

Knowledge Society and Accessibility to Information and Communications Technology in Sub-Saharan Africa

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Abstract: This research addresses issues such as knowledge society, Education, Development, Technology and Leadership. This article is not intended to cover all facets of the knowledge society and its pillars (Education, ICT and ITS) for the region but to develop an understanding of the situation based on documentary research and consultation with key stakeholders. Indeed, innovations are not only technological, but also social and organizational. Furthermore, for a knowledge-based development process to exist, it is necessary to have an educated and skilled workforce, in parallel with dense, modern and intelligent information infrastructures.

To carry out this study, the data collection was structured around two main avenues. In the first place, the research and the documentary analysis, reinforced in the second place, by a series of face-to-face meetings and interviews carried out in face-to-face and remote interviews, made in the form of a remote dialogue by way of electronic or telephone (telephone, e-mail or Skype).

In the same vein, this article presents a model multi-stakeholder approach for capacity building and sensitization of African leaders on issues of the knowledge society, ICT, education, science, technology and innovation.

Keywords: Accessibility ; ICT ; Education ; Knowledge Society.

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1. Introduction

Sciences, Technology, Innovation, Capacity Building and Partnerships are the five basic pillars, which support each other and are at the top of the list of the African Union Agenda 2063¹: *The Africa We Want* and STISA-2024² as a strategic intervention of the African STI sector. The link between these plans, frameworks and these innovative programs is the provision of quality long-term education as the key factor in achieving full employment and eradicating poverty. The development of a well-trained and sufficiently qualified human resource for education and training is fundamental (African Union, 2015). This strategic vision of Africa fits into a broader development context, including the 2030 Agenda for Sustainable Development³ as an intergovernmental commitment. Education is at the heart of this program as a key driver of development and essential to the achievement of all of the Sustainable Development Goals (SDGs) (UNESCO, 2016, UNESCO, 2017).

This work fits into such framework by identifying the capacity building needs of African leaders in the field of ICT and the knowledge society. It aims to analyze the priorities and key initiatives in the education, ICT and STI. We will not try to cover all facets of the knowledge society and pillars, but to develop an understanding of the situation based on desk research and consultations with key stakeholders.

With this situation analysis and the identification of needs, this article makes a number of recommendations to develop appropriate strategies and strengthen leadership capacities for the evolution towards the knowledge society and the role of ICT, education and STI in socioeconomic development. The goal is to facilitate the empowerment of individuals, organizations and communities to make strategic choices and transform those choices into desired actions and results. It aims to develop and increase the knowledge, skills and attitudes of future leaders to manage transformation and change, manage institutional pluralism, improve coordination, foster communication, and ensure the sharing and use of data and information, information in planning, implementation and evaluation processes.

It is through acquiring, assimilating, transforming and harnessing the benefits of knowledge to produce dynamic organizational capacities through knowledge sharing, collaboration and exposure to technology.

2. Conceptual note

1.1 Knowledge Society

At the global economic and social level, countries and regions increasingly rely on knowledge as a resource and technological infrastructure (ICT) to access and use knowledge for development. In fact, knowledge and technological infrastructure can be used to increase the efficient use of knowledge in agriculture, industry and services to improve a country's economic and social development (Tapper 2000). In this context, Knowledge societies are identified as societies based on the creation, dissemination and use of information and knowledge to foster economic development.

In addition, in this same respect, in a commissioned study for the ALICT program, the Association for the Development of Education in Africa (ADEA) emphasizes the interrelationship between knowledge structures and ICT infrastructure contributing to socio-economic development towards a knowledge

¹ https://au.int/sites/default/files/documents/33126-doc-01_background_note.pdf

² https://au.int/sites/default/files/newsevents/workingdocuments/33178-wd-stisa-english_-_final.pdf

³ <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

society through its four pillars : ICT, education, science and technology and innovation. (Chehidi and Abdelwahed, 2014).

To achieve or support the development towards a knowledge society, the following dimensions are essential considerations:

- a) Vectors of both innovation and education.
- b) Expansion of education and research and development should be positioned in such a way as to raise awareness of the importance of science and technology and to build S&T capacity for development and capacity building innovation systems.
- c) Necessity to develop a comprehensive approach to science, technology and innovation, beyond the activities and institutions that come under the responsibility of the responsible ministries, which seeks the involvement of all the ministries and supervisory bodies, and which mobilizes the private sector, academia and donors.
- d) Leadership capacities must be developed to address changes at the system level and at all its levels with a view to coordinating and scaling up policies towards sustainable implementation and development across all levels of the government system.

These four factors form the framework for assessing the state of the knowledge society and its pillars in a country. In this sense, UNECA (2010) defines an innovative society as one whose growth and development are based on continuous learning and in which the reservoir of knowledge is constantly replenished and renewed. In such a society, the extensive networks and interactions between information sources and research actors form a continuous circle of knowledge production, acquisition, exchange and use. This cycle encourages innovation and change, which become a permanent feature of society to stimulate growth and competitiveness.

3. Environmental and technological trends characterizing ICT accessibility in Sub-saharan africa

Profiles of development, digitization and education in the 21st century vary from one African country to another, but the general orientations seem to converge on many points. In this regard, it is necessary to understand the trends characterizing the African context in general and the zone of sub-Saharan Africa in particular. This is the purpose of the following sections.

3.1 Modes of Internet Connection in Sub-Saharan Africa

Despite serious challenges facing it, Africa is today the continent with record performance on the Internet network worldwide. Indeed, between 2000 and 2010, the penetration rate of the African continent increased more than 20 times, from 0.5% to 10.8% (Sy, 2012). Generally, there are two major types of connection to the Internet, namely:

3.1.1 Wired connection consists on:

- a. the *switched wired Internet connection* including the analog connection and the connection with the Integrated Services Digital Network (ISDN). It is available in all countries in sub-Saharan Africa. The dial-up Internet connection is charged as a local or long-distance telephone call. This method of billing penalizes users from provincial localities. Since the Internet node is often installed in the capital, all users who call the Internet server outside the local area of the capital are billed in long distance. This Internet connection is therefore more expensive for users in this situation. This type

of billing has been corrected in several countries of West Africa by introducing uniform and cheaper pricing in some countries.

- b. On the other hand, it is the *non-switched Internet connection* with the leased link (specialized link in some countries) and ADSL (Asymmetric digital subscriber line). The leased link is a cable concession made by a wired network operator to a business to connect to the Internet. ADSL is provided in the majority of countries in sub-Saharan Africa. However, the weak subscriber base in the various countries hampers its expansion. Moreover, the absence of regulation on the unbundling of the local loop or the lack of its effective implementation also hampers the rapid development of ADSL in the majority of countries in the south of the Sahara.

3.1.2 Wireless or radio connections

Wireless or radio connections made from four technologies: the Radio in Local Loop (RLL) used to serve localities or areas without wired telephone lines; the Mobile Special Group (GSM), mainly with GSM 3G, the most extensive network in sub-Saharan Africa. Ongoing studies are underway for its possible allocation in Niger; Code Division Multiple Access (CDMA) adopted by the large incumbent operators to make up for the delay in the construction of the wired network; and the Worldwide Interoperability for Microwave Access (WiMax) that appeared in the sub-Saharan region in the mid-2000s. In general, the Internet connection in the African context necessarily evolves towards radio because of the weakness of telephone teledensity. In other words, with only wired lines, sub-Saharan Africa cannot provide access to the Internet to its entire population (Akue-Kpakpo, 2013).

3.2 Africa, continent of innovation: mobile telephony, m-Banque, m-Santé ...

The Internet connection in sub-Saharan Africa is evolving towards mobile (Akue-Kpakpo, 2013 ; Ouédraogo, 2009 ; Ifri, 2012 ; Rennard, 2012). Indeed, the growth of mobile telephony has surpassed the most optimistic expectations of the operators. According to the ITU, this is proof of the validity of a competitive economy that must be further strengthened (Chéneau-Loquay, 2010). The number of subscribers to mobile telephony or other wireless broadband networks has increased sharply. The use of mobile phones is unique insofar as access has become more democratic and now affects all population groups, including a majority with low incomes. According to figures from the World Association of Mobile Telephony Operators (GSMA), the number of subscribers to mobile broadband reached 30.3 million in 2011, a penetration rate of about 3.8% of the population, compared with just 0.35% in 2007 (GSMA, 2011).

Therefore, mobile telecommunications contribute to equity in allowing disadvantaged populations to access information that would be very difficult or impossible to obtain by relying on fixed telephones, which in most developing regions are not ready to be installed. Very low-income populations give priority to the mobile by being totally convinced of its utility for their well-being. Such populations, which are the intended beneficiaries of development projects, are themselves involved not only in accessing the telephone, but also in innovating by creating new functions and applications that are useful to them (Chéneau-Loquay, 2010). Indeed, the mobile telephony universes in Africa allow applications and services adapted and / or adaptable to meet the needs of users.

These innovative modes of appropriation are proven today. Essentially, the following examples were given:

- m-Payment, which is a reference on a global scale. It is the continent of the world where m-Payment works best (30% of transactions in Kenya) (Ifri, 2012; Sy, 2012);

m-Health aimed at improving people's access to relevant information in the fields of health and living conditions. Thus, telecoms represent 2% of the health budget in Africa (Ifri, 2012). Issues such as HIV / AIDS treatment and prevention, improved maternal health care, appropriate immunizations to children, education and awareness are stimulated by access to wireless technology which in turn allows connectivity to healthcare systems and expert opinions at distance (Chéneau-Loquay, 2010); and,

- m-agriculture and m-fisheries to rationalize the sector at all levels. For example, in Senegal, the use of mobile phones in the small-scale fisheries sector represents an improvement in working conditions and practices: better management of sea traffic with more limited travel efficiency, time with faster transactions and greater security in such a dangerous trade (Chéneau-Loquay, 2010).

Thus, from a technical point of view, mobile applications in Africa for development generally focus on providing services via Short message services (SMS). From the point of view of the user, this predominance reflects the most current capabilities of the device and all SMS services are accessible from any device. From the point of view of information providers, SMS is the most easily accessible technology for all entities that want to deliver information via mobile devices. The installation of an SMS platform is fast, economical and simple. However, certain economic and cultural constraints stem from these broad facilities for design and use. The text also has the disadvantage of being an obstacle for illiterate users who may be unable to make full use of it. Solutions with information delivered by voice message can be very useful for the illiterate population, but they are relatively expensive and still undeveloped (Chéneau-Loquay, 2010).

3.3 The informal sector: a dominant mode of operation in Africa

ICT are a major sector of recent informal growth in all African cities. This informal sector of ICT has established itself not only as the popular economy of the poor, but also as a powerful economy overvalued in some African countries (Senegal for example) (Chéneau-Loquay, 2012). This is the result of the combination of several phenomena, in particular:

- the need to externalise charges and functions of telecommunications operators;
- the facility for investment and deployment of services;
- the existence of an abundant clientele forging and modifying the supply of traditional services;
- the potential for substantial gains over other sectors; and
- an abundant, idle and very creative labor force (Ouédraogo, 2009).

In fact, small trades have been created to meet the needs of retail services and proximity of users. From the importation of products to the itinerant trade, a whole series of new service activities proliferate and mark the African region. In 2007, the mobile phone sector directly or indirectly employs more than 3.5 million Africans south of the Sahara (ITU, 2009).

3.4 The digital divide in sub-Saharan Africa is different

The digital divide in sub-Saharan Africa has multiple dimensions, not just physical access, that is access to technological tools. Rather, It is about a fracture of the mobile due to problems of access to electricity, network coverage and income inequality. Let us take the case of Niger. One of the dimensions of the digital divide that is most often ignored is how the Internet works (or does not work) in Africa. For example, for people in developed countries, power outages are rather rare. This is also the case of total Internet disruption as an even rarer event. However, in countries like Niger, especially in rural areas, power outages, inadequate and unreliable connections, as well as total lack of energy, are part of daily

life. This situation most often puts people in the obligation to innovate and to invent many different modes of appropriation that are not the case elsewhere. Such as, recourse to the solar installations of the rural dispensaries, the batteries of motorcycles or cars and the pedaling of bicycles to produce energy. Here, it is less the exogenous norms of the technical object that are at issue. It is rather a question of an inadequate physical and technological environment due to the lack of minimum conditions for operating the equipment. Thus, such context puts users in the obligation to cope with the resources at their disposal.

Moreover, while mobiles are a fantastic tool to stimulate the development of grassroots communities, they are also a marker of inequality of opportunity. The analysis of the projects shows that technology alone does not solve social problems. It is applied to improve the quality of relationships and development processes and thus creates competitive advantages that could marginalize those who do not. It is the orientation and quality of the underlying development process that will have to condition the implementation of mobile technologies. Isolation and marginalization of populations are social problems and technology alone cannot solve them. The motives are only tools and they can only be a complement in social organization, not a central element (Chéneau-Loquay, 2010).

3.5 Human Capacity Building

The shortage of human capacity is a major problem in the development and use of ICT in many sub-Saharan African countries. The lack of ICT skills not only hinders economic and social development, but also the competitiveness of the continent in the regional and global economy. The skill deficit is flagrant and the need for skilled personnel in the ICT sector is enormous (African Development Bank Group, 2013; Economic Commission for Africa, 2013). In the absence of sufficient, reliable and appropriate expertise, local suppliers are unable to improve their competitiveness, meet technical requirements, innovate or adopt global customer management practices or programs.

Similarly, many potential local suppliers lack the skills, technical capacities and support institutions needed to catch up (Economic Commission for Africa, 2013). Sub-Saharan African countries need a large pool of ICT experts capable of designing, managing and implementing projects related to electronic applications and participating in the development of computerized services at the international level.

In this regard, African countries are paying more attention to ICT capacity building in recent years. Indeed, several centers for ICT education, training and research have been established (African Development Bank Group, 2013). These include the African Virtual University (UVA) and the Virtual University of Senegal (UVS). However, despite these efforts, capacity deficits still permeate the sub-Saharan African economy, especially in terms of operational, financial, technical, and engineering capabilities. Computer and network training tends to be theoretical and does not meet the needs of public and private institutions that are often looking for advanced technological solutions (CNUCED, 2013).

3.6 The population of children in Africa is growing rapidly

According to the latest UNICEF statistics (February 2014), between 2010 and 2025, the population of children in sub-Saharan Africa will increase by 130 million. Thus, from around 2030, sub-Saharan Africa will be the region with the highest number of children under 18 years of age. Indeed, by 2050, 1 out of 3 births will take place in Africa. While other regions have halved the number of stunted children, this has increased by one-third in Africa. However, there are considerable disparities between the richest and poorest countries in most regions of the African Union (UNICEF, 2014).

3.7 Boys are more likely to attend school than girls

More than half of the world's out-of-school children live in Africa, 33 million. In this regard, there are some aspects of the African context in particular: girls are more likely than boys not to attend school, children with disabilities are overrepresented among the out-of-school population, and a number of children do not acquire not the basic learning of reading, writing and numeracy (UNICEF, 2014).

3.8 Overview of the African electricity sector

The energy sector is one of the most deficient sectors in Africa (Niquet and Touati, 2011). Generally, the economies of many sub-Saharan African countries are severely handicapped by the quality and quantity of electricity available (Périou, 2013, De Borde and Yasser, 2013, Durand, 2013, Heuraux et al). This reality is of great concern to development actors. In this respect, the road ahead is still long and the awareness of the interest of the private sector takes time. In this context, the role of donors remains essential to support private sector projects and to support countries in setting up a framework favorable to the development of independent electricity producers (Durand, 2013).

3.9 Human and social development is improving in Africa

In general, Africa is making significant progress in human development. Revenue increases. Similarly, performance in education, the fight against hunger and health care are improving (Economic Commission for Africa, 2013; African Development Bank, 2014). The Human Development Index (HDI) of the United Nations Development Program (UNDP) shows an annual increase of 1.5%. This improvement is attributable to improved governance, expanded access to physical infrastructure, and mitigation of economic, social and environmental risks, increased wage employment, agriculture and better social protection. African countries with high or increasing levels of development are well integrated into global markets through a variety of export products that are diverse and potentially job-creating (African Development Bank, 2014).

The Millennium Development Goals (MDGs) report in 2013 showed remarkable progress in primary education, health and in combating malaria, tuberculosis and HIV / AIDS (CNUCED, 2013). Indeed, progress in terms of poverty remains slow, fragile and does not go hand in hand with progress in economic growth. Deprivation is the cause of multidimensional poverty that is still spatial in rural areas because of the because of economic growth. The main determinants of rural poverty are poor infrastructure, economic, political and social instability, limited access to education, food insecurity and widespread child labor (FAO et al., 2010; African Development Bank, 2014).

3.10 Economic development

In sub-Saharan Africa, growth averaged 5% in 2013 (African Development Bank, 2014). Given this growth since 2000, the continent has been recognized as the next frontier of opportunities and potential global growth pole. (Economic Commission for Africa, 2013). On the other hand, this performance has not yet translated into an increase in the standard of living. Indeed, the African social development model has produced contrasting results in recent years: positive changes in most areas (education, infant and maternal mortality rates, and gender equality), but these changes a slow pace to enable African countries to achieve their social development goals (Economic Commission for Africa, 2013).

Indeed, much remains to be done to ensure that African economies diversify, emerge from the production of commodities, improve their competitiveness and shift from resource-based growth to a higher value economy in all sectors (agriculture, industry and services).

4. Conclusion and recommendations

The study carried out by Association for the Development of Education in Africa (ADEA), shows countries in sub-Saharan Africa generally invest in ICT as an undeniable tool to fight poverty. Indeed, the integration of ICT into economic, social and industrial policies has led to a real qualitative leap in the development of many priority sectors in Africa such as education, health and agriculture and as well as in crucial areas like decentralization and good governance. In this context, the telecommunications and ICT sector in Sub-Saharan Africa has undergone profound changes over the last decade, with the sector opening to competition, the creation of National Regulatory Authorities, the privatization of incumbent operators and the appearance of private operators. The first positive result of these structural reforms was the growth of the sector in the region, particularly with the emergence of mobile telephony (Akue-Kpakpo, 2013).

In this regard, making education an object of investigation as well as strengthening scientific and technological capacities for development cannot be achieved without a global framework for science and technology. In other words, it is important that African countries create institutions and partnerships in order to increase economic opportunities. In fact, to best meet the diverse landscape of research and development in Africa, it is important to carry out individualized reviews and to define science, technology and innovation policies for each country.

The challenges arising from the analysis of the political, economic, social and educational strategies of the countries studied ; as well as the interviews with the key actors of the implementation of different programs made it possible to identify priority needs for capacity development grouped around three priority areas:

- leadership, design, planning, budgeting, implementation and evaluation of policies and programs;
- business competitiveness, administrative procedures, good governance and human resources management; and,
- empowerment of local communities to master concepts such as decentralization, planning and participatory budgeting; strategies for improving good local governance and managing local development.

At the same time, another constraint has been identified in two main areas:

- the inadequacy between the profile of the training provided and the needs of qualified personnel; and,
- the education systems are not oriented towards training of skilled workers. This is why skills development is a major challenge for Africa in the future. It is a matter of changing the profile of the workforce through reforms aimed at the gradual transition towards a logic of steering the education system by economic demand. It is in order to offer the growing flow of young people relevant and better training. This is a shift in perspective towards the development of technical and vocational skills (TVSD). It is a broader view of training that includes knowledge developed outside the formal training system, including in-company training, non-formal programs and family learning (Azoh et al., 2012).

On the other hand, in science, technology and innovation needs have recently emerged to strengthen scientific and technological skills in Africa. In this regard, an increasing number of African countries are re-examining and reformulating their policies to meet the current strategic directions and needs related to science, technology and innovation. For this purpose, these countries have more or less expressed support needs to development partners, particularly to meet training needs. However, the current structure of human capital in Africa poses a serious challenge to the development of skilled

workers for better investment in ITS and their integration into educational, economic and industrial policies (UNESCO, 2008).

In concluding, the economic, social, educational and technological achievements in sub-Saharan Africa should not make us forget what still needs to be done in that regard. For this reason, the following sections will develop a number of recommendations by basing on some of the weaknesses and bottlenecks observed in the three basic sectors: education, ICT and ITS. These include :

4.1 Investing in infrastructure

The lack of infrastructure in sub-Saharan Africa is a major obstacle to the economic development and interconnection of countries. It concerns not only inter-country infrastructures, but also within the same country, with inadequate infrastructures in the fields of transport, energy, water, telecommunications and ICT. In fact, inadequate infrastructure limits access to markets, increases business costs and reduces productivity. In other words, support for infrastructure development, including transport, water, energy, ICT and the adaptability of ICT to the realities of disadvantaged and rural populations, is essential for growth, poverty reduction , create jobs and realize Africa's development potential in both the commodity and related sectors (Economic Commission for Africa, 2013, World Bank, 2013, Akue-Kpakpo , 2013).

4.2 Decrease the cost of providing and the cost of accessing the Internet connection

The Internet connection in sub-Saharan Africa is ranked among the most expensive in the world (Akue-Kpakpo, 2013). Thus, for the African user, the limitation of the Internet connection due to costs is at two levels, namely: the cost of the equipment to connect to the Internet and the monthly charges related to the Internet connection. The reasons for the high Internet connection in sub-Saharan Africa are mainly: insufficient investment in telecommunications, lack of infrastructure, insufficient economic market conditions, insufficient competition in certain market segments and Internet connection. In this regard, it is therefore recommended to develop and implement a mass Internet access plan and to address the causes of the high cost of the Internet connection in sub-Saharan Africa. The aim is to facilitate the construction of basic broadband infrastructures capable of supporting Internet traffic generated by mass use of ICT (Akue-Kpakpo, 2013).

4.3 Ensure the availability of appropriate skills and competencies for the use of ICT

Fundamentally, it is crucial to ensure a quality scientific education system, to improve the literacy, to define a coherent training policy. In order to develop ICT skills, create a structure for the validation, evaluation and control of ICT training, encourage public-private partnerships in research and ICT development, introduce ICT education in basic training institutions, design, develop and evaluate an ICT capacity-building program and to submit it to national and international donors and to create a national fund for ICT capacity building and promotion, fueled by the State, the national private sector and strategic partners.

4.4 Creating institutional frameworks to guide and generate science, technology and innovation

The promotion of partnerships and cooperation between universities and industry, innovation and knowledge transfer plays a central role in the advancement of scientific knowledge, discovery and innovation. By bringing together scientific research, business and government organizations, scientific and technological parks can host centers dedicated to scientific research, innovation, training, as well as spaces for fairs, exhibitions and development of the market. The concept of science parks in Africa is

now recognized as one of the means to promote science, technology and innovation, the commercialization of research and development (R & D), science and engineering education, and vocational training (Mian Bi, 2011).

4.5 Provide quality indicators on science, technology and innovation

It is recommended that African countries regularly produce reliable data and quality indicators on science and technology, including through the organization of regional workshops and training sessions on the relevance of science and technology statistics. The objectives of these workshops are to share experiences and address common problems with other African countries in the area of indicators, data collection. Also, strengthen local capacity for production and sustainability of statistical systems in these areas, share and develop initiatives and good practices in the region, promote the use of indicators on science and technology in the development-based policies (UNESCO, 2008).

4.6 Establish interdepartmental coordination to improve the implementation of policies

In order to ensure effective implementation of strategic choices in education, ICT and ITS, it is essential to ensure effective coordination of different development programs and to be able to translate policy choices into action plans priorities, based on clear guidelines and coherent and integrated programs. Similarly, policy coherence and inter - ministerial co - operation are crucial to enable ministries to have a comprehensive vision and institutional arrangements to facilitate policy implementation and overcome coordination problems (Economic Commission for Africa, Africa, 2013, International Monetary Fund, 2013).

4.7 Developing and strengthening the skills of the workforce

The shortage of skills is a major challenge for African companies. Businesses cannot be productive and competitive if they do not have reliable and affordable access to essential skills. In this context, African governments need to invest more in quality education and develop training programs to raise the level of skills and knowledge. They should also consider allocating additional resources to science and technology, particularly engineering, manufacturing and construction, which are considered crucial for private sector innovation and productive capacity development. It is about adapting to changes in technology and markets and anticipating future skills needs. The private sector can also play a role in this regard by providing on-the-job training and by funding training and research programs at universities and research institutes (CNUCED, 2013, Economic Commission for Africa, Africa, 2013). For example, it is recommended to: (a) create training and capacity building grants that are accessible to local businesses; (b) encouraging international organizations to implement capacity-building programs for local enterprises; (c) establish technical training institutes and strengthen curricula to increase the number of technicians and basic maintenance workers.

4.8 Bridging the gap between development policy and implementation strategies

In the present study, it is observed that the implementation of economic and social development strategies is slow in achieving the objectives (Sedegan, 2014). Indeed, the translation of visions and initiatives into real practices is more or less limited, particularly in the sectors of education, the fight against poverty and professional integration. Indeed, some sub-Saharan African countries suffer from a qualitative deficit in expertise or capacity to analyze, implement, monitor and evaluate strategic development policies (CAFRAD, 2014). This observation leads the aim of the capacity-building

program towards the emergence and development of a new generation of qualified and sufficient leaders. ***These are capacities capable of effectively monitoring and supporting technological innovations and the country's strategic development dynamics.***

4.9 Build capacity to respond to the ongoing and ongoing challenges of Africans

Strengthening leadership in sub-Saharan Africa is not an academic exercise but rather a conscious effort that takes into account the current challenges facing the development process on the continent and the challenges that future generations face. Without an ability to react and be sensitive to socio-political, economic and cultural challenges in the African environment and its relationship to the international context, leadership capacity building programs produce leaders who embark on changes, which do not meet the needs of Africans and do not improve the lives of Africans.

4.10 Strengthen leadership capacity in negotiations

In fact, socio-economic development strategies, particularly in sub-Saharan African countries, are based on complementarity, partnership and competitiveness (Lelo, 2011), building on a galaxy of development partners. It is therefore essential that African leaders possess the necessary skills, knowledge and skills to master the process and negotiating approaches.

4.11 Utilize and capitalize existing initiatives, achievements and expertise

This should not duplicate efforts but rather create synergies, develop complementarities, strengthen existing programs, fill gaps and meet the country's capacity building needs.

4.12 Adopt a holistic methodological approach

It is inclusive, interdisciplinary and cross-sectorial with interactive and participatory strategies of activities that rely on the sharing of knowledge, expertise and joint projects. That is to say, take into consideration the broadest spectrum of leadership, in terms of partnerships and complementarities between the private, public and civil society sectors. The aim is to develop together a common vision of development, to encourage partnership, collaboration, dialogue and networking between actors in different sectors (education, health, ICT, employment, vocational training, etc.) for support and development.

In addition, the approach is *flexible and adapted* to the new needs arising from the action. This ensures continuous improvement of the target groups, critical feedback on the practices implemented and necessary adjustments along the way. It is a *process of strengthening leaders* in the form of a process that is long-term and not one-off courses. It includes a *series of steps and actions before, during and after capacity building actions*.

To conclude, the present study found that the economic future of sub-Saharan Africa remains dependent on large investments in innovation and ICT to consolidate integration into the new ICT-based economy. Indeed, ICT has the potential to stem poverty. For this reason, it has become important to develop sound strategies for the digital and creative economy. Through this type of strategy, it is necessary to provide innovative solutions to the problems of the African populations and to promote a shared prosperity driven by growth, innovation and job creation. To achieve this it is crucial that the public and private sectors work together to create an enabling environment for innovation and adoption of ICT across the economy to have a positive impact on all aspects of society: family, school, health, etc.

The challenges for developing a digital and creative economic strategy in sub-Saharan Africa include:

- developing a world-class digital infrastructure (switch to broadband), a strong and competitive ICT industry;
- acquire digital skills for all Africans;
- support a program to promote the use of ICT at the private sector level in order to stimulate the competitiveness of enterprises in different sectors and create a market for actors in the sector;
- promote and deepen research on ICT and ITS;
- harmonize the concept of ICT with all stakeholders in line with a forward-looking vision of African countries on the basis of operational and reliable strategies and programs;
- put in place a tool for updating and online consultation of databases in different crucial sectors (education, economy, ICT, health, agriculture, etc.).

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