might be hard to obtain due to cultural reasons. Many women and girls still do not have access to ICTs, and there is an ongoing challenge to offer these services to all those in need.

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[14] https://www.weforum.org/agenda/2019/03/fake-news-what-it-is-and-how-to-spot-it/ (March 2020)

[15] https://www.oecd.org/social/empowering-women-in-the-digital-age-brochure.pdf (March 2020)

[16] https://uniglobalunion.org/sites/default/files/files/news/digitalization_-_en.pdf (March 2020)

[17] https://www.oecd.org/social/empowering-women-in-the-digital-age-brochure.pdf (March 2020)

In order to implement these ideas successfully, it is vital to involve women in designing programs and policy, apps and other digital services development and implementation to ensure that their needs are integrated in the digitalization process at all levels (Laura Schelenz 2018).

In the area of employment, job access for women can also change in a digitalized world. If women and disadvantaged groups are integrated in digital-skill training, open platforms and have access to the information and opportunities, they have the possibility of enter into the labor market as equals and become part of a world of digital employment. Moreover, in the digitalized work environment, where the employee only needs an ICT and Internet access, flexible working hours and home office solutions[18] are a huge opportunity for women and people with disability.

8. Security in the Digital Age

In the digitalized world, personal data has become the most valuable good. It is impossible to see or to count it and is extremely hard to protect. Cyber security has become an essential subject of digital development. Access to sensitive information through hacking and digital related crimes is becoming an increasingly relevant threat and concern for governments, companies, organizations and individuals. Everybody is affected. Therefore, there is need to invest in cyber security (Clive 2016). There are several ways of accessing consumers´ data. Big tech companies and service providers collect private data and can use them for different purposes. Even though this process is legal, it has several hidden consequences that many users of these mostly free services are not aware of since it is mostly not clear what the provided data is used for and how much of it is being collected.

Some of the obtained information might not seem relevant to the consumer but can become sensitive in the hands of a certain actors (Svensson, Rosengren and Astrom 2016). Generally, one has to remember that no company is offering their product for free, which makes the consumer itself the product. Therefore, it is essential to be aware of what information one is disclosing and what terms and conditions one is agreeing to when using digital service platforms.

Private data needs to be protected. Unlike the European Union or the USA, most African states do not have any updated data privacy laws. Even though the continent has the fastest growth of Internet use, personal data is often not protected from data breaches and hacking e.g. on social media websites, which can leave the consumer exposed. Currently, only 23 out of 55 African nations have passed or drafted personal privacy laws, and only nine of them have data protection authorities. Even though, awareness of the issue is rising, many African countries view data protection as a priority in their digital development strategies due to the restriction measures of European data policy about sharing data with third party, which include Africa countries (Makulilo 2012). It should also be in the interest of governments to protect individual data, as breaches and hacking can also have political consequences (Toward a Social Compact for Digital Privacy and Security 2015).

Data analytics firms have evidentially manipulated electoral processes through data mining. After acquiring personal data through hacking of social media profiles, these firms can post personalized political advertisements based on users´ digital and derived from that psychological profile.

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[18] https://your-digital-workplace.com/en/ (March 2020)

This strategy targets both a candidate's supporters and undecided voters.[19] The provided content often contains false information about the opposition candidate as it took place in the elections in Kenya and Nigeria in 2017 and 2015.[20]

This "weaponization of information" can have several consequences as it interrupts the democratic process by manipulating voters. A functioning democracy can only rely on a population that has a right to privacy and the possibility to make reflected decisions based on true and neutral information provided (Toward a Social Compact for Digital Privacy and Security 2015).

9. Case of Rwanda: Opportunities and Challenges of digitalization

According to the plan to become a mid-income country with a knowledge-based economy by 2020, Rwanda aims for an ICT infrastructure comparable to any other in the developed world. The Vision 2020 claims to guarantee internet access at all administrative levels, for all secondary schools and for many primary schools. Furthermore, it is set to create smart cities and communities, in which citizens and the public sector can interact more directly, efficiently, environmentally sustainable and through digital services improving its inhabitants' quality of living. It states that it will encourage the use of ICT as a tool for self-employment, innovation and job creation.[21]

Rwanda not just aims to improve its own digital economy but also to share a pan-African platform for exchange and digital prosper. In the past years, Rwanda hosted several hundred of ICT stakeholders at summits. Throughout these exchanges various challenges became transparent.[22]

First, many firms and entrepreneurs still face the problem to raise capital for their business purposes. Many investors dare the risks that come alongside and need to get convinced by minimizing the potential risks by advanced business strategies.

Secondly, growth of digital business within just one country is limited. A relatively small market like Rwanda, needs to expand its digital businesses to other markets in the long term. This includes building fruitful partnerships in other states (especially neighbor countries) that is also made in a diplomatic way. Fourthly, it is crucial to develop skills and talent among the population. Rwanda already puts efforts to educate its youth regarding future challenges and digitalization.

Finally, it is required to establish an overall awareness and sensitization among the people. For instance, when it comes to cashless economies, they are advancing rather slowly in Rwanda. Rwanda's Vision 2020 seeks to transform the economy from a cash-based economy to a digital-driven economy, among other targets. To achieve this, the government and central bank have been at the forefront of promoting technology among financial sector players and the business community over the past few years. In this context, different actors such as banks and other companies made lots of efforts.

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[19] https://www.reuters.com/article/us-facebook-africa/in-africa-scant-data-protection-leaves-internet-users-exposed-idUSKCN1HB1SZ (March 2020)

[20] https://qz.com/africa/1233084/channel-4-news-films-cambridge-analytica-execs-saying-they-staged-kenya-uhuru-kenyatta-elections/ (March 2020)

& https://www.theguardian.com/uk-news/video/2018/apr/04/how-cambridge-analytica-tried-to-intimidate-nigerian-voters-video-report (March 2020)

[21] http://www.minecofin.gov.rw/fileadmin/templates/documents/NDPR/Vision_2020_.pdf , p. 18 (March 2020)

[22] https://www.newtimes.co.rw/section/read/229826 (March 2020)

So far, the outcome is rather low, though. Actors from various banks, primarily consider the missing sensitization among the people as the missing link. This challenge not only targets educational issues but also the general willingness to adapt to new tech solutions by the common people.

Nevertheless, there already exist areas where digital solutions are promising and increasing effectively. As mentioned before, the health sector could significantly profit from digital processes.

In July 2016, a British telemedicine firm in conjunction with the Rwandan government ministries of health, youth and ICT, launched a mobile-based healthcare scheme at the trade exhibition in Kigali. This program is focused on easy and quick access to live medical doctors and medical professionals via a mobile device.

Apps are available for download on smartphones. Phone features are not left out; a USSD code for consultation purpose is available. Put together; this reduces the disadvantageous effects of the shortage of doctors and health personnel.

It's cost-effective; citizens pay less for consultation, get to pinpoint symptoms and connect with doctors for medical advice. In October 2016, the Rwandan government formed a partnership with a Silicon Valley-based tech company to deliver blood and vaccines to hospitals and clinics via drones. Before the arrival, most hospitals outside of Kigali would have to travel several times a week to procure blood from the primary source in Kigali.[23] All these projects provide improved healthcare in Rwanda in the long term, especially in rural areas.

Another sector, which is highly focused in terms of digitalization, is education. In 2017 the Rwandan Government rolled out a new system of teaching in collaboration with a well-known software US-American enterprise. In general, the aspects range from helping students access computers and basic software installed in them, digitize subject content delivered in schools, and help students get access to internet in their schools. In the long term it is aimed to implement smart classrooms in every school in the country. It is planned under the partnership that by the year 2020 all schools in the country will have two smart classrooms and all subjects will have been digitized.[24] Another example is the "One Laptop per Child" (OLPC) project in Rwanda.

The project is internationally established and acts in several countries but has a special high success rate in Rwanda because of the high level of collaboration with the Rwandan Government. In 2014 the Country had distributed 204,000 laptops to 407 schools across the country- ranking it the 3rd largest deployment in the world after Peru and Uruguay – under the One Laptop per Child (OLPC) project.[25] The country's largest universities and educational institutes support the project team. Despite the advancement, many challenges remain in providing the children with laptops in an effective way. Among the challenges of the technology, according to experts in the sector, is that the gadgets require constant charging, which is not always possible given the electricity penetration in the country both via grid and off-grid solutions.[26]

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[23] https://www.dr-hempel-network.com/health-policies-in-india/digital-health-sector-in-rwanda/ (March 2020)

[24] https://www.newtimes.co.rw/section/read/210813 (March 2020)

[25] http://www.newsofrwanda.com/featured1/24845/rwanda-saluted-for-developing-21st-century-learning-skills/ (March 2020)

[26] https://www.newtimes.co.rw/business/meet-rwandan-innovation-one-laptop-child (March 2020)

10. Conclusion

This brochure sought to give an overview about digitalization, opportunities, challenges and its possible impacts on different societal areas in African. Needless to say, this research only scratched the surface of such a complex and global phenomenon. It becomes clear how ubiquitous digital change processes are with lots of opportunities and challenges to address as well. ICT services; mobile phones; internet and introduction of new applications became important global communication channels that connect Africa the whole world. Access to the global information integrated even remote areas in the socio-economic, political and cultural aspect of globalization. Digitalization changed financial and non-financial services and thus the lives of many people in Africa. In the field of agriculture, mobile phones and other digital device provide information, training and other many ways of optimizing production, creating sales and distributions and expanding the markets. Still, such an improvement requires digital knowledge of the farmers and especially the ability to invest in digital and automated solutions.

Concerning workers and decent work, though some jobs disappear with digitalization, other new jobs emerge. Africa countries would explore many opportunities that increase employment especially for young generations and disadvantaged groups. In addition, trade union would play major roles in education and creation of digital platforms for information sharing and collaboration. Trade unions also would facilitate social dialogues that bring together Governments, employers and workers to work together on improving policy and working condition to find collaborative solutions to the emergent challenges and shortcomings of digitalization. Through digitalization, it is also possible to address issue of gender and social protection. When somebody has a digital device, benefits are equal without distinction of gender, age, religion, race or any other barrier. However, the improvement of gender issues through digitalization generally depends on the overall willingness to support gender equality, inclusive design, and planning and implementation process. When it comes to the information, digitalization makes it possible to share news and information in a rapid manner. Furthermore, people could be reached and informed that were not covered by news before, however, there are many concerns about fake news, cyber security and digital related crimes. In the recent years, not only big organizations, companies and individuals have been subject of digital crimes, even countries have been affected. For the case of Rwanda, effort toward digitalization is seen in the increase of ICT related services and policy. Some examples are found in the use of drones to improve services in health sector, one laptop per child project and access to computers in education and other services, innovative business , mobile money transfer, Irembo in public services, internet coverage in the country, among others. Those examples demonstrate that digitalization represents a good opportunity for economic social welfare and transformation in African countries.Can we say that Africa has reached a good progress in digitalization? There is still a long way to go.

Looking at the complexity of digitalization; as Parviainen, et al said in their paper: "digital transformation is a monumental and multi-dimensional concept. There is no silver bullet for tackling digitalization". Therefore, combined efforts, commitment and collaboration and partnership among digital actors would be a key to ensure that Africa benefits from digitalization. The collaborative efforts would address challenges such as lack of investment, knowledge and skills development, infrastructure and material such as strong internet coverage, cyber security measures, adoption of policy and other regulation that not only improve digitalization but also give room to digital incentives to improve digital services and innovation and entrepreneurship in e-commerce for inclusive economic growth. All those strategies will improve governance in the digital arena, social protection, and inclusive economic development.

This paper suggests a further deepen research on digitalization in Africa to give clear recommendation of actions to be taken to ensure that digitalization contributes to the overall politico- economic and social development of the continent.

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