Republic of Rwanda
Ministry of ICT and Innovation

2019

RWANDA ICT SECTOR PROFILE

ICT FOR SUSTAINABLE DEVELOPMENT

MINICT

1/9/2019

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I. INTRODUCTION

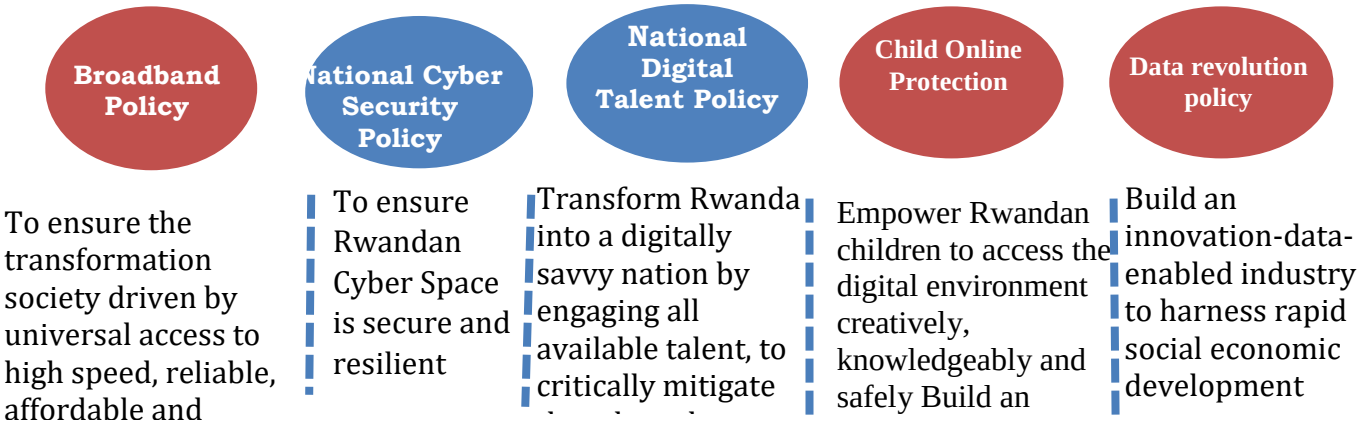
Over the past year, Rwanda continued to witness steady uptake of ICT in the society. By the end of 2019, almost 7,5 million people subscribed to the Internet, up from 6,1 million at end 2018. The mobile-cellular subscriptions in 2019 reached 9658548, which led to Internet penetration to grow form 52.1% in December 2018 to 60.4 % in December 2019. The figure indicates that more than three times increase in the penetration rate in last 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 2019, the penetration rate of 4G recorded at 96.6% of population coverage. The access to Internet and the increase in mobile cellular phone services yielded to the increase of Mobile money subscribers from 9,912,735 users in 2017 to 1,1067,077 in 2018. Rwanda has capitalized online service delivery with digitization of all government services where so fare 98 services accessed online through "irembo" platform (Government's e-service portal) and 165 services acceded through different platforms including USSD and websites.

ICT policies and strategies

ICT policies and strategies in Rwanda have become more mainstream in the last decade to support economic growth through job creation, increasing productivity, enhancing the delivery of public and private services, and achieving broad socio-economic objectives in the sector of education, health, justice, governance, finance, trade and industry.



II. ICT FOR DEVELOPMENT

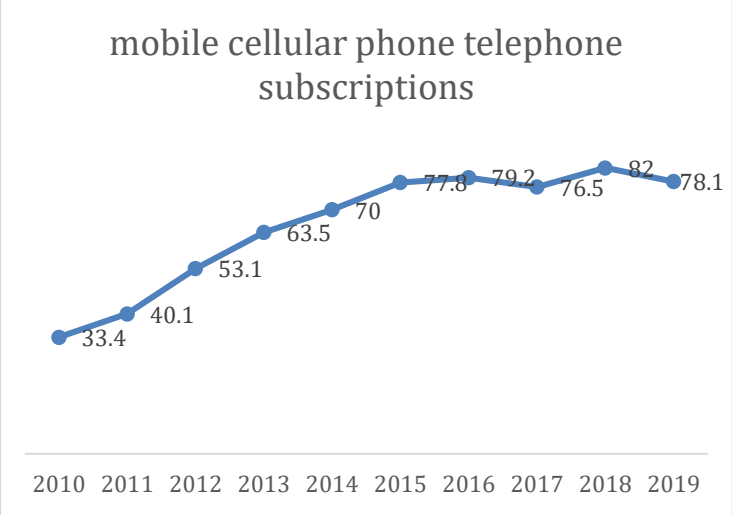
ICT is an enabler for development which cuts across all sectors. As such, tracking of implementation of ICT programme requires factoring in activities and contributions from various sectors. This report is a compilation of indicators that have been selected to measure Rwanda's ICT sector performance 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

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.

II.1.1. Mobile Phone Penetration

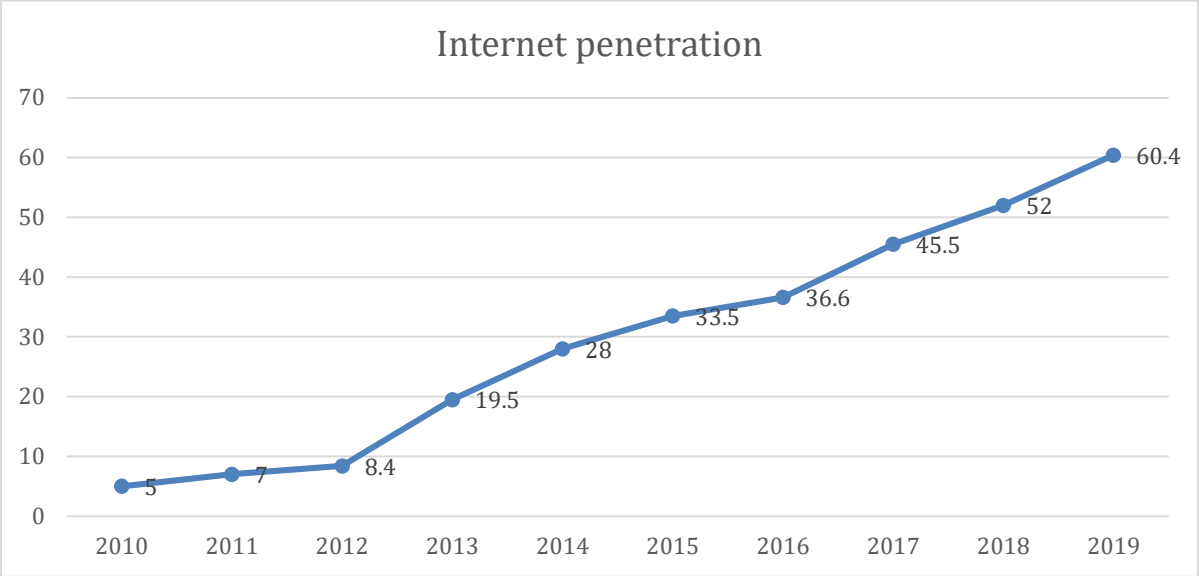
Mobile-cellular subscriptions approaches 9.6 million by December 2019. This presents a big increment in ten years with average increase of 61% per year. The subscription was 3.5 million in 2010. Mobile network population coverage reaches close to 99.9 per cent with 2G and 85.6 per cent with 3G.



The improved affordability has directly contributed to increasing mobile phone and Internet penetration in the country.

II.1.2. Internet Penetration

The ten years have seen substantial growth in access to ICTs and their use, particularly mobile phones and the Internet. From 2010 to 2019, internet penetrate rate has tremendously increased from 5% to 60.4%.



II.1.3. Broadband access: 4G LTE deployment

As of end 2019, Rwanda enjoys 4G LTE services of 97.6 of geographic coverage and 98.9 % of population coverage, while 3G and 3.5G services remained at the rate of 92.3% of geographic coverage and 97.4 % 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

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, and increase of ICT companies with e-commerce platforms.

With ICT infrastructure in place, E-Commerce has expanded rapidly over the last 5 years and booming in the domestic market. Currently, Rwanda has registered 30 online companies

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

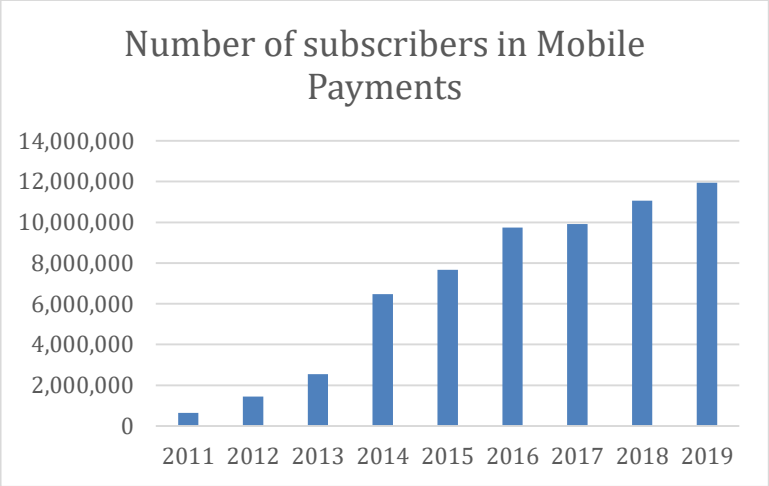
Rwanda is actively promoting e-Payment for every level of financial transactions. This is in line with its ICT outreach efforts. Specific outreach activities include promotion of ICT enabled Government and banking services, providing specific ICT tools to facilitate e-payment (e.g.; Rwanda Integrated Payment System, Shared Agency Banking System, etc.),

Electronic financial services are getting more common among citizenry and playing a crucial role in transforming the business processes in Rwanda. Mobile financial service is helping citizens not only electronic payment but also Saving or d borrowing at low interest rate without going through more rigorous financial lending processes.

II.2.2. Mobile Payment

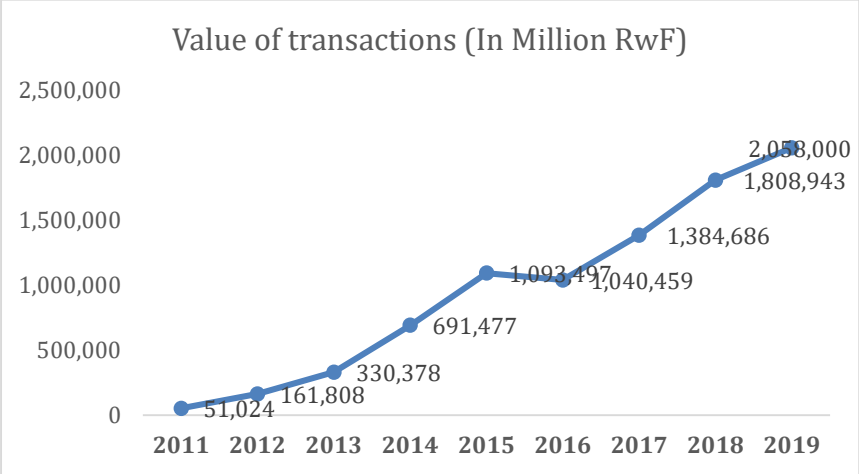
Mobile Payments - subscription

The number of mobile payment subscriptions has increased over the years with high growth in 2014 with 4.6 million of scrimptions from 2.5 million in 2013. In December 2019 subscriptions reached at 11.9 million. An increase of 7.3% 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)

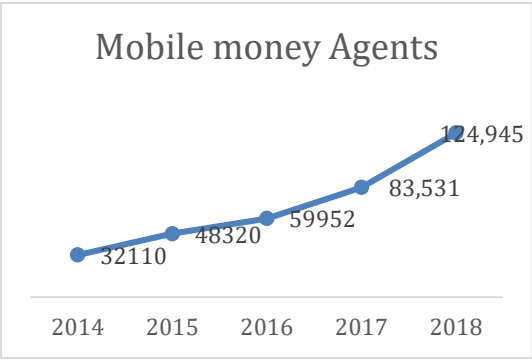


In December 2018, the total number of values transacted through mobile payment reached FRW 1,808 billion. The increase of 31% was observed from FRW 1,384 billion transacted in the previous year (2017). The figure also corresponds to approximately ¼ of GDP in Rwanda.

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.

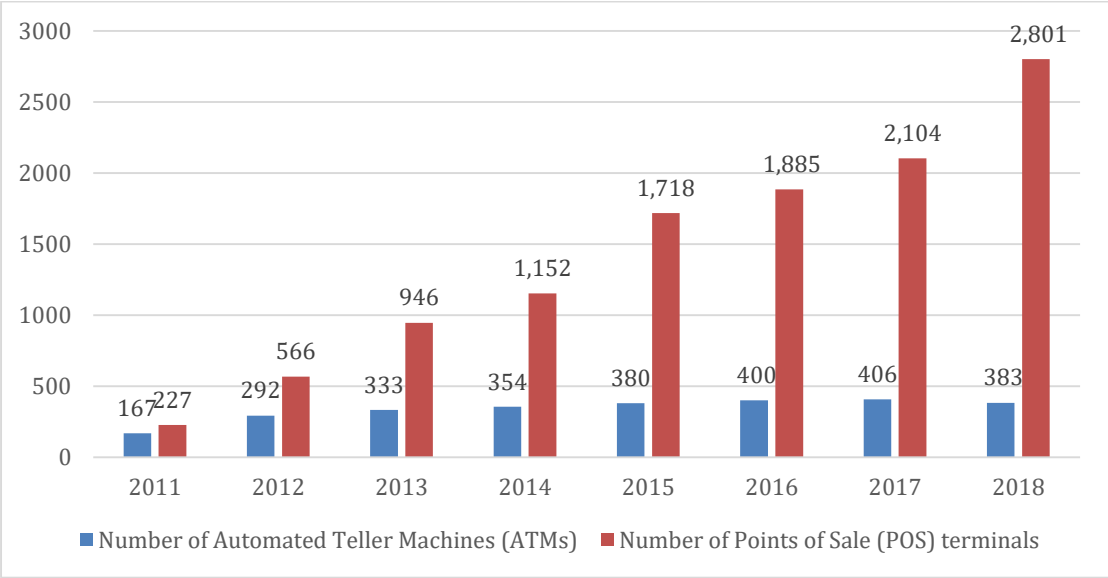


Mobile money is playing a big role in all transactions made online across the country and the number of agents are increasing every year with an increase of 50% from 2017 to 2018.

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.

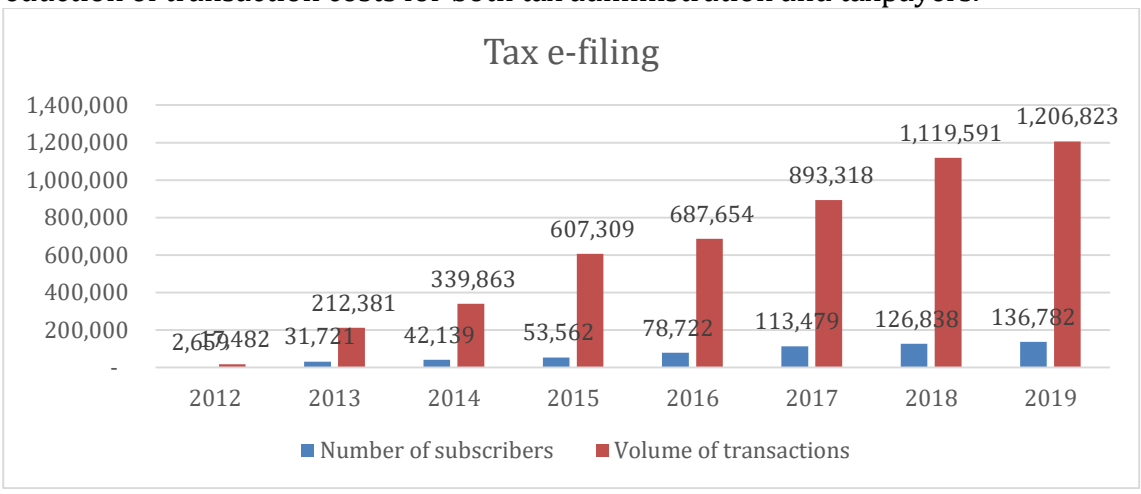


The number of debit cards issued in Rwanda increased by 18% from 746,458 in 2016 to 883,755 in 2018. In the same period, POS transactions increased by whooping 140% from 660,746 to 1,588,639 with corresponding increase of value from FRW 41.5 billion to FRW 85,434 billion, an increase of 106%. This was 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 8% in 2019 from 126,838 in 2018 to 136,782.

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.

II.3. ICT in Governance

Modernization of the administration involves the use of new technologies to facilitate citizens' access to basic services and reduce administrative expenses for the administration. Strengthening ICT infrastructures in the Government institutions have contributed to the efficiency gains between Government and private sector. Both back-end and front-end business process transformations through ICT are changing the ways people interact with the Government to get online services.

Key systems to facilitate service delivery

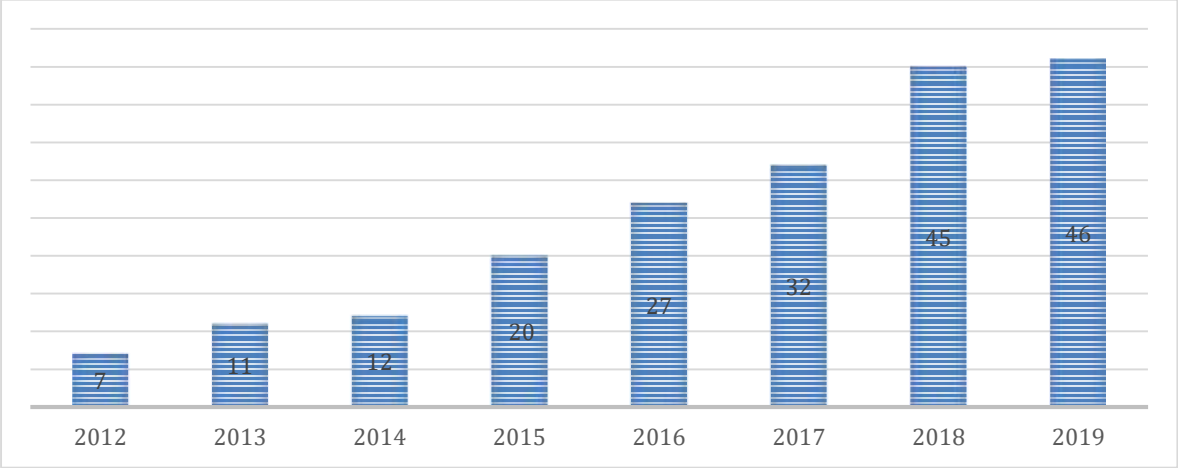
IREMBO portal	A centralized portal which serves as a one stop shop for all services offered by the Government to businesses and citizens. Currently IREMBO automates 98 services.
Umucyo System (E-Procurement):	An end-end public procurement system that curbs corruption by reducing physical contacts between bidders and government officials. It increases transparency by providing fast and accurate information and efficiency through access to online line products and suppliers. So far 194 entrepreneurs have registered into the system.
E-Recruitment System (IPPIS)	An online recruitment tool that used by both Government and public institutions to recruit employees, evaluate identities and help employees to petition in case of any dissatisfaction
Smart Administration system	An centralized system which implements a paperless office by automating all internal approval processes including incoming and outgoing mails. The system also has a centralized email, chat and Project Management platform. It is currently deployed in 20 institutions
IMBONI (Document Tracking System and Workflow Management System)	A centralized system which is used by GoR's institutions to keep records of paper based incoming mails, and helps the sender tracks the progress as different actors are working on the received document.
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
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.
Population registry	Holds population demographic data for both under and above 16 years. Holds biometric data for above 16 years. Provides a unique ID for citizens above 16 years and application number for under 16. Holds civil registration and vital statistics. 11,433,497 Citizens are registered in NPR, 6,826,386 citizens have ID with biometrics, 47 Institutions are connected for authentication
household Profiling system (Ubudehe Registry)	The system handles social economic status and classifications of 2.885.343 Households. Powered by UBUDEHE, the PM&E system allows collect public opinion on village priorities and mainstreamed into National planning & budgeting. PM&E also has a citizen complain system on USSD platform. The system helps the distribution of different types of support to vulnerable people including micro loans from financial institutions
Property Registry	contain uniquely identification of land parcels with details of ownership, location, shape-files. Also identifies land use cases like forestry, arable land, water bodies, mining and housing.
Business Registry	Repository of all registered business, Intellectual Property and mortgages for both immovable assets like house, land & movable assets like cars, stock, shares etc
IPPIS	System holds information about public service. It has 4 different modules (RBM, Payroll, Organization structure & E-recruitment). Currently the 4 modules re in use by all public institutions
HRMS	It contains 2 registries: Electronic Medical Records and Electronic Health Management System. The EMRs keeps patient medical records and supports billing and the EHMIS allows hospitals to be managed and reporting (daily cases, death, epidemiology etc). Open EMR is in use by 25 hospitals, 8 hospitals use open clinic while 15 hospitals are not under coverage.

II.3.1. National ID

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



As of 2019, a total of 46 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.3.2. Digitization

The Government of Rwanda has placed ICT as a central tool for its transformation and to facilitate its service delivery across all sectors.
In an effort to improve service delivery and promote transparency, Government of Rwanda begun an initiative ZERO-TRIP, ZERO-PAPER PROGRAM to minimize the burden citizens face to receive Government services in 2015 for the following main objectives:

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

III.3.3. Rwanda Online.

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 2019, 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)** facilities located at the district and sector levels through which the citizens could access services online.
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,

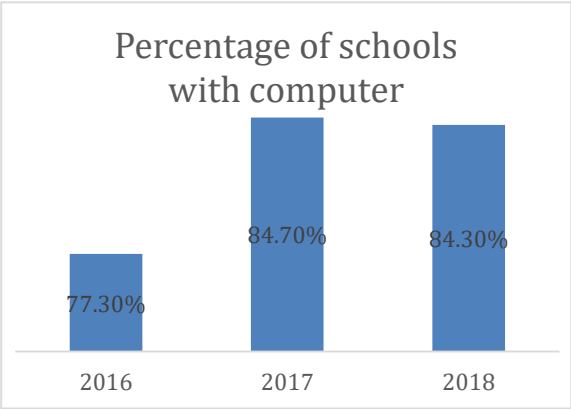
II.4. ICT in Education

The education sector has advanced tremendously with technology tools in the past 5 years with purpose of improving the quality of education, increasing access to/utilization of knowledge, and allow diversity of learning methods. The ICT 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.

II.4.1. ICT infrastructure in education

Computers in schools
Student computer ratio in primary schools reduced from 13 in 2016 to 10 in 2018. In secondary schools this ratio extraordinary reduced from 27 in 2016 to 8 in 2018. In tertiary schools the ratio is 4

Internet in schools
In primary schools, internet reached at the rate of 30% in 2018 from 10% in 2016. In secondary schools, 52.9% of al schools are connected, in 2018 from 35.4% in 2016. All universities are connected 100%



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.

School Data Management System (SDMS)

This system was developed in 2016 to keep records of education like students, teachers, schools with their equipments. This improved the reporting system in education sector

II.4.2. 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.

II.4.3. ICT and skills

The percentage of citizens equipped with digital literacy reached 20% as of December 2019. Several initiatives have been put in place to increase this percentage towards National Strategy for transformation (NST1) targets of 60 % of all adults to be equipped with digital literacy and 100% for all youth by 2024.

Digital Ambassadors Program) is an initiative led by the Rwandan Ministry of ICT and Innovation (MINICT) aimed at increasing the number of digitally literate citizens and their use of e-Government and e-Business services.

Under the implementation of Digital Talent Policy, the Government of Rwandan has put emphasis on hands-on and market-oriented ICT skills, specifically introducing software programming to learners at elementary levels in order to address current shortages of software developers on market. Hence the creation of Rwanda Coding Academy(RCA) which opened its doors on 4th February 2019 starting with 60 students in total - 30 girls and 30 boys, who were among the top achievers in STEM subjects.

For high technology talents, 14 center of excellences were crated to uplift skills of Rwandans. Those centers include Carnegie Mellon University (CMU), African Institute of Mathematical Sciences (AIMS), CoE in Theoretical Physics, CoE in Internet Of Things, CoE in Data Science, CoE in Biomedical Engineering. Etc..

II.5. 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.

RapidSMS

Within the period of 6 years (2013-2019) more than **24,473** patients received facilities through RapidSMS.

Open clinic & open medical records system

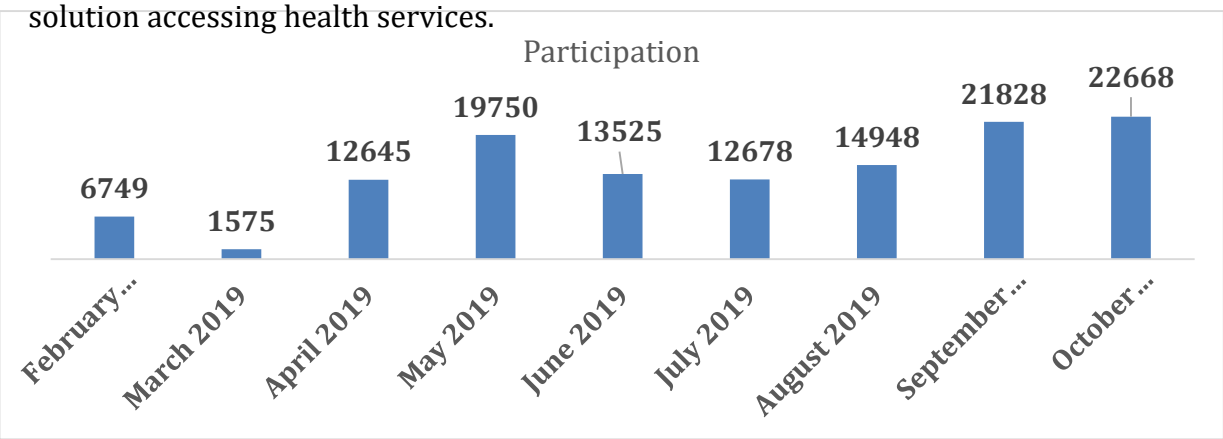
48 hospitals using this system

Health management information system

It helps timely reporting between health centers and Ministry of health and also between

II.5.1. Digital health service in Rwanda

In line with reducing the time wasting while citizens are waiting for doctors and also removing trips done between home and hospital, the Government of Rwanda in collaboration with Babyl; the largest digital health service provider in Rwanda started e-health platform where citizens can access services using their mobile phones. Since the introduction of this health solution, the participation increase over the time, where only in 9 months starting from February up to October 126,366 citizens have used this solution accessing health services.



II.5.2. Drone industry

The government of Rwadna , in collaboration with Zipline , has introduced Drone delivery system for urgent medicines such as blood and vaccine

Serving our customers Since the start of operations in 2016, Zipline made 26000 drone deliveries including more than 49000 blood units and 4000 medical products to our customers. Blood deliveries account for 85%, while medical products deliveries make up 15% of that number.

II.6.. ICT in Agriculture

Agriculture is one of the main drivers of economy in Rwanda and is the one has the greatest absorption capacity for employment. ICT was introduced to foster innovative solutions and start-ups in agriculture sector.

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.

Smart nkunganire: This system plays the big role in distribution of seeds and fertilizers. It is used by cooperatives and agro dealers and link them with micro financial institutions. 1,300,000 farmers and agro dealers 1,000 have been registered to the system as of December 2019

II.7. 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.

II.7.1 Kigali Innovation City

The Government of Rwanda in partnership with Africa50, a Pan-African infrastructure investment firm backed by the African Development Bank Group, has initiated Kigali Innovation City (KIC), a project aiming to be an 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.

II.7.2. 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 per sector

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 • Pikko Stores • Homeness Rwanda • Ihaha Technologies • Hehe Limited • Entreprise Urwibutso • Different Hotels and transport companies
Justice	
IECMS: A computerized Judicial case processing system for the whole judicial chain to provide easier, faster and affordable judicial service to the citizens.	

III.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[1]	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.

[1] The global innovation index

IV. 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
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
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

key indicators	2012	2013	2014	2015	2016	2017	2018
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
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						

key indicators	2013	2014	2015	2016	2017	2018
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
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
Africa	12.1	14.5	18	19.8	22.1	24.4
Rwanda					N/av	20
Mobile-cellular telephone subscriptions						
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						
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
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