

Current State and Development Potential of the ICT Sector in Africa

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1. Introduction

There is surprisingly little reliable statistics and other information regarding Africa compared with Asia. It is even more difficult to obtain information in Japanese, particularly information organized to give an overview of the ICT sector.

In the context of development, high-quality ICT infrastructure is an unavoidable requirement for maintaining on-going development, as much in Africa as in Asia. However, there is a shortage of basic infrastructure in Africa, so beyond simply maintaining quality, compensating for shortages in absolute quantities is an urgent issue.

Under the current conditions Japan has come to a crossroads at the Sixth Tokyo International Conference on African Development (TICAD 6), and must reexamine our mid-to-long term perspectives for support in the ICT sector, particularly considering the high priority given to promoting human resource development, to bolster ICT industries and infrastructure that will be able to use the human resources once they are trained.

With this article, I hope to provide food for thought for considering future directions on support and investment in African ICT sector. I describe the state of the ICT sector in Africa, including development potential, based on reliable survey data from international organizations mainly in Europe that have been dealing with African ICT sector issues for many years, as well as local conditions and empirical data as obtained by the Japan International Cooperation Agency (JICA), an agency undertaking official development aid (ODA) of Japan.

2. Economic Impact of ICT in Africa: Overview

Recent technical innovation in telecommunications, centered in certain developed regions in Europe, America, and East Asia, has brought drastic reductions in the cost of mobile telephones through commoditization, and made it possible to connect to the Internet from anywhere in the world through mobile telephones. Africa has also benefited from this innovation. The “Mobile economy,” which is composed of both the economic effect created by mobile communications and its related services industries, is continuously contributing to overall economic growth in the whole African region. The mobile phone has now grown into an indispensable engine of growth for economic activity throughout Africa.

The GSM Association (GSMA) is an organization of mobile communications operators and associated industries that have adopted GSM, the current most widely used mobile telecommunications system in the world. The report issued by

GSMA in July 2016 titled, “The Mobile Economy Africa 2016,” contains very important data for forecasting the scope of effect that the mobile economy will have on economic growth of Africa in the future. According to this report, the overall adoption rate for mobile phones in Africa relative to the population had already reached 46% by 2015, and was expected to continue to grow by approximately 6% yearly. In that same year, the added value created by the mobile economy accounted for 6.7% of the overall GDP of Africa, equivalent to 153 billion US dollars of economic value. The GSMA expects these figures to rise to 7.6% and 214 billion US dollars by 2020. Note that the GSMA has confirmed that as of June 2016, 4G level telecommunications networks were already operating in 32 countries and 74 regions throughout Africa.

Incidentally, Rwanda advocated ICT nation building in its “Vision 2020,” long term development plan, winning high recognition from around the world through this strategy and strong governance. The ICT sector’s economic contribution to Rwanda’s GDP reached 3% in 2014, which exceeded the total value of all agricultural exports from the country. On the other hand, ICT related business activity and especially manufacturing has not fully taken off as a secondary industry for many countries in Africa. In those cases, the ICT sector is supported by revenue from telecommunications operators and related services based on the spread of mobile telephones, so it is not an exaggeration to say that “ICT sector” and “mobile economy” mean almost the same thing.

There are four fields that can be defined to compose the mobile economy, namely (1) Sales by mobile telephone operators, (2) Sales from directly related industries, (3) Sales from indirectly related industries, and (4) Added value created by improved productivity due to mobile communications technology. Recently, the most remarkable growth is being seen in the field of services that build on the spread of mobile phones, which corresponds to items (2) and (3). M-Pesa, developed in Kenya as the mobile phone money transfer service, is the one of the largest such services that generates sales. It is also an example of so-called “fintech” in Africa. According to the Wall Street Journal, the total of mobile money transfers in all of Africa had reached 30 billion US dollars, and the GSMA report mentioned earlier stated that gross mobile money settlements would continue to grow at a yearly rate of over 30%. On street corners in every country in Africa, you will see kiosks offering easy mobile money transfers, using mobile telephone technology to provide an excellent solution to a demand that is particular to the Africa region.

3. Opportunity: Internet Infrastructure in Africa

In the previous section I discussed how high-demand services such as mobile money transfers are showing remarkable growth in the rapidly expanding mobile phone market in Africa, but we also want to know the state of the actual ICT infrastructure supporting these information technologies.

Currently, there are many international undersea network cables in place along the eastern and western coasts of the African continent (Figure 1).

The main cables on the eastern side cross the Indian Ocean, connecting East Africa with South Africa and the Middle-East region, while on the west side they connect the west side of Europe (U.K., France, Spain, etc.) with countries on that side. Crossing the southern Atlantic Ocean, they also connect with Brazil as a gateway to South America. There are also many international undersea cables, mainly from Asia, connecting with various European countries on the Mediterranean coast via the Red Sea and landing at locations along the north coast of Africa. Projects including DARE (east coast, scheduled for 2018), Africa-1 (east coast, 2018), Liquid Sea (east coast, 2018), and SACS (west coast, 2018) are also in the construction

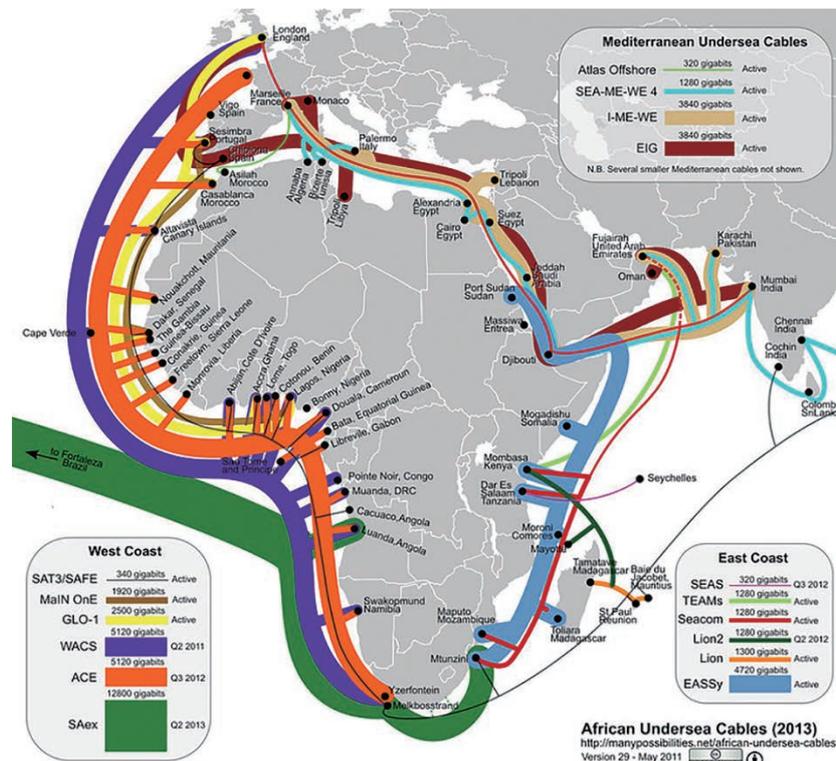
stages. Through those projects, Africa has been connecting with international undersea networks at a rapid pace in the past ten years, and it is clear that it will also connect with Asia and North and South America by high capacity communication networks in the future.

This consolidation of international telecommunications networks includes several investment projects from international cooperation. Recently, the World Bank invested 500 million US dollars into the Regional Communication Infrastructure Program (RCIP), to improve communication lines in Africa, which rapidly expanded capacity in the sub-Saharan region from just 80 Gbps (Gigabits per second) in 2008, to 15.7 Tbps (Terabits per second) in 2012. This clearly demonstrates the effects of support from public funding.

On the other hand, what are conditions like for end users, who are actually using this telecommunications network? According to the GSMA report, the global rate of smartphone adoption was 51%, and the rate in Africa was 30% in 2016, but this difference is expected to decrease significantly in the future (Figure 2).

In this way, wired network infrastructure enabling high-speed has reached the continental coast and sub-US\$100 inexpensive smartphones coming from China and India are spreading rapidly,

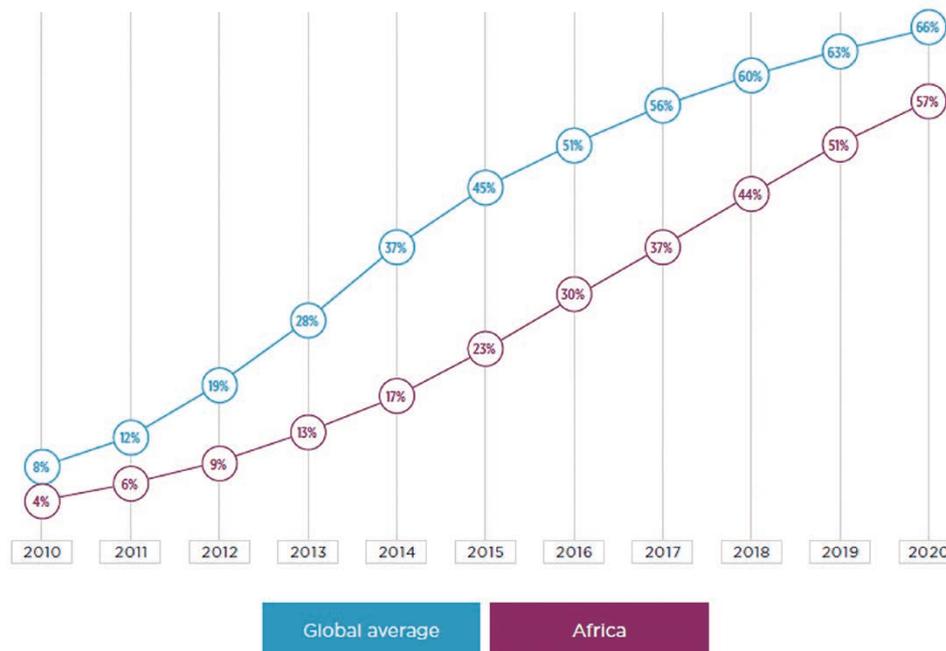
Figure 1: Undersea cable high-capacity international telecommunications networks surrounding the African continent



Source: SAex

■ **Figure 2: Smartphone adoption rates in Africa**

Percentage of connections



Source: GSMA

but there are still several bottlenecks for this to be a driver of real, continuous growth in the mobile economy of Africa as a whole. These include (1) inadequate domestic communications networks able to provide services at competitive prices, (2) inadequate domestic core networks able to provide access to international lines arriving at the coasts, (3) concentration of most of the available bandwidth in cities and major urban areas, and (4) while connection to the Internet through mobile phones is a powerful breakthrough, it is not a panacea.

It is clear that it will be difficult for all countries in Africa to overcome these bottlenecks through self-help efforts alone. Mutual cooperation between neighboring countries and collaboration with supporting countries and international organizations outside the region, setting and implementing policy for general and strategic measures and investment planning is essential. Concrete policies and allocation of roles for this is being discussed seriously at many related international meetings and initiatives.

4. Opportunity: Digital Economy elated Initiatives in Africa

Africa consists of 54 countries, large and small, with almost 20% of the world's population. Among the countries there are great differences in the per-capita gross domestic product, which expresses levels of income in basic terms, ranging by a factor of over 60 from highest ranked Seychelles (14,938 US\$) to lowest ranked South Sudan (233 US\$).

Considering that there are also great differences in the populations of countries, ranging by a factor of 2,000 from the largest (Nigeria, approx. 180 million) to the smallest (Seychelles, approx. 90,000), disparity in GDP is not necessarily directly proportional to the level of ICT infrastructure development or

penetration of ICT into societal activity. It is clear that explaining the situation for all regions in such broad terms is not necessarily the right approach.

Thus, even in numerical and physical terms, it is not an exaggeration to call Africa one of the world's most dynamic regions, overflowing with diversity. Neutral organizations and mechanisms are needed in the whole continent, as well as within regions, which can span borders and pursue the common good, and distribute it effectively and efficiently. There have already been many projects in the past, mainly established from UN proposals and leadership (e.g. UN Economic Commission for Africa, African Development Bank, etc.). On the other hand, particularly since the failure of structural adjustment lending by multilateral development banks in the 1990s, "African regional organizations and cooperative infrastructure facilities by Africa and for Africa" are being established, and there is an increasing tendency to respect discussion and activity that pursues economic growth that is capable of sustainable development, while maintaining African identity and ownership, according to local conditions and emphasizing sharing of development knowledge.

Given this background together with the trend since 2000 toward active introduction and use of ICT in global development, initiatives by function and spanning regions are being established one-after-another, using ICT as the driving force and promoting digital economy according to conditions in each country, to realize and promote a "leap frog" effect in Africa.

At the first Transform Africa Summit (TAS) held in Kigali, Rwanda in October 2013, heads-of-state from seven countries shared leadership in establishing Smart Africa (SA), as a regional initiative to accelerate social and economic development in Africa through ICT. The heads-of-state in the region agreed on and signed a manifesto at the 22nd meeting of the African Union

(AU) in 2014, with public support provided by the International Telecommunications Union (ITU), the World Bank, the African Development Bank and other organizations. A headquarters was established in Kigali starting in 2016, with Hamadoun Toure of Mali (former Secretary General of the ITU) as the Founding Executive Director; a position which he still holds. Given this background and events leading to its establishment, and having a rare international leader like Dr. Toure as its full time ED, it is very promising for the role and function of ICT in Africa to have the SA as a permanent gateway for collaboration with agencies outside the region.

The third biannual meeting of TAS was held in Kigali in May 2017. TAS continues to increase in number of participants, number of countries represented, and in diversity, and has become the largest international conference related to ICT in the region. As mentioned earlier regarding Smart Africa, TAS brings together many heads of state in the region and ministers in charge of ICT from most of the countries, so it is used as a venue to discuss important common ICT related initiatives. It also attracts many ICT related participants from outside the region, both government and private, with reports of 3,800 participants from 81 countries at the third meeting. It also has a role as a trade fair, enabling ICT related enterprises expanding their international business to present their latest technologies and solutions for Africa, and at each meeting, sessions are held for venture entrepreneurs and investors to meet, so it is an excellent opportunity to get an overall view of the dynamic ICT activity in each African region.

In the East African region, the Northern Corridor Integration Project (NCIP) has governments and private enterprises in each of the countries along the corridor (the northern corridor is an international telecommunications corridor connecting Mombasa Bay in Kenya with Rwanda) collaborating in the ICT sector, and the Northern Corridor Technology Alliance (NCTA), which has been officially operating since 2015, is an initiative attempting to create common benefits for the whole region through technical cooperation. The NCTA has already succeeded in stimulating demand for communications, by reducing communication roaming fees among the countries along the northern corridor all at once. It also has initiatives such as unifying electronic customs clearing procedures and making distribution of agricultural products more efficient through ICT.

The Sustainable Development Goals Centre for Africa (SDGC/A) is an independent non-profit agency established in Kigali, Rwanda, to promote initiatives for achieving sustainable development goals (SDGs). As a regional agency promoting SDGs in the Africa region, the SDGC/A has led other regions by starting in January 2016, and held a ceremony celebrating the start of activities in January 2017. The main roles of the SDGC/A are (1) policy proposals and research, (2) training and capabilities development, (3) promoting technical reform and innovation, and

(4) coordinating investment and projects among the countries.

5. Issue: “Four billion not reaping the benefits” in Africa

In Africa, where there are still overwhelming shortages of basic infrastructure such as water and electricity, there are many areas where the ICT sector still lags behind expectations, so we will touch on a few of them.

According to analysis in the 2016 World Development Report, “Digital Dividends,” the size of the population without access to a high-speed internet connection in that year was more than half of the total population of the earth, at approximately four billion. Without actively working to improve this number, it would be extremely difficult to resolve various development problems identified as SDGs. One of the major differences between the SDGs and their predecessor, the Millennium Development Goals (MDGs), is their evolutionary approach in that ICT is seen as an essential means for achieving many of the development goals. In this case, ICT is exemplified by the Internet, which has already become established as new social infrastructure in countries around the world. For example, one of the SDGs set was called “Goal 5: Gender equality and empowerment of women,” and ICT was expected to play a crucial role in achieving this goal.

On the other hand, as mentioned above, there are already many international undersea communications cables installed and landing along the coasts of the African continent, but most of the countries are still developing their inland data communications infrastructure to use this capacity effectively, backbone networks, particularly fiber optic, are not yet complete, and investment is gravely inadequate to meet the need for completing these networks.

To achieve Goal 5 and other SDGs, it will be critical to stimulate and attract investment for these inland backbone communications networks. Accordingly, since the SDGs were agreed upon by UN member countries in September 2015 and recognizing that the investment shortfall problem must be dealt with, various initiatives have been started in international society and efforts seeking alignment in international society are accelerating.

Typical initiatives include the Global Connect Initiative (GCI) by the US State Department, and Internet for All (IfA) by the World Economic Forum (WEF). GCI and IfA are closely connected and linked to the US Agency for International Development (USAID), a bilateral support agency under the umbrella for the US State Department. In the fall of 2016, USAID published a report called, “Connecting the Next Four Billion,” which focused on the situation of the “four billion not reaping the benefits” identified by WDR 2016, identified measures to address it, and encouraged unification and cooperation among support agencies at a practical level.

The WEF, which is promoting organic cooperation through

dialogue between public and private organizations for work on global scale development issues, also officially started IfA in 2016 as a multi-year project. It has gained participation from approximately 50 public and private organizations around the world, has selected three pilot regions as of March 2017 which are: Africa (Northern Corridor), Southern Asia (India), South America (Argentina); and is actively continuing to work with the intention of enabling those that are not “reaping the benefits” to receive income or to participate in society at a higher level.

Japan has been participating in IfA since May 2016, actively contributing input with JICA as a member of the global steering committee. Beyond just investment in infrastructure to increase the number of Internet users and promote sustained development in developing countries, the IfA acts as a common platform for various approaches and initiatives by industry, government and academia, in areas such as human resource development, content, device pricing, and ecosystems, and makes valuable contributions to accelerating further mediation of ICT inequality on a global scale.

6. JICA and ICT in Africa: Projects on Strengthening ICT Innovation Ecosystems in Rwanda

In the light and dark areas of ICT in Africa, there are aspects that are developing beyond expectations and others that remain undeveloped, as ever, so an objective perspective on both of these aspects must be maintained while studying practical ways to solve issues according to conditions in each country and region.

Throughout Africa, with its 1.1 billion people in 54 countries, even with countries and agencies supporting individual cases where support can be given, it is clear from the facts of international development over the past half century, that highly effective results in terms of efficiency cannot be expected without a specific strategy.

So what initiatives should be taken to increase development effectiveness? It goes without saying that as foreigners, we cannot envision the solution, and it will only become clear when the people of Africa take ownership and study it, considering possibilities of lessons from the past and conceivable futures, and international society must provide support from the side through dialogue. Existing initiatives, including SA, TAS, NCTA, and support from SDGC/A and others are naturally essential for this. The fact that Rwanda exists is not an accident, and we should consider it due mainly to these important initiatives.

Rwanda is a landlocked country with scarce natural resources, but since 2000, when it initiated its “Vision 2020,” 20-year long-term development plan to build an ICT nation, it has instituted various reforms and schemes required to receive foreign investment, performed diligently through strong leadership from the president himself and Rwanda’s cabinet and bureaucracy, and as a result, in recent years it has consistently ranked second only

to Mauritius among African countries in the annual World Bank Group publication, “Doing Business.” This is related to the fact that it has become a hub for important ICT initiatives across the region.

Since 2010, JICA has provided continuous support for Rwanda, which has become an ICT hub in Africa. In the Rwanda government’s “Vision 2020”, the National ICT Strategy and Plan (NICI) is divided into five-year phases. In the past three phases, the basic policies, strategies and plans were created, data communications infrastructure was completed, and policies and strategies for human resource development were created. In the final, fourth phase (NICI-4: 2016-2020), The “Smart Rwanda Master Plan (SRMP)” created in the previous phases will be comprehensively put into practice.

JICA began its support in the final stages of NICI-2, and in NICI-3, it has conducted joint projects working closely with government agencies to create a human resource development plan based on the policy. This will enable large numbers of human resources to be produced, who will contribute to increasing overall productivity, building the ICT sector as an industry that can contribute to the nation’s economic growth and also promoting its use in other sectors.

Through the effective activities of specialists from the UN and other agencies, who provide rich support, advice and experience in the ICT sector, functions and organizations have been established over the past six years, including the Knowledge Laboratory (K-Lab), which is an incubation facility supporting the young generation of “Digital Natives” from concept through to starting a business; the Fabrication Laboratory (FabLab), which is a digital workshop where product prototyping can be done easily and at low cost; and the ICT Commerce/Industry Association, which provides various regulatory functions for nurturing the ICT industry. These have acted as a showcase to other countries when advocating for Rwanda as an ICT Nation (Figure 3). The strong leadership and ownership by the Rwanda government, effectively integrating support from JICA and other industry, academic, and government sources, continuously gathering people, goods and money in Rwanda from around the world, and organically generating an ecosystem of innovation there, is a notable and rare development result in the world.

The Rwanda government, needing to further scale up the results of these past six years based on this success, has asked for technical cooperation from the Japanese Government to further strengthen this innovation ecosystem and is starting a new collaborative project between JICA and the Rwanda Government in November 2017 (Figure 4). As part of performing SRMPs based on NICI-4, this project aims ultimately to strengthen the innovation ecosystem, which will resolve various social issues in Rwanda through use of ICT, through pilot projects performed jointly with various other sectors, while strengthening growth of industry, promoting investment, and promoting creation of jobs.

Figure 3: Rwanda “Vision 2020” and related support from JICA

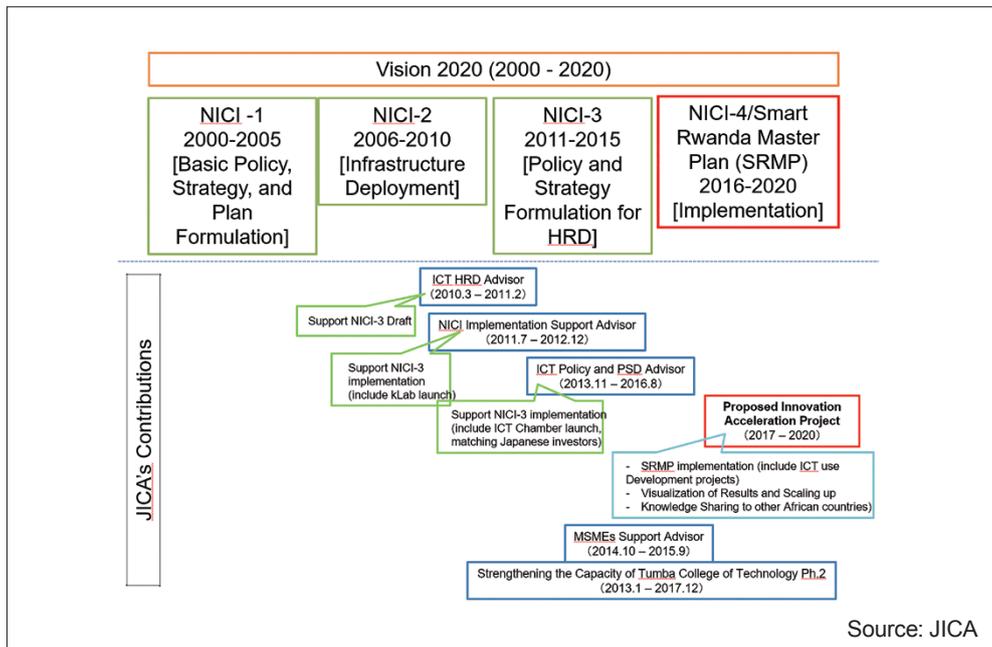
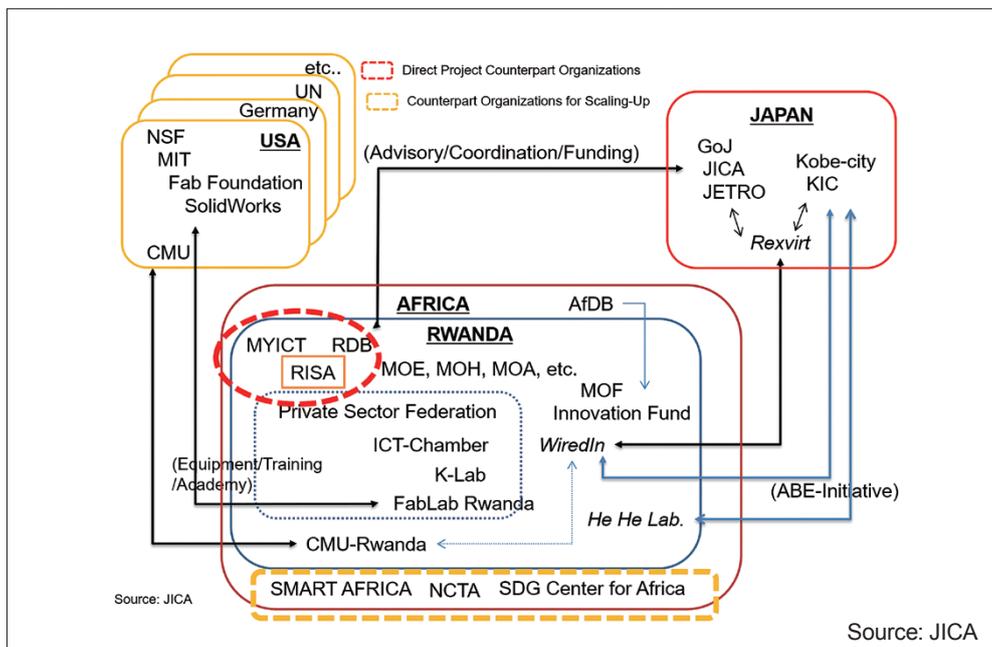


Figure 4: Rwanda “Innovation ecosystem” and related support from JICA



7. Conclusion

I have described the ICT sector in Africa in terms of the current state of telecommunications networks, digital economy initiatives, and the example of the innovation ecosystem in Rwanda. However, I have not mentioned many aspects such as the micro-conditions in each country, characteristics within each region, the current state of human resources and organizations, or the state of private investment, but these are all important factors when considering investment or expansion into support, whether from a public or a private organization.

Nevertheless, as mentioned at the beginning, there is

surprisingly little reliable statistics and other information regarding Africa, particularly information organized to give an overview of the ICT sector, so I would be pleased if this article is helpful in providing an initial understanding of the current state and future potential of the ICT sector in Africa.

In closing, I had the opportunity to present the main points in this report at the symposium in March 2017, and I would like to express my sincere thanks for that opportunity to everyone involved at the ICT Global Strategy Bureau, Ministry of Internal Affairs and Communications.