ICT SECTOR PROFILE 2018

CONTENTS

CONTENTS

EXECUTIVE SUMMARY

Over the last 8 years, the Ministry of ICT and Innovation has been providing an annual overview of statistical information covering the ICT sector performance and progress against its ICT for Development (ICT4D) strategy known as Smart Rwanda Master Plan (SRMP).

This ICT Profile report of the year 2018 brings together various indicators that have been selected to measure the Rwanda's ICT sector performance and track ICT4D towards Rwanda socio-Economic Transformation and provide valuable information for the formulation of National policies. Concrete evidences and statistics underlined in the sector will be found in the report.

The report is in line of the Government of Rwanda that aims at promoting accountability amongst all public and private institutions and we believe information shared in the report will be helpful to the public.

Rwanda continues to be one of the fastest growing African countries in ICT, from service digitization, mobile technologies, applications development and automation. Much emphasis was put on Broadband as a basic need for all Rwandans and this was realized through 4G rollout program where 4G LTE services reached 96.7% of geographic coverage and 96.6% of population coverage, while 3G and 3.5G services remained at the rate of 93.37% of population coverage. Deployment of LTE technology in Rwanda is opening up new opportunities for innovative services and applications, as well as providing opportunities to improve existing businesses and innovations.

In financial sector, the number of subscribers in mobile payment grew at 71% in 5 ago; consequently, different sectors are increasingly digitizing and mobilizing their products and services, reducing costs and providing compelling new experiences for consumers.

As of December 2018, the population has accessed the Internet at the rate of 52% and mobile cellular phone subscription reached at 82.1%. The usage of different devices has impacted a lot on increase of mobile money subscribers from 9912735 in 2017 to 11067077in 2018. The ICT sector presents the growth of 12 % according to the National Institute of Statistics of Rwanda (NISR) 2018.

In the year 2018, Rwanda was re-elected at the International Telecommunication Union (ITU) Council for a four-year term (2019-2022), with 131 votes, during

ITU Plenipotentiary Conference that took place in Dubai, United Arab Emirates. We have also had numerous innovations from the citizens especially the youth as we experienced a good number of innovations that have been solutions to some problems encountered by community. As the report highlights it, the innovations focused in the sectors of health, commerce, governance, transport, trade and industry, agriculture, and justice production, and sales of ICT goods and services and indirectly through creation and distribution of technologies that enable health, trade and finances, agriculture, retail, and a host of other industries.

The Rwanda's Telecomunication industry is continuing to see rapid growth in connections, subscribers and data traffic, and is playing a pivotal role in unlocking socio-economic progress across the Country. By December 2015, the number of active phone mobile-cellular phone subscribers has increased to 77.8%, from 70% in December 2014, hence a total addition of 1,012,600 new subscribers in a period for nearly a year. 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. The One Network Area which was introduced in October 2014 with the aim of harmonize tariffs on mobile voice calls, SMS and data transmission within the EAC. Today, roaming charges between Rwanda, Kenya and Uganda have been removed and all mobile calls between the three countries are local. This has led to a minimum 400 per cent increase in the volume of calls; a direct benefit to EAC citizens and African businesses operating across EAC borders. Subsequent to the ongoing development of seven ICT Sector Strategies The ongoing national roll out plan of 4G LTE Technology, Rwanda will usher in a completely new data era that will open up new opportunities to create businesses, spur innovation 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. Since the roll out of the initial system, many modules have been added and these include, death audit reporting for all maternal, Neonatal, and child deaths, Community Health Information System, eTB-a patient level system for tracking MDR (multi-drug resistant) TB patients as well as the HIV reporting and Disease surveillance system which is currently being transitioned. 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%.

ACKNOWLEDGEMENT

This report is a collaborative effort of the Ministry of ICT and Innovation together with: Rwanda Utilities and Regulatory Authority (RURA), Rwanda Development Board IT department (RDB-IT), and the National Institute of Statistics of Rwanda (NISR).

We also recognize the support and cooperation of the Ministry of Local Government (MINALOC), the Ministry of Health (MINISANTE, the Ministry of Education (MINEDUC), the Ministry of Finance and Economic Planning (MINECOFIN), the Ministry of Justice (MINIJUST), the National Bank of Rwanda (BNR), the Rwanda Revenue Authority (RRA), the Rwanda Education Board (REB), the National Identification Authority (NIDA) Higher Education Council (HEC), the Registrar General Office of the Rwanda Development Board (RDB), and Japan International Cooperation Agency (JICA).

1.   INTRODUCTION

Over the past year, Rwanda continued to witness steady uptake of ICT in the society. By the end of 2018, almost 4 million people subscribed to the Internet, up from 3.7 million at end 2018. The mobile-cellular subscriptions in 2018 saw 10% increase (9,665,544 from 8,819,217) in the same year but the pace of growth is slowing; indicating the fact that the market may be reaching at the saturation point. The Internet penetration, on the other hand, remains bullish as the fastest growing market segment. It has garnered continuous double-digit growth rates in 2018 which pushed the national penetration rate to 52 per cent. The figure indicates that more than three times increase in the penetration rate in mere five years.

This report records achievements of implementation 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 seven key sectors which are Governance, Education, Health, Finance, Gender and Youth mainstreaming, Trade and Industry, and Agriculture. In order to achieve the transformation in these sectors, it relies on three key enablers including ICT governance and management, digital talent development, and broadband for all through shared ICT infrastructure.

In 2018, following the 4G LTE rollout to all districts, other noticeable broadband access initiatives started such as free WiFi deployment in buses and in public places. As of December 2018, Rwanda's 4G penetration is recorded at 96.6% of population coverage.

47.7% of the total population has access to Internet and 82.6 % of them are subscribed to mobile cellular phone services. Mobile money subscribers have increased from 9,912,735 users in 2017 to 1,1067,077 in 2018. Through "irembo" platform (Government's e-service portal), Rwandans can access 88 government services online via mobile devices and/or PCs. Those services include: Government to Citizen (G2C) and Government to Business (G2B) and Government to Government (G2G) services.
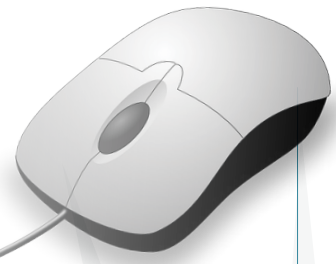
II.   ICT FOR DEVELOPMENT

ICT is an enabler for development which cuts across all sectors. As such, tracking of implementation of ICT programme requires factoring in activities and contributions from various sectors. This report is a compilation of indicators that have been selected to measure Rwanda's ICT sector performance and track ICT for Development programs which will guide the implementation of current national policies and strategies as well as to facilitate formulation of new policies and strategies to further uptake of ICT to help develop the country. It has been compiled from the information collected from sectors such as Governance, Health, Education, Agriculture, Trade and Industry, Justice, Finance and the private sector to get holistic picture. A particular emphasis was placed on tracking the current adoption and use of key ICT systems, services, and solutions in the above mentioned sectors to showcase the trends of the ICT evolution in Rwanda.

II.1. ICT in Telecommunication
II.1.1. Mobile Phone and Internet Penetration

Technological evolution and healthy competition among technology vendors, telecom operators, and service providers over the years have contributed to a continuous decrease in the price for accessing voice and data services, as well for obtaining accessibility devices such as feature phones and smartphones. The improved affordability has directly contributed to increasing mobile phone and Internet penetration in the country.

Internet penetration 2011-2018

Year	Value
2011	7
2012.4	8.4
2013	19.5
2014	28
2015	33.5
2016	36.6
2017	45.5
2018	52

Mobile cellular phone telephone subscriptions

Year	Value
2011	33.4
2012.4	40.1
2013	53.1
2014	63.5
2015	70
2016	77.8
2017	79.2
2018	76.5 / 82.1
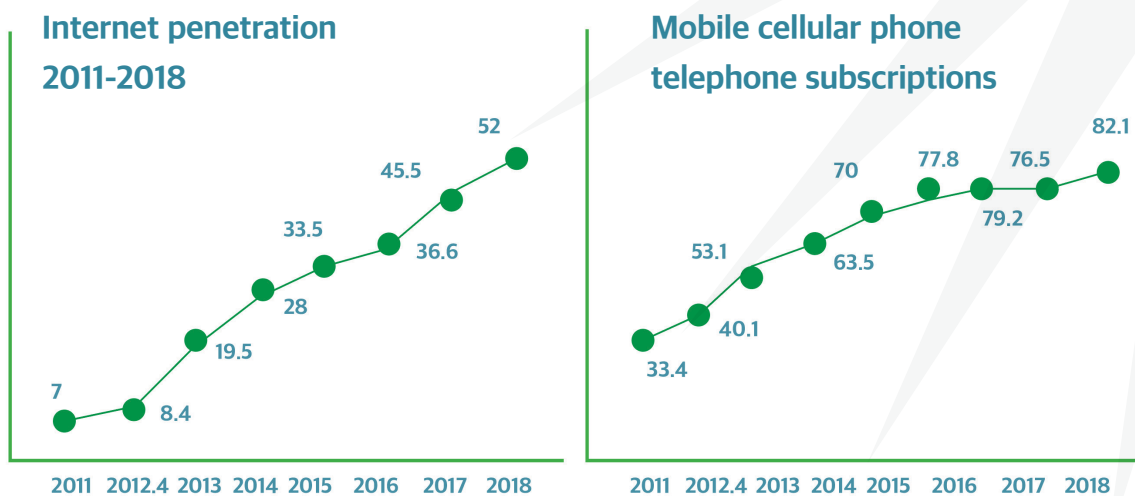
II.1.2. Broadband access: 4G LTE deployment

As of end 2018, Rwanda enjoys 4G LTE services of 96.7% of geographic coverage and 96.6% of population coverage, while 3G and 3.5G services remained at the rate of 93.37% of population coverage. With the focus on 4G LTE deployment, 4G LTE service now surpassed 3G and 3.5G services. Deployment of LTE technology in Rwanda is opening up new opportunities for innovative services and applications, as well as providing opportunities to improve existing businesses.

II.2. ICT in Finance (Toward Cashless Economy)

ICT continues to support the growth of the Finance Sector while improving the financial-inclusion for all Rwandan. This is evident through improved use of ICT in financial services delivery, increased number of mobile payment subscription and electronic transactions, increased deployment of electronic billing/transaction machines, increased use of online tax payments, etc.

The benefits of actively deploying ICT into finance sector include improved effectiveness and efficiency in both transaction and business processes, increased transparency, opportunities in new and existing businesses, financing opportunities, etc. Creation and adoption of more innovative ICT tools/services is needed, however, to realize much wider financial inclusion by the people and resultant improvement of their socio-economic welfares.

II.2.1. ELECTRONIC FINANCIAL TRANSACTIONS

Rwanda is actively promoting e-Payment for every level of financial transactions. This is in line with its ICT outreach efforts. Specific outreach activities include promotion of ICT enabled Government and banking services, providing specific ICT tools to facilitate e-payment (e.g.; Rwanda Integrated Payment System, Shared Agency Banking System, etc.), and instituting conducive strategies/policies (e.g.; Rwanda Payment System Strategy, Regulatory Sandbox for innovative Fintech solutions, Financial Literacy strategy, etc.). These efforts are responsible for much of the rapid acceptance of electronic financial services and the adoption of e-transactions.

Observing the current trend, it is fair to conclude that the electronic financial services are getting more common among citizenry and playing a crucial role in transforming the business processes in Rwanda. Meanwhile, citizens' welfare is being improved through new innovations in the financial sector. An example of such innovation is a Rwandan mobile financial service called "Save" by Exuus, a mobile group saving/lending platform that would allow its users to save and borrow at low interest rate. The users can get access to much needed financing opportunities without going through more rigorous financial lending processes.

II.2.2. Mobile Payment
Mobile Payments - subscription

In 2018, Mobile Payment subscribers across all mobile network operators have reached 11,067,077 from 9,912,735 users in 2017. This makes an increase of 12% of the total subscribers in one year. The growth of subscribers is steadily increasing which reflect growing use for these services within various different sectors.
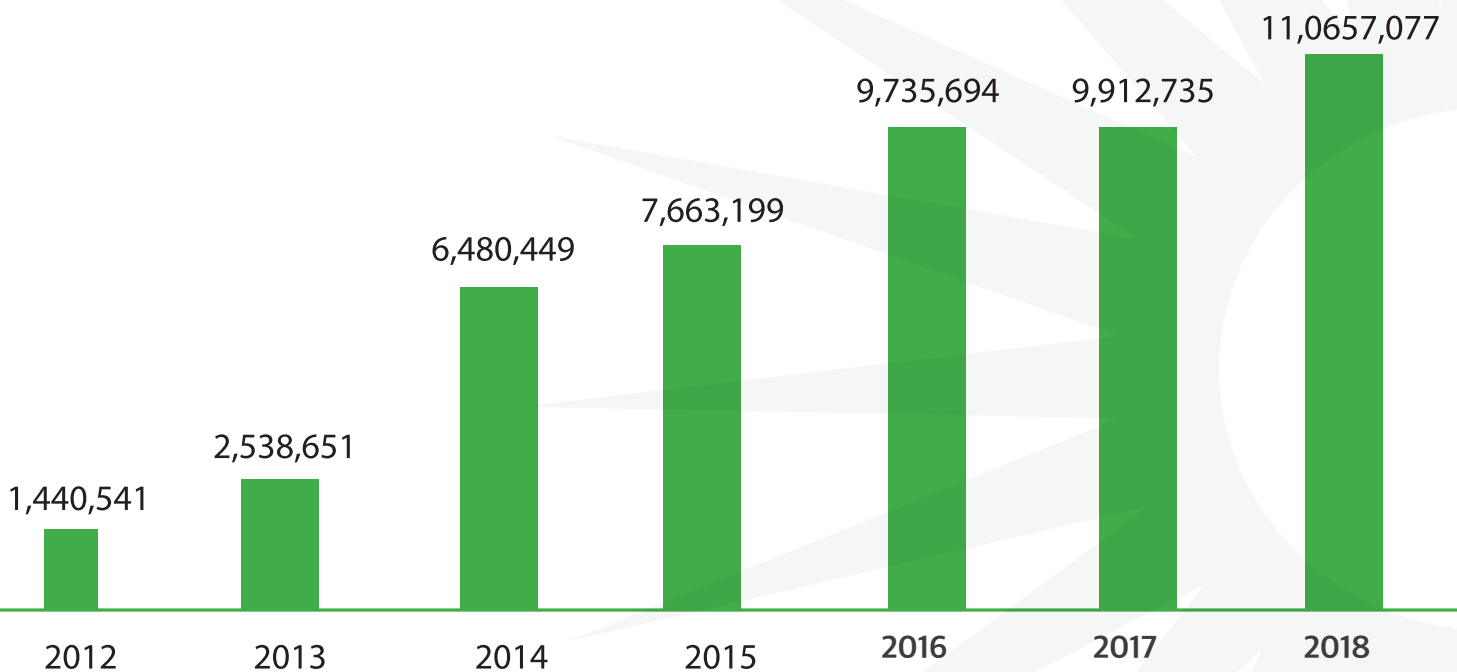
The figures are cumulative which include both active and inactive users. Efforts are underway to streamline the statistics of mobile payment subscribers to reflect the active mobile cellular phone subscribers.

II.2.3. Mobile Payments - Value of transactions (In Million FRW)

In December 2018, the total number of values transacted through mobile payment reached FRW 1,808 billion. The increase of 31% was observed from FRW 1,384 billion transacted in the previous year (2017). The figure also corresponds to approximately ¼ of GDP in Rwanda.

Year	Value
2012	161,808
2013	330,378
2014	691,477
2015	1,093,497
2016	1,040,459
2017	1,384,686
2018	1,808,943
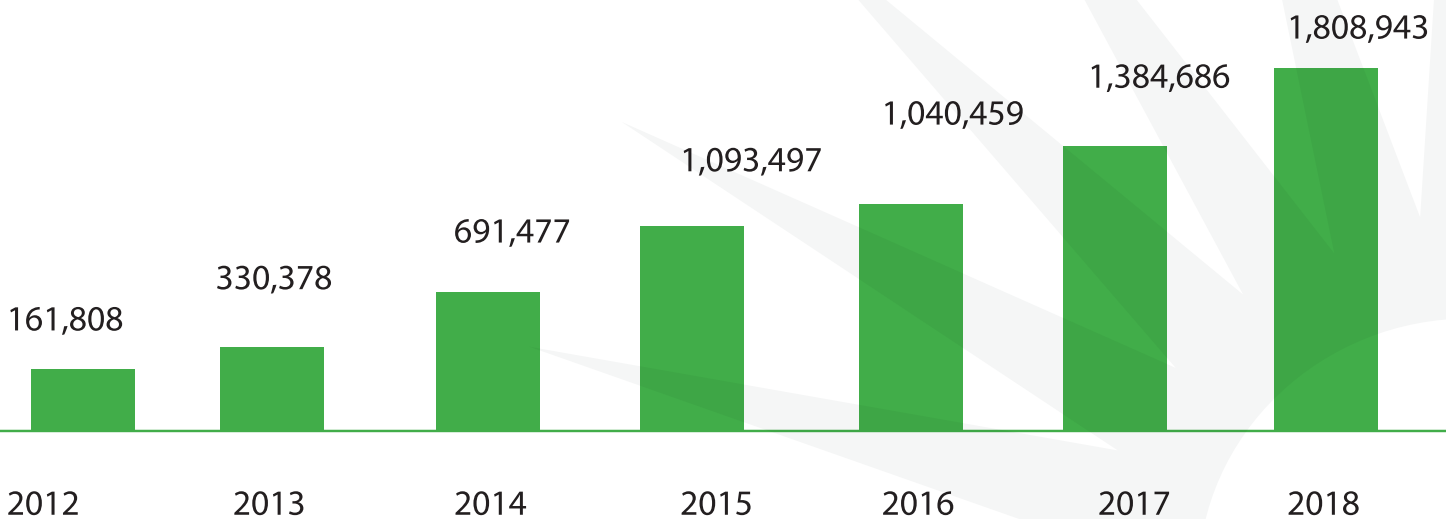
Consumers' economic behavior is changing rapidly. People are increasingly comfortable in using mobile services and non-cash instruments for such services as financial account creation, money transfer, money deposits, and payments.

II.2..4. Mobile Money Agents

Mobile money agents are rapidly growing in the country. In 2018 the number of mobile money agent reached 107,858 from 83,531 of 2017, which is 37.9% increase within one year. These agents are the first contact of financial services for the citizenry, especially in the rural area where access to financial institutions are limited.

3850	40,467	55,829	83,531	107,858
2014	2015	2016	2017	2018
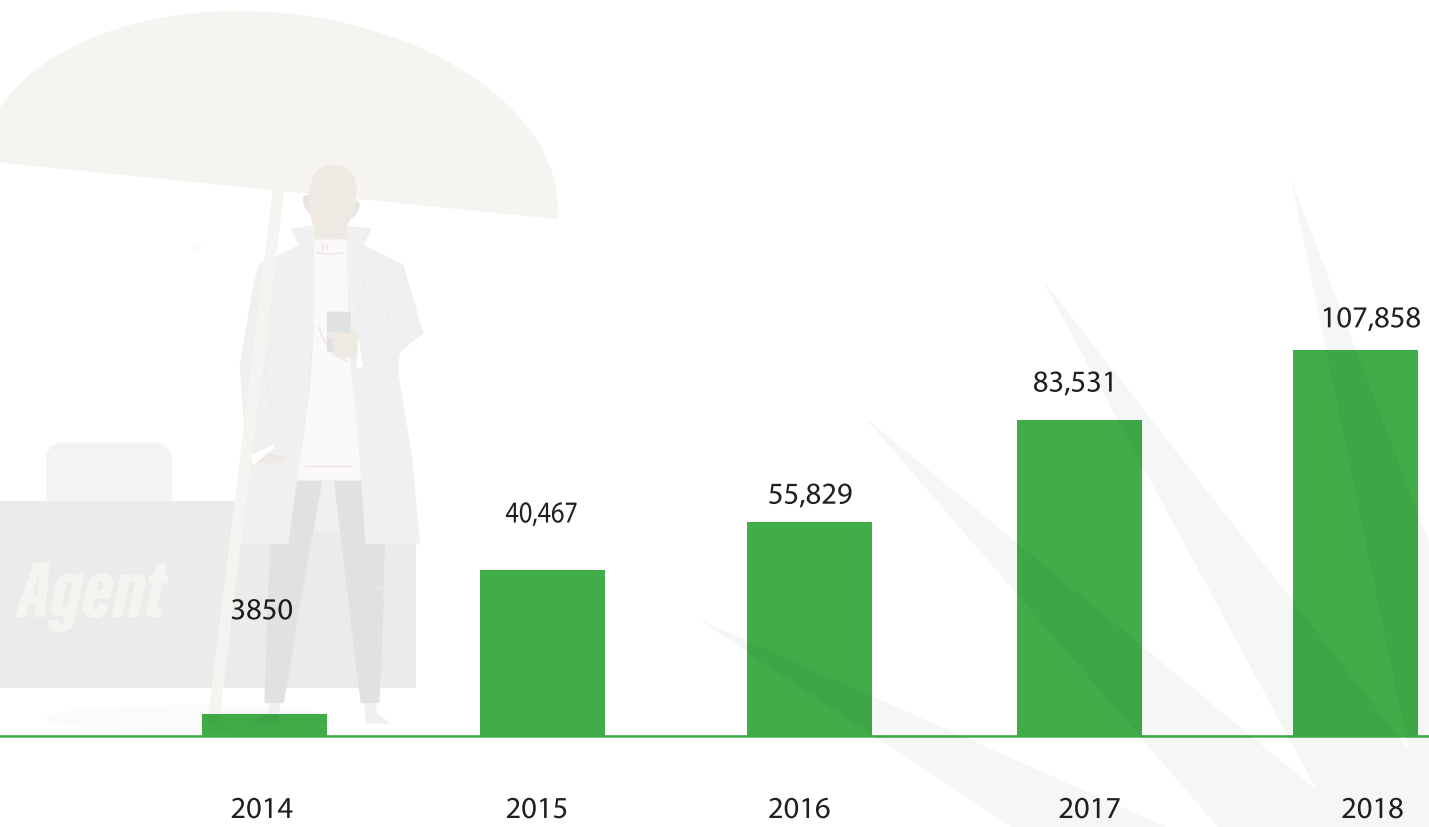
II.2.5. ATM and POS transactions/volume

The number of points of sales (POS) terminals has increased by 33 percent from 2,104 to 2,801 in 2018. This increase was due to the high demands from merchants like hotels and other retail entities. Meanwhile, the number of ATM terminals have decreased by 6 percent from 406 to 383, suggesting a correlation that more people are using mobile based transactions in lieu of relying on traditional cash.
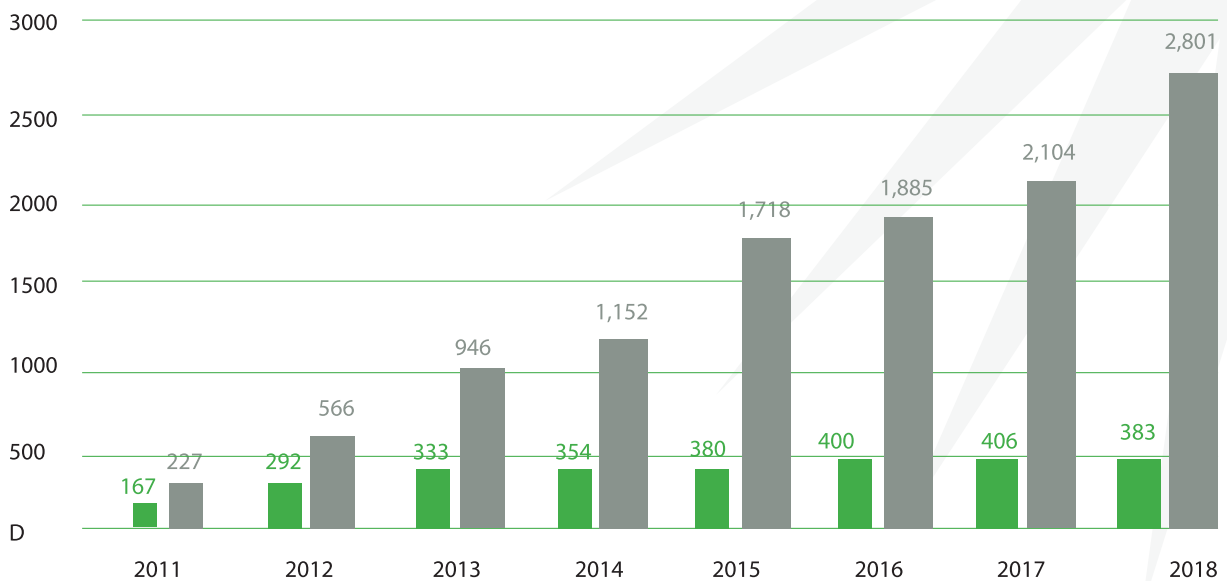
The number of debit cards issued in Rwanda increased by 18% from 746,458 in 2016 to 883,755 in 2018. In the same period, POS transactions increased by whooping 140% from 660,746 to 1,588,639 with corresponding increase of value from FRW 41.5 billion to FRW 85,434 billion, an increase of 106%. This was a result of strong partnership between banks and local telecom operators. Financial sector recorded the big impact on financial inclusion in the last three years by working together to rollout products capitalising on the popularity of electronic transaction platforms, hence leading to the realization of the vision of "Cashless Economy."

In the same period, Rwanda welcomed more international electronic transaction platforms in addition to Visa International. Currently, other international payment cards (American Express, Master Card, China Union Pay, Dinners Club and Japanese Credit Bureau) are accepted in Rwandan market seamlessly.

II.2.6. ICT in Tax and Revenue Payment

Introduction of E-filling and E-payment has continued to increased compliance and reduction of transaction costs for both tax administration and taxpayers.
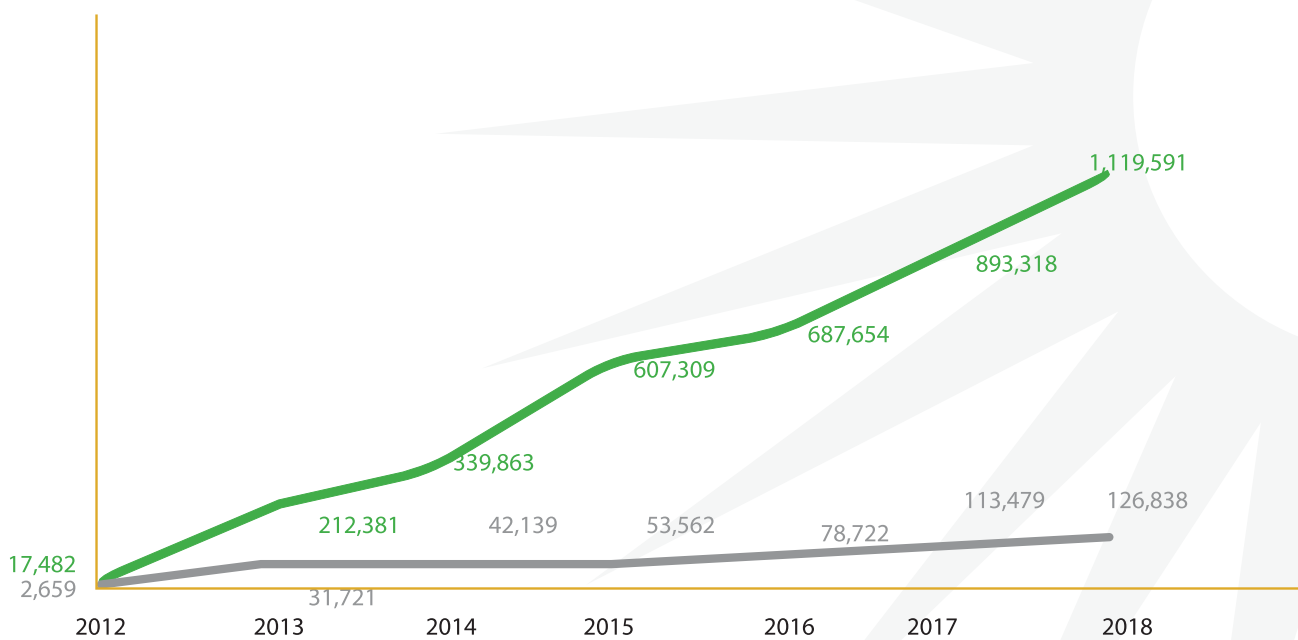
Increasing number of enterprises are now using their mobile devices to declare and pay taxes using different mobile money platforms. The number of taxpayers using online tax filling has increased by 12% in 2018 from 113,479 in 2017 to 126,838.

The growing use of Electronic Billing Machines among the vendors has improved revenues collection and management; these devices contributed to reducing time of transactions, reducing the efforts of massive document auditing, minimizing errors, and frauds.

III. ICT IN GOVERNANCE

Use of ICT tools and services in the Government and to facilitate in the governance processes are growing in Rwanda. Growing use of online Government Service Portal "irembo" is facilitating provision of key Government services in the area of G2G, G2B, and G2C. In the same token, strengthening ICT infrastructures and introduction of ICT enhanced services in the Government institutions have contributed to the efficiency gains within the Government. Both back-end and front-end business process transformations through ICT are changing the ways people interact with the Government and get services from.

III.1. Video Conference and Tele-presence systems

In the past 2 years, meetings between local government and central government are increasingly handled by video-teleconference system; providing considerable saving for both the ministries and local Government institutions. As of 2018, sixty (60) Government institutions are connected and are active users of the videoconference systems.

III.2. Document Tracking System

The Document tracking and workflow management system was deployed in 124 institutions in 2018, up from 116 in 2017. With this automated tool, not only the document processing time has been reduced but reduction of paper usage in Government was observed as well.

III.3. National ID mom

The National Identification Agency "NIDA" was established in 2011 under the law No 43/2011 of 31/10/2011. It has a mission of "building and modernizing the National Population Registry and the production of Modern identity cards and integrates systems for online authentication purpose in order to contribute to the socio-economic and political planning." Under the legal guideline, all Rwandan citizens above 16 are qualified to get the National ID without fee. The application process is currently handled through the Government's on-line portal "irembo" to reduce the transaction cost while expediting their issuance.

CUMULATIVE NUMBER OF INSTITUTIONS CONNECTED TO NIDA DATABASE USING ONLINE AUTHENTICATION

2012	2013	2014	2015	2016	2017	2018
7	11	12	20	27	32	45
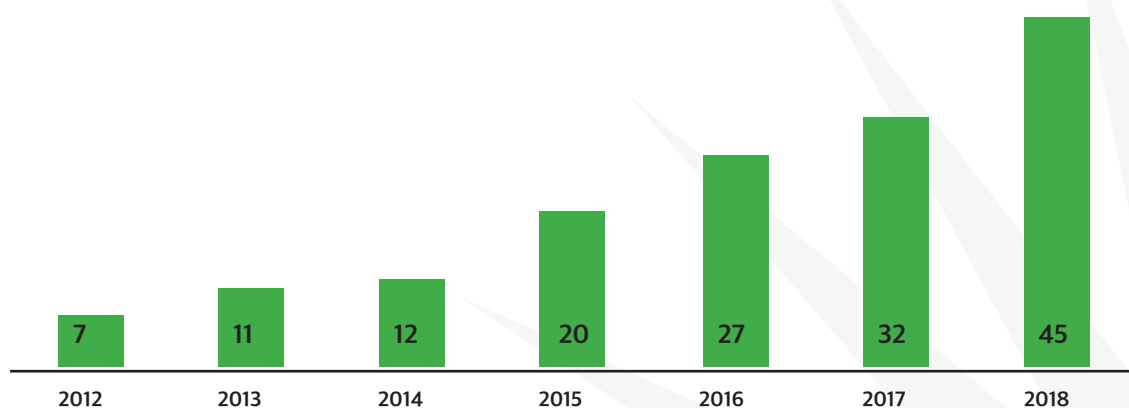
As of 2018, a total of 45 institutions are connected to the National Identification Authority Database using online secure authentication. This has allowed these institutions to provide services to their customers through a single and unique user identifier. Efficiency gain for consolidating the service authentications under the NIDA database is considerable and will be further strengthened through the introduction of multipurpose integrated Smart Identity Cards using Blockchain technology.

III.4. Government Command Center (GCC)

The GCC is a centralized business intelligence and analytics system which provides an overview of past, current, and future (predictive) information on projects across all government institutions. The information provided on projects includes objectives, targets, and performance over given timeframe. The system was deployed in 10 government institutions. This helped to improve performance and ensure proper accountability, thus cementing good corporate governance in public service.

III.6. Digitization

The Government of Rwanda has placed ICT as a central tool for its transformation and to facilitate its service delivery across all sectors. The National Strategy for Transformation (NST-1), which was compiled as a new 7 years development strategy in 2017, calls for proactive use of ICT to realized knowledge based economy and efficient service delivery through platforms like irembo and service delivery improvement campaigns such as Nkuwikorera ('as you'd wish to be served' campaign), NOZA SERIVISI (streamlining of processes of Government to citizens service delivery), Nayombi (better service delivery campaign for Government and private sector), among others.

In an effort to improve service delivery and promote transparency, Government of Rwanda begun an initiative to minimize the burden citizens face to receive Government services in 2015

The initiative today is known as ZERO-TRIP, ZERO-PAPER PROGRAM and the first 4 services commonly requested by citizens were selected to spearhead the initiative. The advantages of such initiative include:

- Eliminates physical visits by citizens to the Government offices which eliminates possible undue influence and corruption
- Reduces the risk of fake documents
- Eliminates the pain of citizens for waiting in long queue at the sector offices or other Governments' institutions
- Eliminates physical interactions reduces costs for both the citizens and the Government institutions.

III.6.1. Implementation of Rwanda Online Platform

Under the goal of achieving 24/7 ubiquitous Government service delivery, which includes an ambitious goal of providing 100% of Government services transacted online by 2024, the Government created a state owned enterprise, Rwanda Online Ltd (ROL) which developed the irembo platform in 2015. As of December 2018, the number of government services 89 were automated and could be accessed on irembo platform. The number of e-services are expected to grow to cover more Government run services. The Government of Rwanda is committed to increase access to digitized information and services throughout the country. One of the emphasis to enable that goal is facilitation and support to operationalize Service Access Points (SAPs), physical infrastructure facilities located at the district and sector levels through which the citizens could have access to multitude of services online.

IV. ICT IN EDUCATION

The ICT in Education policy was approved on April 27, 2016 which emphasized the needs for "equipping learners with the necessary tools to fully embrace digital learning." While challenges still remain, the education sector has advanced tremendously with technology tools in the past 5 years. There are three main targets for ICT use in the education field which are 1) to improve the quality of education, 2) to increase access to/utilization of knowledge, and 3) to allow diversity of learning methods. The policy calls for primary, secondary, TVET and higher education stakeholders to actively utilize ICT in their teaching and learning practices, to promote the use of Open Distance e-Learning, and to utilize Open Education Resources.

IV.1. ICT Devices in Education

The integration of technology in education in Rwanda starts at the primary school level with the implementation of the 'One Laptop per Child' (OLPC) program. In education Sector, One Laptop per Child (OLPC) program in primary schools has played a key role in enhancing education experiences among the students. The program also enabled primary school students to have early access to computer skills and to understand fundamental of computing. This was in addition to the expansion of their knowledge on specific subjects such as Science, Mathematics, languages and Social Sciences through accessing both off-line and online contents.

Currently, Rwanda is aggressively introducing ICT devices in schools where 84% of schools have computers installed and utilized. In order to increase the computer penetration further, Rwanda has invested in locally made computers, Positivo BGH. These devices are providing new learning opportunities for the students and the teachers alike. This reduced computer ration from 23 in 2016 to 8 students in 2018.

Percentage of schools with computer
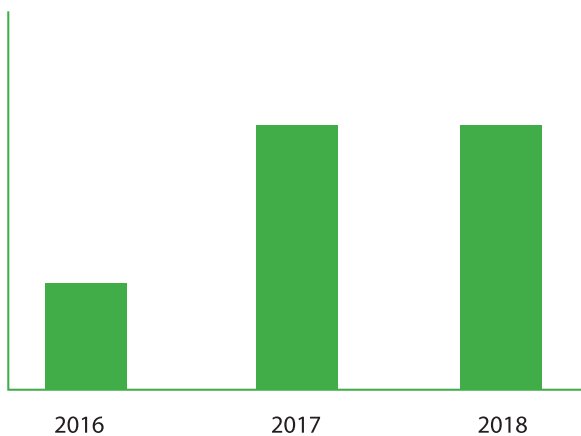
Users per Computers in secondery schools
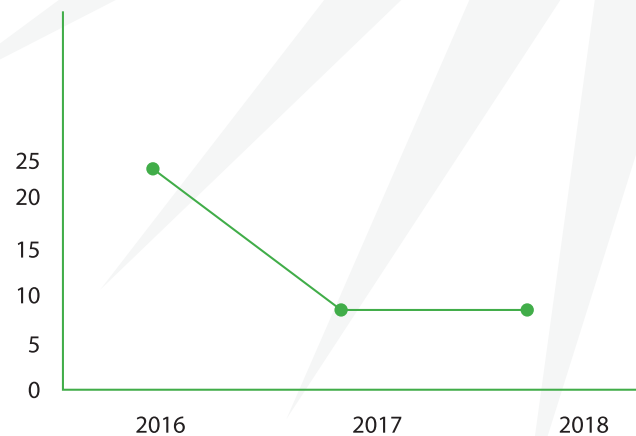
IV.2. ICT ENROLMENT IN TECHNICAL VOCATIONAL EDUCATION TRAININGS (TVET)

With the Government strategy to encourage young people to pursue hands-on technical skills at the TVET schools, the number of students' enrolment in ICT related programs reached 13,464 (6,409 girls and 7,055 boys) in 2018, from the 9,901 students who are enrolled in the same programs in 2017. This increase is significant as it is an increase of 36%, reflecting the fact that the ICT professionals are one of the most sought-after professions in Rwanda.

Furnishing ICT literacy among the education professionals is of utmost importance. Not only for the fact that it allows teachers to facilitate students' learning by using ICT tools but it also allows teachers to build their teaching capacity more effectively.

Increase in teachers' digital literacies have helped the effective use of ICT equipment (e.g.; OLPCs, Laptops, Tablets, etc.) in Teaching. As such, building teachers' capacity in the digital literacy and in effective use of the modern ICT tools need to be priority for the country's education system. Only with continued and proactive teachers training programs will ensure that thee teachers are well prepared to offer competent education and learning environment.

V. ICT in Health

ICT has brought numerous benefits and transformations in the health sector. One such benefit is that the ICT enabled creation of professional networks of healthcare specialists which provide diagnostics and treatments advices. As supplements to the traditional healthcare services, Telemedicine and e-Diagnosis have opened the door for the new level of healthcare services for the patients.

The percentage of health centers connected to Internet reached to 100% in 2018 and 36% of them are connected to 4G internet from 8% in 2017. The Internet connection has allowed the health centers to access health information system, medical records system, and medical reporting system which would aloe them to serve their clients better. These tools have streamlined patients' intake, improved communication among the healthcare practioners and between patients and healthcare practioners, reduced gaps in referrals services, and reduced duplicated information collections among healthcare service providers.

Wide adoption of RapidSMS, a SMS based health services for data collection, streamlining complex workflows, and group coordination, has increased the number of clinical emergencies support and more than 415427 Patients at community level tracked using RapidSMS in past three years.

Through strong partnership with the private sector, the number of registered clinics and dispensaries reporting using Health Management Information System (HMIS) has increased from 1332 in 2017

to 1534 in 2018. This increase enabled better patients management which lead to better service deliveries foe the patients.

VI. ICT in Agriculture

Agriculture is one of the main drivers of economy in Rwanda and is one which has the greatest absorption capacity for employment. Through the implementation of National ICT for Agriculture Strategy (ICT4AG Strategy), the sector is ready to significantly increase access and use of ICT tools and services with different stakeholders.

ESoko the real time electronic system that provides market price information for agriculture commodities has registered 12,320 SMS transactions in December 2018. The Web-based transactions reached at 5439. This system plays the big role in distribution of fertilizers used by cooperatives and agro dealers.

With the increase of phone penetration up to 81%, the agriculture is now facilitated with the adoption of ICTs, through applications development

ICT has been one of the targeted areas for fostering innovative solutions and start-ups in the country. Many development partners which include FAO, JICA, and others have encouraged young Rwandans to come up with different solutions and to create viable businesses based on these innovative solutions. Use of FabLab and other maker spaces for creating in-house IOT solutions for agriculture are also promising area which should be encouraged as well.

VII. ICT and Innovation

Rwanda aspires to become the leading ICT Hub in Africa by establishing conducive innovation ecosystem with competitive startups which supply high quality and high value ICT-products and services for the continent and for the global markets. This aspiration requires strengthening various different components which comprise innovation ecosystem. One of the important components is socio-economic condition which value innovation and learning from failures. This cultural shift requires significant change in the mind-set of the people, especially among the youth. Another important component is human resource development which results in the creation of highly educated and skilled workforce. Significant investment in R&D, establishment of appropriate financing mechanisms, implementation of conducive policy and regulation, identification of niche but targeted market environment, and creation of ICT and innovation fostering infrastructure are among many other components which comprise of strong innovation ecosystem.

VII.1 KIGALI INNOVATION CITY

Kigali Innovation City (KIC) is a project with an aim of becoming innovation hub for the region. This project is an important component for Rwanda's ambition to become an ICT Hub for the continent. The project, valued at $2 billion and located in Kigali's Special Economic Zone, is set to accommodate world-class universities/R&D centres, technology companies, and innovative start-ups on 70 hectares of land.

It also strives to become best home in Africa for multinational technology companies to domicile their offices, bring their technologies and skills, and conduct the innovation necessary to create optimized products and services for the African market.

Africa50, a Pan-African infrastructure investment firm backed by the African Development Bank Group, announced in November that it will invest $400 million (about FRW348.9 billion) in Kigali Innovation City to boost Rwanda's efforts to become a technology hub. The Africa50 will also work on what is known as the Digital Innovation Precinct, which is a facility that will house all the technology companies in KIC. Africa50 will focus on the real estate portion of the project, including building retail and commercial complexes.

VII.2. UNIVERSITIES AND R&D INSTITUTIONS

Nurturing talent is one of the most foundations for creating strong innovation ecosystem. Apart from strengthening local Universities and R&D institutions, Rwanda has been attracting world class universities such as Carnegie-Mellon University-Africa (CMU-A), African Institute of Mathematical Sciences (AIMS), Africa Leadership Universities (ALU), Milken Institute, International Centre for the Theoretical Physics, etc. The number of these institutions are growing rapidly attracting national, continental, and global talents to Rwanda. The human resources fostered by these premier institutions will become the leaders of innovation ecosystem.

Examples of Innovative ICT solutions

Trade and industry	Transport
Rwanda trade portal Company issue tracker National Monitoring Committee for NTBS	Tap & Go Safe Motos Yego Innovision Ltd (Yegomotos and Yegocabs
Governance	**Agriculture**
Rwanda On-Line E-Procurement System Irembo Rwanda Electronic Cargo Tracking System	e-soko precision agrrculture smart nkunganire smart irrigation
Health	**e-commerce**

Babyl: The largest digital health service provider in Rwanda Zipline : drone delivery system for urgent medicines such as blood and vaccine	Rwandair, REGS LTD Kasha jumia Yubeyi.com
JUSTICE	Pikko Stores
IECMS: A computerized Judicial case processing system for the whole judicial chain to provide easier, faster and affordable judicial service to the citizens.	Homeness Rwanda Ihaha Technologies Hehe Limited Entreprise Urwibutso Different Hotels and transport companies

VIII. Development Partnership

Rwanda's ambitious goal to become a high-income economy by 2050 necessitates bold and deliberate actions that will accelerate growth. Preceding the achievement Rwanda's Vision 2050 are mid-term commitments of attaining an upper middle-income economy status by 2035 underscored by the successful alignment and implementation of the 2030 Sustainable Development Goals (SDG) agenda.

In order to realize Rwanda's vision to utilize ICT for socio-economic transformation and becoming the ICT Hub for the continent, several development partners such as; JICA, GIZ, KOICA, World Bank and World Intellectual Property Organisation(WIPO) continuously support different initiatives including; innovation, start-ups, incubation centres, Digital economy and Intellectual Property.

Partnerships between the private sector, the Government and development partners have put deliberate emphasis to invest in scientific and technological capability as necessary foundations towards fostering innovation as an engine for growth.

VIII.1. SMART AFRICA SECRETARIAT

Smart Africa Secretariat was the one of recommendations of Transform Africa summit held in 2013. It was established on January 7th 2016 in Kigali with aim of putting ICT at the center of national socio-economic development agenda, improve access to ICTs especially broadband, improve accountability, efficiency and openness through ICT to put the private sector first, and leverage ICT to promote sustainable development. The Smart Africa manifesto focuses on ICT industry

development, SMART cities, youth innovation and job creation, digital economy, and green economy to digital literacy.

The Transform Africa Summit has been held four times to date, attracting over 15,000 delegates from over 100 countries. The Summit has been held in Rwanda, under the following themes in different years

TRANSFORM AFRICA SUMMIT

2013	2015	2017	2018
The future delivered today	Accelerating Digital Innovation	Smart Cities Fast Forward	Accelerating Africa's Single Digital Market

VIII.2. RWANDA GLOBAL INDEXES

Index	Global 2015		Global 2016		Global 2017		Global 2018	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Global Innovation Index			83th	30	99th	27.4	99th	25.54
ICT development Index (IDI)			151	2.10	153	2.18		
Global Competitiveness Index			58th	4.29	58	4.35	52	4.36
E-Government development index	125th		138th				120th	0.4590
E-Participation Index (EPI)							59th	0.7584

For global innovation index Rwanda raked 99th and kept same position since 2017. In 2018, South Africa takes the top spot among all economies in the region (58th), followed by Mauritius (75th), Kenya (78th), Botswana (91st), the United Republic of Tanzania (92nd), Namibia (93rd), Rwanda (99th), and Senegal (100th). Among these, Kenya, the United Republic of Tanzania, and Namibia improve their GII ranking compared to 2017, while other three economies (South Africa, Mauritius, and Botswana) lose positions.

ANNEXES
Annex 1.: ICT in business

key indicators	2012	2013	2014	2015	2016	2017	2018
Number of subscribers	2,659	31,721	42,139	53,562	78,722	113,479	126,838
Volume of transactions	17,482	212,381	339,863	607,309	687,654	893,318	1,119,591
e-Payment payment							
Number of subscribers	69	250	637	37,949	196,607	398,048	373,646
Volume of transactions	329	2,461	7,954	89,633	590,424	1,638,975	2,056,281
SIGTAS (Domestic taxes)							
Number of registered subscribers	32,533	20,587	33,636		20,195	7,456	162
Volume of transactions	371,156	875,805	460,872	81,005	29,908	9,364	818
Electronic Single Window							
Number of subscribers	126	245	2,048	3,058	3,166	16,328	16,245
Volume of transactions	90,435	138,747	314,240	320,360	269,955	277,198	294,334

key indicators	2012	2013	2014	2015	2016	2017	2018
No Creance							
Number of subscribers	9,364	8,798	9,179	13,146	23,844	14,446	16,160
Volume of transactions	13,461	12,731	2,633	9,727	17,290	29,134	32,218
Mobile declaration							
Number of subscribers	N/Av	N/Av	15,521	39,639	38,661	44,051	41,283
Volume of transactions	N/Av	N/Av	60,457	116,243	154,690	171,799	168,049
Non Fiscal Revenue System							
Number of subscribers	N/Av	N/Av	N/A	888,807	713,630	426,505	300,318
Volume of transactions	N/Av	N/Av	551,559	769,674	625,927	679,218	535,185
Mobile Payments							
Number of subscribers	1,440,541	2,538,651	6,480,449	7,663,199	9,735,694	9,912,735	11,067,077
Volume of transactions	22,191,674	57,147,777	104,800,000	168,612,455	205,687,966	251,361,153	299,941,137
Value of transactions (In Million FRW)	161,808	330,378	691,477	1,093,497	1,040,459	1,384,686	1,808,943

key indicators	2012	2013	2014	2015	2016	2017	2018
Mobile money Agents			32110	48320	59952	83,531	107,858
Payment Systems - Instruments							
Number of Automated Teller Machines (ATMs)	292	333	354	380	400	406	383
Number of Points of Sale (POS) terminals	566	946	1,152	1,718	1,885	2,104	2,801
Number of debit cards (ATM)	389,269	487,498	638,869	657,904	746,458	754806	883,755
Number of credit cards (POS)	418	845	2,540	3,485	3,668	3,679	3,638
ATM transactions							
Volume of ATM transactions	5,753,163	7,774,053	7,488,707	7,505,815	8,183,116	9,408,701	9,585,002
Value of ATM transactions (In million FRW)	180,567	260,585	310,009	354,049	406,235	493,171	529,825
Pos transactions							
Volume of POS transactions	63,757	111,570	185,441	373,029	660,746	1,211,824	1,588,639
Value of POS transactions (In million FRW)	9,034	14,718	19,223	26,625	41,500	68,994	85,424

Annex 2: ICT in Health

key indicators	2013	2014	2015	2016	2017	2018
Infrastructure						
Hospitals (referrals and districts) and pharmacies						
Total number of public hospitals	48	48	48	48	48	48
Total number of private hospitals			5	5	8	8
Number of hospitals (public and private) connected to 4G internet						
% of public hospitals with telemedicine infrastructures	21%	21%	21%	21%	21%	81%
Number of public pharmacies that use ICT in pharmacy services						78
Number of whole sale private pharmacies that use ICT in pharmacy services						54
Internet connectivity						
Health Centers						
Total number of Health Centers	468	477	494	499	503	504
Total number of Health Centers connected to Internet(Fiber, 4G,3G Modems)	451	457	434	467	503	504
Total number of Health Centers connected to 4G and Fiber Internet					40	180
Application and system						
Electronic Medical record (EMR)						
Number of Hospitals using less paper in medical records	3	6	4	4	4	35
% of Hospitals using less paper in medical records	6%	10%	8%		8%	74%
Health Management Information System （HMIS)						
Number of Health facilities reporting into HMIS	797	802 1161	1221	1285	1332	1534

key indicators	2013	2014	2015	2016	2017	2018
HMIS data managers assisted through HMIS e-support messaging	1,473	1067	456	456	456	456
Number of registered private clinics and dispensaries reporting routinely using HMIS	221	204	218	253	253	266
Rapid SMS						
Number of Patients at community level tracked using RapidSMS	158,510	173,131	176,675	180,944	156,965	77,518
Number of clinical emergencies supported through RapidSMS	176	220	542	6,230	9,287	1,257
Telemedicine						
Number of Hospitals using Telemedicine	13	13	15	15	15	39
%Hospitals using Telemedicine	27%	27%			31.25%	81%
Calls for medical assistance						
Number of emergency calls for ambulance (SAMU)	25,010	11,564			48,812	35,580
Number of call received for clarification on health issues	9,878	5,870			2,848	5,186
Digital health service provider						
Babyl				2016	2017	2018
Number of registered users				231,000	502,383	1,328,925
Number of consultations performed				45,218	48,218	164,651
Zipline						
Total number of units of medical supplies delivered					3371	10748
Number of units of emergence medical supplies delivered						3224.4
IT Solutions / innovations						
Number of IT solutions in health sector					10	10 &IRCAD

Annex 3: ICT in Education

key indicators	2014	2015	2016	2017	2018
Primary Education					
Ratio teacher per computer			7	9	15
Ratio pupils per computer			13	11	10
Percentage of schools with computer infrastructure	56.10%	58.80%	65.80%	69.2%	75.5%
% of school with sciences Kits			35%	37.00%	34.40%
Percentage of schools connected to the Internet	8%	10.25%	10%	25.1%	30%
Percentage of schools with a networked computer lab	2%	1.30%	1%		
% of schools using ICT for teaching and learning				44%	
Secondary education					
Ratio teachers per computer			14	6	5
Ratio students per computer			27	9	8
Ratio teaching staff per computer			2	2	2
Percentage of schools connected to the Internet	16,9%	16.10%	35.40%	41.30%	52.9%
% of school using ICT for teaching and learning				60.20%	64.7%
Percentage of schools with computer			77.30	84.7%	84.3%

Percentage of schools with a networked computer lab	31%	43%	8.80%		
% of school with sciences Kits			63.2%	66.2%	63.8%
Tertiary education					
Computer to acad. staff ratio				1	1	1
Computer to student ratio				4	4
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%
Number of students (public and private) enrolled in ICT related courses				9309	7540
Number of students (public and private) graduated in ICT related courses			2544	1515	
ICT skills development					
Total number of TVET students enrolled in ICT-related programs	12631	15979	15324	9901	13,464
Male	7171	9566	8859	5256	7,055
Female	5814	6413	6465	4645	6,409
ICT Literacy					
Number of teachers trained in basic ICT literacy	10,246	16,214	17791	22565	22966
Male	6,001	9567	10513	16215	16283
Female	4,245	6647	7278	6350	6683

Annex 4: ICT in Agriculture

key indicators	2012	2013	2014	2015	2016	2017	2018
Applications / e-Soko							
Number of SMS-based transactions	9,893	11,815	11,320	11,820	11,820	12,320	12,320
Number of Web-based transactions	3,652	4,640	4,939	5,439	5,439	5,939	5,939
AMIS – Agric. Management Info System							
Number of Users/ visits	-	-	11,028	16,214	19,165	25,123	25,223
Number of pages visited	-	-	83,736	118,214	207,151	318,001	318,301
Noza ubuhinzi n' ubworozi platform							
Number of Users/ visits	-	-	-	7,918	16,120	29,711	29,811

Number of pages visited	-	-	-	27,771	34,253	45,026	45,226
Hotline							
Number of Phone calls	-	-	6,292	9,490	13,152	13,352	13,402
Management Information System (MIS)							
Number of IT solutions in agriculture sector					40	209	1,041
Number of indicators					81	191	191
e-Ralis (Rwanda Agri and livestock inspections							
Number of export Certificates					4,096	5,127	5,320
Number of import permits					4,284	5,652	6,395

ANNEX 5. RWANDA AND GLOBAL OVERVIEW

Indicators	2013	2014	2015	2016	2017	2018*
Fixed-telephone subscriptions						
Developed	41.3	40.2	39.2	38.3	37.5	36.7
Developing	10.6	9.9	9.1	8.5	8.1	7.5
World	16	15.1	14.2	13.5	13	12.4
LDCs	1	1	0.9	0.9	0.8	0.8
Africa	1.1	1.1	1.1	1.1	0.9	0.9
Rwanda					0.11	0.11
Active mobile-broadband subscriptions						
Developed	74.1	81.1	91	97.9	104	111.2
Developing	17.5	27.5	35.7	42.9	53.6	61
World	27.4	36.8	45.1	52.2	62	69.3
LDCs	4.7	10.3	14.7	19.6	24.2	28.4
Africa	10.5	13.1	19	21.8	24.8	29.7

Indicators	2013	2014	2015	2016	2017	2018*
Rwanda						28.92
Households with a computer						
Developed	78.5	79.1	79.9	81	81.7	83.2
Developing	29.4	31.3	32.6	33.6	34.8	36.3
World	42.4	43.9	44.9	45.9	46.9	48.3
LDCs	4.3	5	5.7	6.7	7	8.5
Africa	6.6	7.5	8.2	7.6	8.8	9.2
Rwanda			2.5			3.3
Individuals using the Internet						
Developed	73.8	75.6	76.2	79.1	79.5	80.9
Developing	29	32.4	36.2	39.1	42.3	45.3
World	36.9	39.9	43	45.8	48.6	51.2
LDCs	7.5	10.5	13.2	15.6	17.8	19.5

Indicators	2013	2014	2015	2016	2017	2018*
Africa	12.1	14.5	18	19.8	22.1	24.4
Rwanda					N/av	20

Mobile-cellular telephone subscriptions

	2013	2014	2015	2016	2017	2018*
Developed	118	122	125	127	127	128
Developing	87.8	91.4	91.7	95.5	99	102.8
World	93.1	96.7	97.4	101	104	107
LDCs	55.8	63.1	66.4	66.5	68.6	72.4
Africa	64.7	69.7	75.3	73.2	74.4	76
Rwanda	63.5	70	77.8	79.2	76.5	81.2

Fixed broadband subscriptions

	2013	2014	2015	2016	2017	2018*
Developed	27.4	28.3	29.6	30.6	31.6	32.7
Developing	5.9	6.3	7.7	8.6	9.7	10.4
World	9.7	10.1	11.4	12.3	13.3	14.1
LDCs	0.3	0.5	0.7	1.1	1.2	1.4
Africa	0.3	0.4	0.4	0.5	0.6	0.6

Indicators	2013	2014	2015	2016	2017	2018*
Rwanda					N/av	0.18
Households with Internet access at home						
Developed	77.5	79	80.6	82.2	83.6	85.3
Developing	29.1	33	37.7	40.7	44.3	48.3
World	42	45.1	48.9	51.5	54.4	57.8
LDCs	5.6	7.7	10.3	12.7	15.2	17.8
Africa	8.7	11.2	14.1	16.7	18.8	22
Rwanda		9.3				17