Republic of Rwanda

Ministry of Information Technology and Communications (MITEC)

ICT SECTOR PROFILE 2016

"Transformed digital community"

Contents

I. Foreword

As the one of ICT sector monitoring reports, the ICT sector profile records the strong achievements from national plans including the Smart Rwanda Master Plan (SRMP), which was approved by the cabinet on November 3rd 2015. This strategic plan towards the knowledge-based economy focuses on the digital transformation in key sectors namely Governance, Education, Health, Finance, Gender and Youth mainstreaming, Trade and Industry, and Agriculture; this transformation relies on three key enablers including ICT governance and management, digital talent development, broadband for all through shared ICT infrastructure.

In 2015, following the 4G LTE rollout of to more than 25 districts beyond Kigali, other noticeable broadband access initiatives started such as free WiFi deployment in buses and in public places. As of December 2016, 35.38% of the Rwanda total population has access to Internet and mobile cellular phone subscription reached at 79.2 % which increased mobile money subscribers from 7,663,199 to 8,921,533. In 2016, the ICT sector contribution to GDP was 3% according to the National Institute of Statistics of Rwanda (NISR). The ICT sector remains also the main target for foreign direct investment (FDI). Through irembo platform, Rwandans can now access almost 53 government services online via computer or mobile devices. Those services are in form of Government to Citizen (G2C), and Government to Business (G2B). Accessing services through this platform has increased the number of people requesting services where now in only three months, the total number of requests/ transactions reached at 393594 from January to March 2017

As by the SRMP, working with the private sector through Public Private Partnerships will hasten achieving Smart Rwanda.

II. ACKNOWLEDGEMENT

III. EXECUTIVE SUMMARY

ICT sector profile is an annual report published by Ministry of Youth and ICT to showcase overview of statistical information covering the performance in ICT sector and progress against targets of Smart Rwanda master plan and vision 2020.

This year, the Profile emphasizes on service delivery, under the Smart Rwanda 2020 Master plan, targeting on self-service Government, driving cashless and paperless economy. As results, 43% of all government institution are delivered online. Irembo as one single platform through which business and citizens access integrated government services was initiated by the Government of Rwanda in partnership with Rwanda Online Platform Ltd (ROPL). So far 53 government services are accessed through this portal.

Under the process of establishing and promoting cashless economy, the Central Bank of Rwanda has continued to promote reliability and robustness of the e-payment infrastructure. Number of mobile payment subscribers reached 9,735,694, this gave the number of Value of transactions of 1,040 billion, which has positively impact the operational efficiency of the entire e-payment ecosystem have been strengthened

In 2016, ICT sector has continued to increasingly fuel the Rwandan GDP growth as it has been among the largest contributor to GDP growth (3%) and it is still persistent to be a primary target for foreign direct investment (FDI) into the country. Though it has reduced compared to previous year whereby FDI in ICT sector was estimated at US $ 55,600,000, in 2015 it attracted US 42,580,000. Telecom Sector brought a lot in ICT for development in terms of revenue generation to the government and also job creation to the citizens. ICT has also enabled service delivery for public and private services, including education, health care, security and financial services. The tremendous increase was seen in telecommunication industry. By December 2016, the number of active phone mobile-cellular phone subscribers has increased to 79.2%, from 70% in December 2014, hence a total addition of 1,012,600 new subscribers in a period two years. Consequently, different sectors especially Financial Institutions and Utilities are increasingly digitizing and mobilizing their products and services, reducing costs and providing compelling new experiences for consumers.

Under the smart Rwanda master plan, 7 pillars were established to achieve vision 2020 as well as SDGs indicators. ICT sector strategy is being developed to each pillar.

Through 4G LTE Technology, which is now covering 55% of Rwandan population which will usher in a completely new data era that will open up new opportunities to create businesses, innovations and improve people's lives.

The Health Sector has continued its tremendous, Rwanda Health Management Information System (R-HMIS) in each of the country's over 500 health facilities in the past two years. The percentage of health centers connected to internet remained at 93.8%, however, increase in number of clinical emergencies supported through RapidSMS is 25%, whyle number of patients at community level tracked using RapidSMS reached 186719 by December 2015 up from 173,131 in 2014, which make an increase of 8%.

IV. ICT FOR DEVELOPMENT (ICT4D)

The contribution of ICT to the GDP is 3%. This share doesn't include all enabler activities of which their calculations are somehow complicated but contributing to the development of the country. In the other hand is crosscutting sector, which means that tracking its implementation involved various sectors since. This section highlights the key statistics of the use of ICT in the five priority sectors including Telecommunications, Finance, Governance, Education, Health, and Agriculture. A particular emphasis was put on tracking the current adoption and use of key ICT systems, services and solutions in the above mentioned sectors respectively. In this report is shown as well trends of the ICT evolution over years.

According to the world Economic forum report titled "The Global Risks Report 2017" The emerging technologies of the Fourth Industrial Revolution (4IR) will inevitably transform the world in many ways – some that are desirable and others that are not. The extent to which the benefits are maximized and the risks mitigated will depend on the quality of governance – the rules, norms, standards, incentives, institutions, and other mechanisms that shape the development and deployment of each particular technology

IV.1. ICT in Telecommunication

In Rwanda, the field of telecommunication is developing very fast compared to the previous years. mobile technology was the fact field that was developed faster due to the high demand of mobile data communication where customers prefer mobile services to services in the fixed-line network. Thus, competition between communication operators is increasing in the field of fast data exchange services. The contribution of the sector of electronic communication to the economy is important as it supports the development of other branches of economy as well.

IV.1.1. Mobile Phone and Internet Penetration

35.58%

Internet penetration
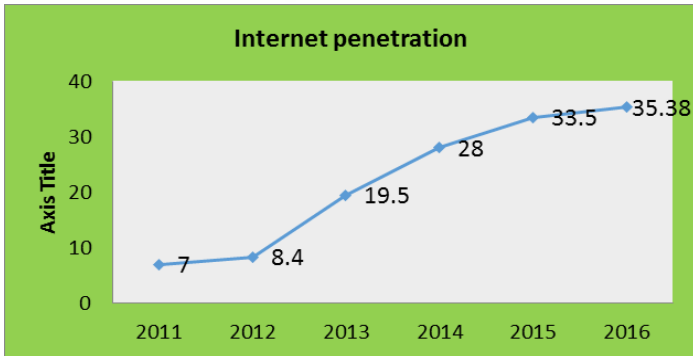
Technology evolution and competition among technology vendors, telecom operators, and service providers over the years has contributed to a continuous decrease of price cost for voice, data, as well as devices including feature phones and smartphones. This has contributed to increasing the mobile phone penetration rate and the Internet penetration rate to 79.2% (8,921,533) in 2016 from 78% (7,663,199) in 2015. This penetration boosted the penetration of internet to 35.38% from 33.5 in 2015

The market share

- MTN Rwanda Ltd — 46%
- TIGO Rwanda Ltd — 36%
- Airtel Rwanda Ltd — 18%
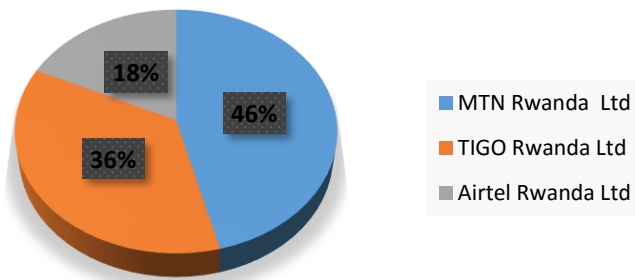
IV.1.2. Broadband access and 4G LTE deployme
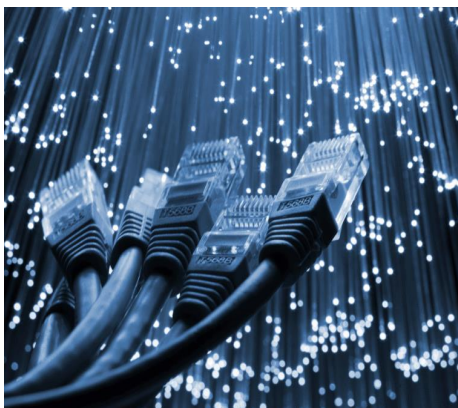
As of September 2016, Rwanda Development Board (RDB) reported that 25 cities are completed and there is continued deployment around the country. The ongoing national rollout plan of 4G LTE Technology, KT Rwanda Networks Ltd deployed 4G geographically by 51% and this network is accessed by 64% of the population. This has opened up new opportunities to create businesses, innovation and improved people's lives. The 4G LTE deployment is on track to provide fast internet access to the big number of citizens. so far 487 buses have been equipped with free 4G LTE WiFi in Kigali

IV.1.3. Kigali Innovation City

Kigali Innovation City is the natural home where indigenous Rwandan technology companies can innovate and serve the whole market of the African continent.
It is also the best home in Africa for multinational technology companies to domicile their subsidiaries, bring their technologies and skills, and conduct the innovation necessary to create optimized products and services for the African market.

The Fourth Industrial Revolution will instantaneously go with the digital transformation which will enable global to reach in all economic activities. By increase digital transformation Africa's economies can exploit this global reach and achieve exponential growth. Rwanda embedded this concept in its Vision 2020 implementation of which has systematically prepared the country for economic transformation from an agrarian economy to a knowledge based one, through the investment in its human capital, its ICT infrastructure, and its business-friendly environment

IV.2. ICT in Finance

IV.2.1. Promotion of Cashless Economy

ICT continues to boost the growth in the Finance Sector and contributes to improving the digital inclusion in Rwanda. This is seen through the improved use of ICT for financial services delivery, the unceasingly increased number of mobile payment subscription and electronic transactions, electronic billing machines deployment, online tax payments etc. The benefits include effective and efficient processes, cashless payments, and more business opportunities.

IV.2.1.1 Mobile Payments - Number of subscriber
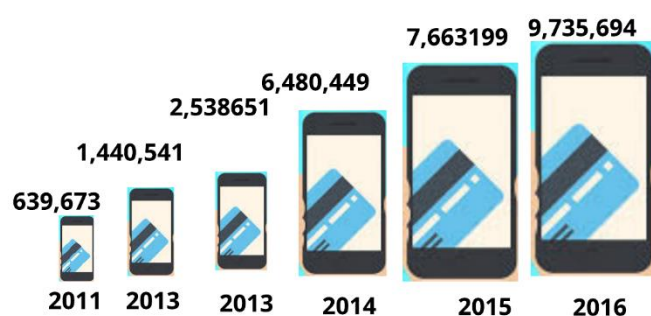
In 2016, Mobile Money subscribers across all mobile network operators have reached 9,735,694 from *7,663,199* recorded in December 2015. This makes an increase of 21% of the total subscribers

IV.2.1.2. Mobile Payments - Value of transactions (In Million RwF)
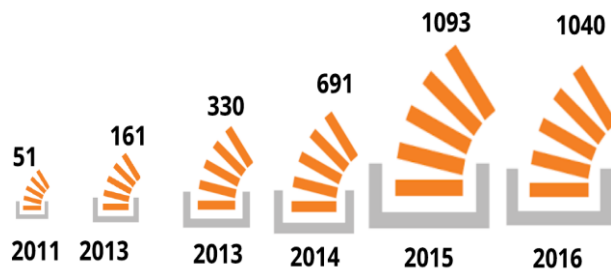
In December 2016 the number of mobile money transactions reached Frw 1,040 billion. The decrease of 12% was observed from 1093 billion amount transacted in the previous year (2015).

Observing the current trend, mobile money services are playing a crucial role in transforming the business processes. The citizens' life style is being improved through more and more innovation in the financial services industry. An example is a Rwandan innovation called "Mergims", a payment platform that allows transactions of basic products and services at international level. All these has greatly changed the citizens' lifestyle and consumers' behavior in terms of money transferring, money deposits, and making payments whereby people prefer to use mainly mobile money payment and other instruments such as debit and credit cards in lieu of cash.

IV.2.1.3. Mobile money agents
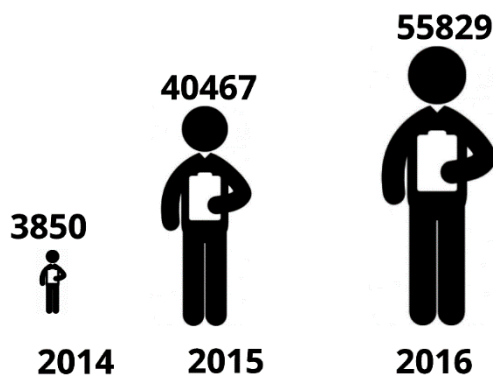
Transaction through mobile money is main cashless channel used in Rwanda. In 2016 the number of mobile money agent reached 55829 from 40,467 of 2015, which is 37.9% increase.

The number of mobile money transaction rose by 22%, 205,687,966 Frw were transacted 2016 whereas it was 168,612,455 Frw in 2015.

Modernized payment systems are improved, regulated and facilitated through the Rwanda Integrated Payments Processing System (RIPPS). This development is expected has increased formal access to financial service between 2012 and 2015 more than what was achieved between 2008 and 2012(BNR, monetary, policy and financial satiability statement report 2015, 54p)

IV.2.1.2. ATM and POS transactions/volume

Between December 2015 and December 2016, the number of ATMs increased by 5 percent from 380 to 400 while the number of POS devices increased by 10 percent from 1,718 to 1,885 due to increased demand from merchants like new hotels. The number of ATM cards increased by 14 percent from 661,389 in December 2015 to 754,384 in December 2016.
The number debit cards for ATM increased by 13%, from 657904 to 746458 and credit cards by increased by 5%, from 3485 to 3668
The usage of both ATM and POS has impacted a lot on cashless where by the number of transactions on ATMs and POSs increased between December 2015 and December 2016. ATMs transactions increased by 9 percent from 7,505,815 to 8,183,116 in volume and by 15 percent from 354 billion FRW to 406 billion FRW in value while POS transactions increased by 77 percent from 373,029 to 660,746 in terms of volume and 56 percent from FRW 26.6 billion to 41.5 billion in terms of value. This was due to different partnership between Telecos and Banks to enable both their clients to cash out from their accounts through their mobile phones and vice versa while they also facilitated bill payments. In addition to Visa, new international payment cards (MasterCard, China Union Pay, Dinners Club and Japanese Credit

ICT in Tax and Revenue Payment

TAX - E-FILING: VOLUME OF TRANSACTIONS

Year	Value
2012	17,482
2013	212,381
2014	339,863
2015	607,309
2016	687,654

Tax - e-filing: Number of subscribers

Year	Value
2012	2,659
2013	31,721
2014	42,139
2015	53,562
2016	78,722
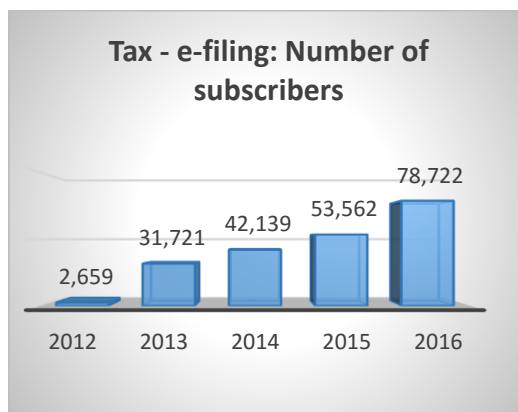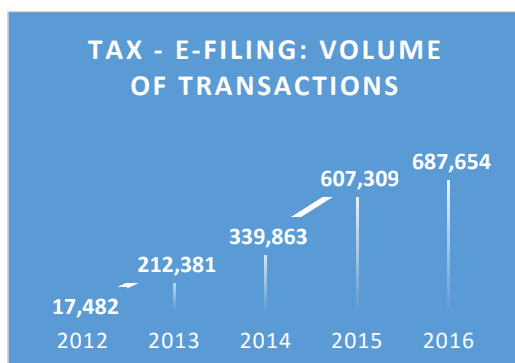
The introduction of E-filling and E-payment has continued to reduce compliance costs for both tax administration and taxpayers. Enterprises are now utilizing their mobile phones to declare tax returns and pay their dues via any of the mobile money platforms regardless of the mobile network provider. The Taxpayers using online tax filling increased by 47 % from 2015 to 2016, from 53562 to 78722. This reduced the time required to comply with VAT.

The use of Electronic Billing Machines has improved highly the revenues collection and management, reducing time and cost of massive document auditing, minimizing errors risks and frauds.

IV.2.2. Financial inclusion in Rwanda

Rwanda has surpassed its financial inclusion targets with more than 89 per cent of adult population accessing financial services, a new FinScope survey 2016 shows.
This is against 80 per cent government's target set for 2017 and up from 72 per cent when the last survey was conducted back in 2012.

According to the FinScope 2016, more than 89 per cent of adult population accessing financial services in Rwanda. This is against 80 per cent government's target set for 2017 and up from 72 per cent in 2012

This increase was mainly due to the mobile money uptake and continued increase in the uptake of Umurenge SACCOs. The percentage of adults, who are formally served, although not banked, increased from 19% in 2012 to 42% in 2016.

Innovation and technologies have revolutionarily boosted the financial industry across the country where the informal inclusion has also increased from 57 per cent in 2012 to currently 72 per cent. Subscription of mobile money has reached to 9735694 which gives the volume of transaction of 205,687,966 in 2016, from 168,612,455 in 2015

IV.3. ICT in Governance

4.3.1 Video Conference and Tele-presence systems
From the last 2 years, meetings between local government and central government can be done through video-teleconference system, a technology that saved money and time for both the ministry and local institutions. Today sixty (60) budget agencies are connected and are able make conferences using videoconference systems.

IV.3.1 Automated Passenger Clearance

The Automated Passenger Clearance System, a system that supports the automation of the migration services rendered to border communities and airports. Using Biometric data, the system removes the need for human input and passport stamps, reduces the migration clearance processing time, eliminates risks of fraud and detects use of illegal and forged documents.

The production of modern identity cards and integrate systems for online authentication has facelifted a lot online services. So far more than 12 institutions are now connected to the National Identification Authority Database using online secure authentication, namely RNP, RRA, MTN, TIGO, AIRTEL, B.N.R /Credit Reference Bureau, and Immigration and Banks. `This has allowed these institutions to provide better and quicker services to their constituencies.

IV.3.2. Government Command Center (GCC)

The GCC is a centralized business intelligence and analytics system providing historical, current and predictive information on projects across all government institutions. The information provided on projects includes objectives, targets and performance over a fixed time. The system was deployed in 10 government institutions with 2 main system controls. Under this track, a Discovery report of readiness in ministries and blue print report was developed and signed off. The discovery report consists of summarized KPIs from each ministry and this was developed after intensive consultations with line ministries.

IV.3.3 Implementation of Rwanda Online Platform

Service delivery is considered as gear of the development. Introduction of paperless and cashless Government was the basis gating into agreement between Government of Rwanda and RwandaOnline Ltd (ROL to develop IREMBO platform. Since its launch in June 2014, by December 2016, 53 government services were automated and could be accessed on Irembo. Besides, there are other existing e-services that were automated by institutions and that were added on Irembo.

IV.3.4 Digital Ambassador Programme (DAP)

The Ministry of Youth and ICT in Partnership with the World Economic Forum (WEF) and Digital Opportunity Trust (DOT) launched "The Digital Ambassador Programme (DAP)". This program is targeting 5000 young Rwandans to be trained as Digital Ambassadors to serve as digital skill trainers to 5 million Rwandans who have low or no experience of using the internet and also how to use e-government services.

The Minister for Youth and ICT, Nsengimana Jean Philbert said, "DAP is a great initiative to achieve Rwanda's Digital Talent Policy objectives. We strongly believe that digital literacy combined with internet access for all will accelerate Rwanda's digital transformation towards a smart Nation. The Government of Rwanda would like to thank all partners of the DAP and extends an invitation for others to join. This is an important step in a long journey of building a Smart Africa".

IV.3.5. ICT Security

As far as ICT is developed faster to facilitate services delivery, the hackers also are increases their attacks. The government of Rwanda has taken measures to defend that by initiating different strategies and setting new policies that aiming at security and storing of the content safety.

IV.3.5.1. National Cyber Security Policy

National Cyber Security was developed to address the growth of cyber threat and improving cyber security for individuals, businesses, critical national infrastructure and government.

IV.3.5.2. National Cyber Security Strategic Plan

National Cyber Security Strategic Plan provide an implementation guidance of the defined National Cyber Security Policy. Specifically, it defines the establishment of a National cyber security Agency, new cyber security initiatives and priorities, roles and responsibilities for parties who will be involved in the implementation and financial implication.

IV.3.5.3. PKI center

The PKI center is National Public Key Infrastructure (PKI) which was created with the vision to make Rwanda e-transaction environment secure and resilient with PKI Technology, increase trust and confidence of online users, reduce time and cost associated with paper based-workflow processes.
The PKI Center will provide information security services to individuals, entities and computer based devices, namely the issuance of digital certificates. This will offer a secure way to conduct online transactions where the digital certificate will act as an online identity card (or digital ID) on internet and Digital signature to sign electronic transactions or documents, files and encrypt them.

IV.3.5.4. National Data Center

National Data Center is data hosting facility for public and private sector institutions that will ensure data safety, data protection and reliable service delivery. The National Data Center runs on a secure, scalable, resilient, and service-oriented automated cloud computing solution that will provide a consolidated solution composed of networking solutions, high-end processing blade servers, tiered enterprise storage infrastructure and virtualization coupled with disaster recovery capabilities, and data security solutions.
In order to reduce high traffic costs and long latencies for the most content on commercial websites that were located abroad, the Government of Rwanda has initiated National Data center to help reduce backbone traffic and improve user experience through storing the content closer to the content consumers. Reduction in latency can also result in increased Internet usage.

IV.3.5.5. Data revolution

Rwanda considers data as a critical resource. In order to promote the area of Big data analysis for enormous amounts of data generated by billions of connected devices and people combined with an increasing number of information systems as the economy gets digitized, the policy "Data revolution policy" was adopted by cabinet wisdom

IV.3.5.6. Smart Rwanda – Smart City
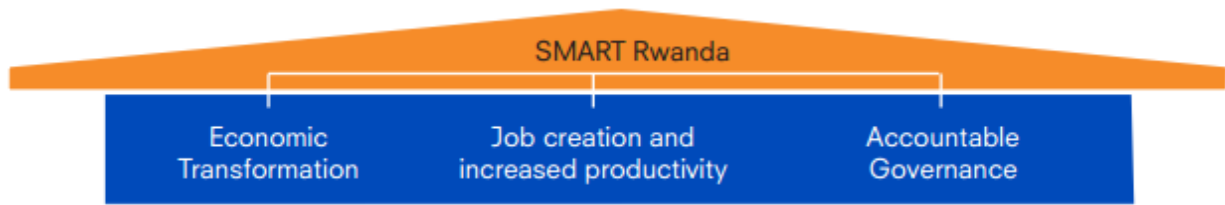
SMART Rwanda is the vision set by the Government of Rwanda towards a Knowledge based society "

The term "Smart City" is understood as combination of all possible solutions that frame the future of cities and their development and hence is rooted in the implementation of user-friendly information and communication technologies developed by major industries for urban spaces. By developing smart city, the government of Rwanda has invested a lot to leverage technology solutions to improve efficiency of cities, WiFi in public areas, including public transport vehicles, as well as cashless payment systems in public transport where now every Rwanda should have a smart card allowing him to pay transport fees

IV.4. ICT in Education

According to education Sector Masters Plan with the vision of harnessing the innovative and cost-effective power of world-class educational technology tools, Education sector was remarked by a tremendous increase, where by quality of education was improved through ICT use.

IV.4.1. ICT Devices in Education
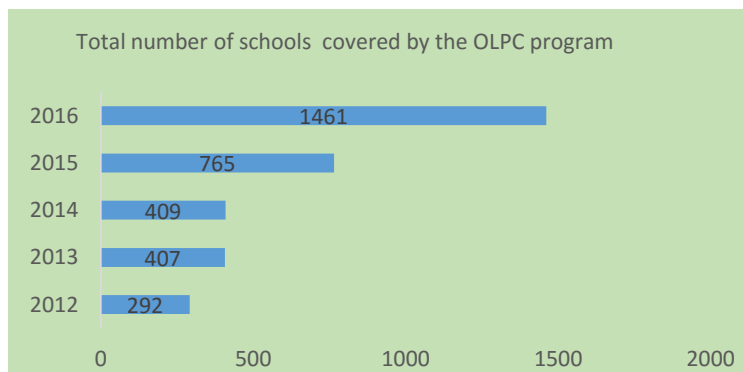
Access to computer skills and computer science understanding through One Laptop per Child' (OLPC) program, was the basis of expanding knowledge on specific subjects like Science, Mathematics, languages and Social Sciences through online research or content hosted on servers. Through this project, sof far , more than 245785 laptops have been distributed in 1461 primary schools through OLPC project

Students were facilitated to access their own laptops under a loan scheme. So far Rwanda Education Board (REB) distributed 61,178 computers to the students (53,255 laptops to secondary schools and 7,923 to UR first year students). Other more than 7,000 computers are till in the stock of REB to be distributed this coming year.

Rwanda-Smart Classroom
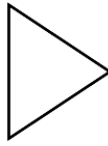
IV.4.2. ICT enrolment in TVET

TVET is the one of Government strategies to encourage young people to join labor market for self-reliance. The number of students' enrolment in ICT related programs under TVET reached at 15324 students by December 2016, from 15,979 students in 2015. This makes insignificant decrease of 4%.

IV.4.3. Teacher Training in ICT

Number of teachers trained in basic ICT literacy

9,377	9,377	10,246	16,214	17791
2012	2013	2014	2015	2016
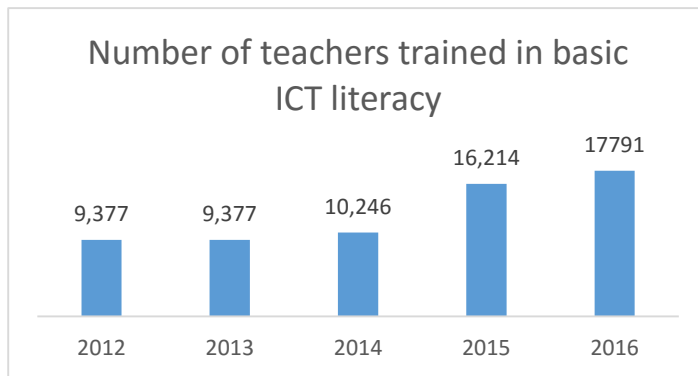
Literacy in ICT is the important area not only for people who are in education system but also for teachers to build their capacity in teaching by using computers. 17791 teachers were trained in 2016, from 16,214 in 2015 in basic ICT literacy Basic.

IV.5. ICT in Health

The fact that ICT is enabler for service delivery, health sector has benefited a lot in terms of network among specialists, health care practitioners to specialists which improved the quality of diagnostics using e-Diagnosis and treatment. This is the result of increase of health centers connected to Internet which increased to 93.8% in 2015. The health centers are now accessing health information systems and medical records systems and provide better and timely reporting. Using RapidSMS, the increase in number of clinical emergencies supported went from to 25% in 2014 to 1820% in 2015. The number of patients at community level followed using RapidSMS was 173,131 in 2014 and has reached 186,719 by December 2015. Also through strong partnership with the private sector, the number of registered clinics and dispensaries reporting using Health

IV.6. ICT in Agriculture

The sector is striving to significantly increase access to information and introduce new technologies through internet access. ESoko the real time electronic system that provides market price information for agriculture commodities has registered 11,820 SMS transactions in December 2016. This figure is almost the same of 2015. The Web-based transactions reached at 5439. Apart from eSoko, the ministry of agriculture has introduced another program called "*noza Ubuhinzi n'Ubworozi*". This IT tool serves as platform that aims at guiding, informing the farmers in their daily basis activities to have good quality and enough quantity of production. Since 2015 up to December 2016, the number of famers used that platform reached at 24038
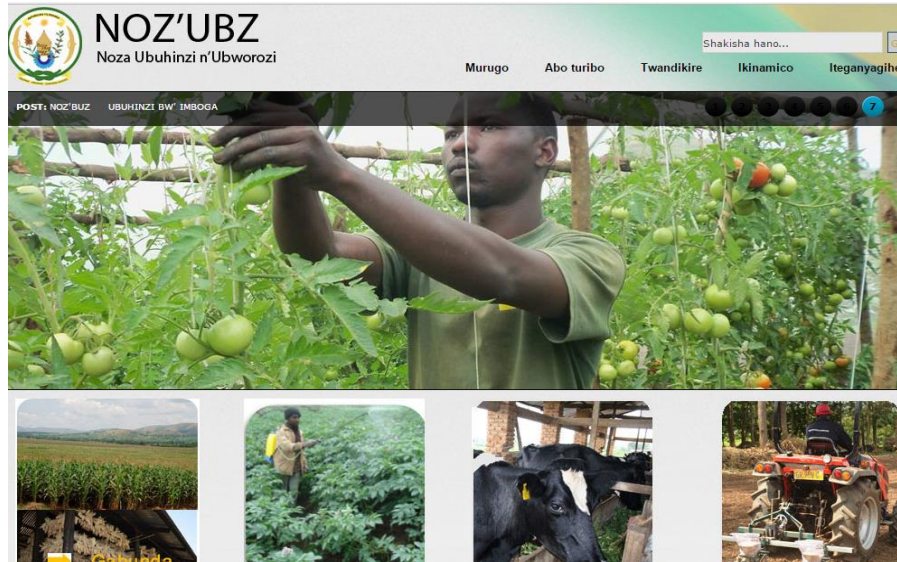
IV.6.1. Agricultural service and digital inclusion Project

The government of Rwanda has initiated different programs to boost the rural development. one cow per poor family '' GIRINKA", like any other programs in agriculture sectors, was an excellent entry point for the use of digital services for information om child nutrition, animal production, health and trade. In collaboration with FAO, the government of Rwanda is undertaking the agricultural service and digital inclusion Project. Through this project, 4 applications have been introduced to create a facilitating environment and strategic focus on the use of ICT in agriculture:

Animal Health e-Service: The app will allow livestock owners to enter information on clinical signs and syndromes (including pictures) and receive immediate information on diagnosis/differential diagnosis and cure and prevention measures.

AgriMarketplace: a mobile crowdsourcing application used to connect famers and suppliers

e-Nutrifood : A mobile application with digital content and information concerning the quality and combination of essential nutrition values of foods

Meteo and Calendar: an application combining information on weather forecasts, crop calendars and alert system

V. Global over view

The global statistic shows that internet penetration in Africa was the worldwide lowest at 14 percent in 2012 and grew to 25.1 percent in 2016. According to the RURA's report, Rwanda has reached 36.6% of internet penetration by December 2016. For the strong public-private collaboration, in partnership with governments, to accelerate the achievement of the broader social and economic priorities of the country/region, the program known as internet for all was launched in May 2016. for Northern Corridor countries in East Africa (Kenya, Rwanda, South Sudan, and Uganda),

The government of Rwanda is very focusing on the digital agenda and it is also making strong efforts to provide a stable regulatory framework which resulted the good improvement in Network Readiness Index where Rwanda is ranked at 80th in 2016, from 88th in 2013. The private sector is making large strides in terms of adopting digital technologies

VI. Annexes

Annex 1.: ICT in business

key indicators Payments - Smart FMIS	2011	2012	2013	2014	2015	2016
Number of subscribers	893	1,292	1,960	1,956	2,357	2,382
Number of payments voucher processed	131,461	137,560	126,768	129,651	182,045	165,696
FDI in ICT (USD)		44,483,333	308,665,230	66,354,860	55,600,000	42,580,000
Investment under implementation (USD)		44,000,333	274,665,230	6,354,860	55,600,000	42,580,000
Investment operational (USD)		2,483,000	34,000,000	60,000,000	0	0
Local Investment (USD)		1,083,000	3,811,484	30,314,000	20353913	164,871,685
Investment under implementation (USD)		1,083,000	3,811,484	-	20,000,000	164,871,685
Investment operational (USD)		0	0	30,314,000	353,913	0
Investment Companies						
Cumulative number of ICT investment companies registered Job Creation		35	50	58	62	68
Number of jobs created by the ICT investments		4,046	374	220	104	357
business registration Online business registration system						
Total number of companies registered	-	11,288	13,396	14,798	21718	20,491
Total number of companies successfully registered online	-	4,169	1,150	11,922	6087	20,491
Percentage of companies successfully registered online	-	36.93%	8.60%	80.60%	28%	100%
Tax - e-filing						
Number of subscribers	-	2,659	31,721	42,139	53,562	78,722
Volume of transactions	-	17,482	212,381	339,863	607,309	687,654
e-Payment payment						
Number of subscribers	-	69	250	637	37,949	196,607

Volume of transactions	-	329	2,461	7,954	89,633	590,424
SIGTAS (Domestic taxes)						
Number of registered subscribers	-	32,533	20,587	33,636		20,195
Volume of transactions	-	371,156	875,805	460,872	81,005	29,908
Electronic Single Window						
Number of subscribers	-	126	245	2,048	3,058	3,166
Volume of transactions	-	90,435	138,747	314,240	320,360	269,955
No Creance	-					
Number of subscribers	-	9,364	8,798	9,179	13,146	23,844
Volume of transactions		13,461	12,731	2,633	9,727	17,290
Mobile declaration						
Number of subscribers	N/Av	N/Av	N/Av	15,521	39,639	38,661
Volume of transactions	N/Av	N/Av	N/Av	60,457	116,243	154,690
Non Fiscal Revenue System						
Number of subscribers	N/Av	N/Av	N/Av	N/A	888,807	713,630
Volume of transactions	N/Av	N/Av	N/Av	551,559	769,674	625,927
business registration						
Online business registration system						
Total number of companies registered	-	11,288	13,396	14,798	21,718	20,390
Total number of companies successfully registered online	-	4,169	1,150	11,922	6,087	12,912
Percentage of companies successfully registered online	-	36.93%	8.60%	80.60%	28%	63%
Mobile Payments						
Number of subscribers	639,673	1,440,541	2,538,651	6,480,449	7,663,199	9,735,694
Volume of transactions	4,323,490	22,191,674	57,147,777	104,800,000	168,612,455	205,687,966
Value of transactions (In Million RwF)	51,024	161,808	330,378	691,477	1,093,497	1,040,459
Mobile money Agents				3850	40467	55829

Payment Systems - Instruments						
Number of Automated Teller Machines (ATMs)	167	292	333	354	380	400
Number of Points of Sale (POS) terminals	227	566	946	1,152	1,718	1,885
Number of debit cards (ATM)	115,200	389,269	487,498	638,869	657,904	746,458
Number of credit cards (POS)	516	418	845	2,540	3,485	3,668
ATM transactions						
Volume of ATM transactions	1,976,376	5,753,163	7,774,053	7,488,707	7,505,815	8,183,116
Value of ATM transactions (In million RwF)	122,536	180,567	260,585	310,009	354,049	406,235
Pos transactions						
Volume of POS transactions	38,440	63,757	111,570	185,441	373,029	660,746
Value of POS transactions (In million RwF)	6,438	9,034	14,718	19,223	26,625	41,500

Annex 2: ICT in Education

key indicators	2012	2013	2014	2015	2016
Primary education					
Computer to teacher ratio	1:17	1:08	1:08	1:06	1:05
Computer to pupils ratio	1:40	1:15	1:15	1:16	1:13
Percentage of schools with computer infrastructure	39%	49%	56.10%	58.80%	65.80%
Total number of OLPC laptops distributed	152,768	203,763	204,321	245,785	275,061
Total number of schools covered by the OLPC program	292	407	409	765	1461%
Percentage of schools connected to the Internet	6%	6%	8%	10.25%	10%
Percentage of schools with a networked computer lab	1%	1%	2%	1.30%	1%
Secondary education					
Computer to teachers ratio	1:06	1:07	1:06	1:11	1:06

Computer to students ratio	1:40	1:44	1:32	1:28	1:26
Percentage of schools connected to the Internet	18%	14%	16,9%	16.10%	18%
Percentage of schools with a networked computer lab	25%	31%	31%	43%	8.80%
Tertiary education					
Computer to admin. staff ratio	1:02	1:01	1:02	1:02	1:02
Computer to acad. staff ratio	1:04	1:02	1:03	1:03	1:02
Computer to student ratio	1:19	1:10	1:07	1:05	1:04
Percentage of High Learning institutions connected to Internet	100%	100%	100%	100%	100%
Percentage of High Learning institutions with a network computer lab	100%	100%	100%	100%	100%
ICT skills development					
Total number of TVET students enrolled in ICT-related programs	7,959	12,532	12631	15979	15324
Male	4,001	6,641	7171	9566	8859
Female	3,955	5,891	5814	6413	6465
Open Distance and e-learning (ODel)					
Total number of institutions offering ODel	1	1	1	1	2
Total number of ODel students	3166	4,372	5,357	3251	4307
Male	2,036	2,607	3,251	2066	2649
Female	1,130	1,767	2,108	1185	1658
ICT Literacy					
Number of teachers trained in basic ICT literacy	9,377	9,377	10,246	16,214	17791
Male	5336	5,336	6,001	9567	10513
Female	4,041	4,041	4,245	6647	7278
Number of teachers trained using ICT in teaching and learning	3,295	3,295	4,164		5584
Male	2,001	2,001	2,666		3350
Female	1,294	1,294	1,498		2234

Annex 3: ICT in Governance

key indicators	2012	2013	2014	2015	2016
National ID					
Cumulative Number of ID cards produced	5,687,210	6,199,533	6,492,248	6,783,088	6,856,149
Cumulative Number of driving licenses produced	141,777	190,068	206,467	273,931	309,769
Cumulative Number of refugee cards produced	15,216	15,542	21970	29,607	29,841
Cumulative Number of institutions connected to NIDA database using online authentication	7	11	12	20	27
Provinces					

Percentage of provinces connected to the Internet Districts	100%	100%	100%	100%	100%
Percentage of districts connected to the Internet	100%	100%	100%	100%	100%
Total number of Business development Centers and Public access points	95	95	95		
sectors					
Percentage of institutions connected to the Internet (modems included)	33.40%	100%	100%	100%	100%
Infrastructures and Applications					
Video conference					
Total number of budget agencies connected	16	56	60	60	60

Annex 4: ICT in Agriculture

key indicators	2012	2013	2014	2015	2016
Applications / e-Soko					
Number of SMS-based transactions	9,893	11,815	11,320	11,820	11,820
Number of Web-based transactions	3,652	4,640	4,939	5,439	5,439
AMIS – Agric. Management Info System					
Number of Users/ visits	-	-	11,028	16,214	19,165
Number of pages visited	-	-	83,736	118,214	207,151
Agricultural extension week (Noza ubuhinzi n' ubworozi platform)					
Number of Users/ visits	-	-	-	7,918	16,120
Number of pages visited	-	-	-	27,771	34,253
Hotline					
Number of Phone calls	-	-	6,292	9,490	13,152

Annex 5: ICT in Health

key indicators	2013	2014	2015
infrastructure			
Hospitals			
Total number of public and private nonprofit hospitals	*48*	*48*	*48*

% of public and private non frofit Hospitals with telemedicine infrastructures	*21%*	*21%*	
Percentage of institutions connected to Internet	*100%*	*100%*	
health Centers			
Total number of Health Centers	*468*	*477*	*494*
Total number of Health Centers connected to Internet	*451*	*457*	*434*
Percentage of Health Facilities Connected to internet	*93.8%*	*95.8%*	*88%*
Application and system			
Electronic Medical record (EMD)			
Number of Hospitals using less paper in medical records	*3*	*6*	*4*
% of Hospitals using less paper in medical records	*6%*	*10%*	*8%*
Health Management Information System			
Number of Health facilities reporting into HMIS	*797*	*1161*	*1221*
HMIS data managers assisted through HMIS e-support messaging	*1,473*	*1067*	*456*
Rapid SMS			
Number of Patients at community level tracked using RapidSMS	*158,510*	*173,131*	*176,675*
Number of clinical emergencies supported through RapidSMS	*176*	*220*	*542*
Telemedecine			
Number of Hospitals using Telemedicine	*13*	*13*	
%Hospitals using Telemedicine	*27%*	*27%*	
Calls for medical assistance			
Number of emergency calls for ambulance (SAMU)	*25,010*	*11,564*	
Number of call received for clarification on health issues	*9,878*	*5,870*	
EDPRS2/HSSP indicators			
Number of registered private clinics and dispensaries reporting routinely using HMIS	*221*	*275*	

Republic of Rwanda

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