TAX DIGITALIZATION

Tax Digitalization in Rwanda: Success Factors and Pathways Forward

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BETTER THAN CASH ALLIANCE

TAX DIGITALIZATION IN RWANDA

Rwanda's impressive economic and social record in recent decades has become one of the success stories of modern African development. The country's improved record has been both accompanied and supported by an ambitious tax digitalization agenda and effective implementation of reforms.

Central to this progress is Vision 2020, the Rwandan government's reform roadmap which aimed, among other goals, "to reduce [aid] dependency [by developing] effective strategies to expand the tax base." The Rwanda Revenue Authority (RRA), the national entity responsible for all tax collection, has invested heavily in digital tax services to drive this vision. RRA has prioritized the simplification of tax forms and processes, providing greater convenience for taxpayers while using third-party systems to gather data for a robust and efficient process.

Combined with tax reforms, these investments have delivered strong initial results, including a meaningful increase in Rwanda's tax-to-GDP and a dramatic increase in the country's position in the World Bank's *Ease of Doing Business* index, particularly in the area of '*paying taxes.*' Key achievements, along with lessons from Rwanda's tax digitalization journey, are outlined below.

As in all countries, there is more work to be done to expand digitalization to fully realize its benefits for RRA, the Rwandan government and the people of Rwanda. This paper suggests pathways forward to help realize these benefits, with specific and practical recommendations summarized.

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Project Leads
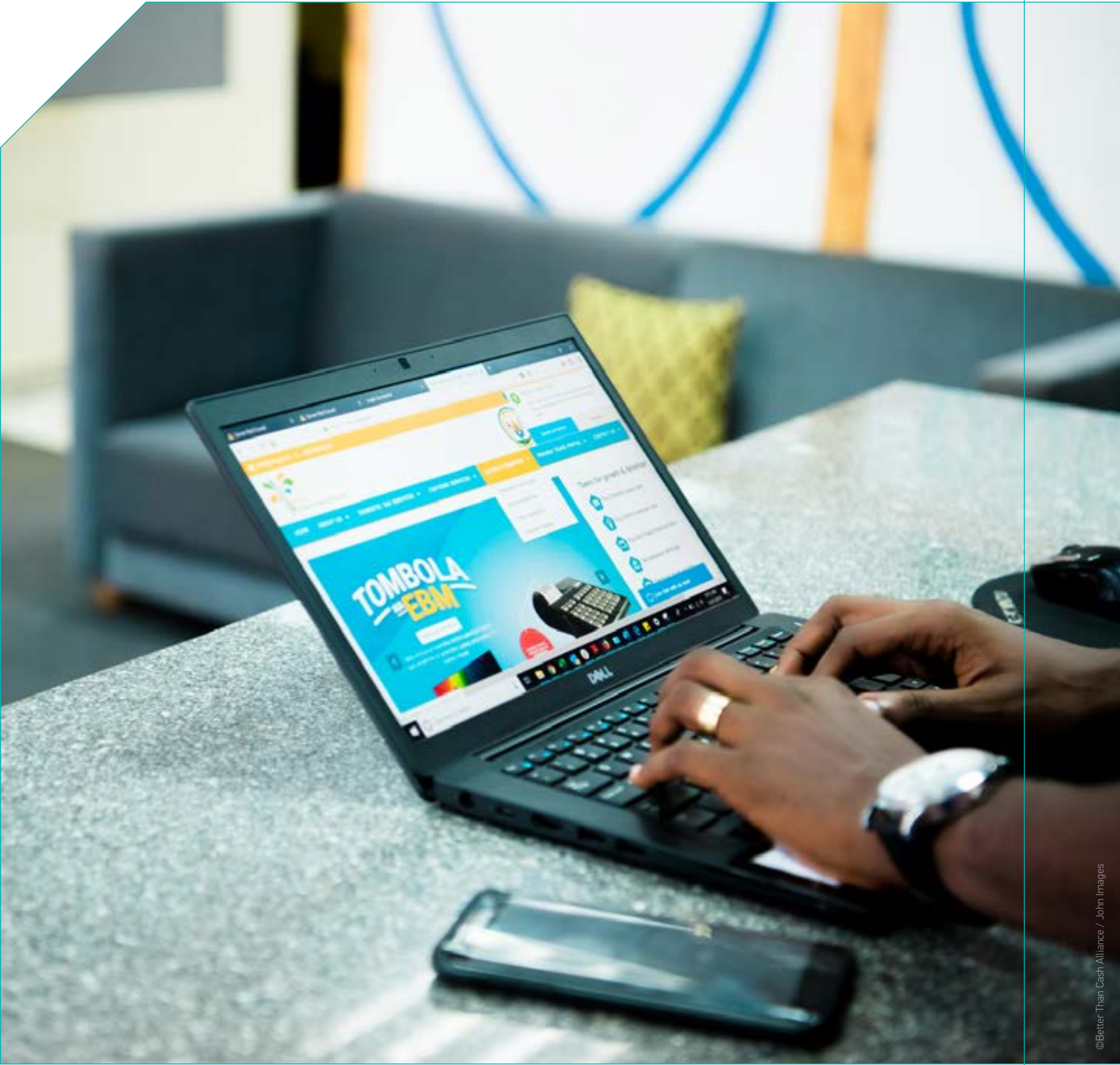Rodrigo Meija Ricart, Camilo Tellez (Better Than Cash Alliance) and Fabiola Salman, Charlie Habershon (Dalberg)

CONTENTS

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Central to this progress is Vision 2020, the Rwandan government's reform roadmap which aimed, among other goals, "to reduce [aid] dependency [by developing] effective strategies to expand the tax base."[1] The Rwanda Revenue Authority (RRA), the national entity responsible for all tax collection, has invested heavily in digital tax services to drive this vision. RRA has prioritized the simplification of tax forms and processes, providing greater convenience for taxpayers while using third-party systems to gather data for a robust and efficient process.

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Key achievements
IN RWANDA'S TAX DIGITALIZATION JOURNEY

Since 2004, Rwanda has improved its tax-to-GDP ratio by 4.5 percentage points to 16.6% in 2016. This ratio is slightly above the current average of 16.1% across all African members of the Better Than Cash Alliance.[2] Although this increase represents an impressive achievement, the current level is still below the 18.2% average for Africa overall.

Rwanda rose to 38th in the World Bank's *Ease of Doing Business* report in 2020, up from 67th in 2010, marking the second-highest ranking for a Sub-Saharan African country. **Rwanda has also risen 22 positions to 38th in the *Paying Taxes* category since 2010,** when the country's tax digitalization process was still nascent.

In 2018, Rwanda collected RWF 1.2 trillion (USD 1.3 billion) in total taxes in 2016 with **an average annual growth rate (nominal) in collections of ~14% since 2010**.

In 2016, small and micro-enterprises (SMEs) paid personal income taxes (PIT) and pay as you earn taxes (PAYE) equivalent to 1.81% of GDP. This total nearly matched the contributions of larger companies, accounting for half of the overall increase in PIT revenues during this period.[3]

The number of registered taxpayers nearly doubled between 2011 – when e-filing and e-payments were introduced – and 2018, rising from 144,000 to 242,000.

Electronic Billing Machines (EBMs) have reduced fraudulent value-added tax (VAT) claims by 25–35% since their introduction in 2013. **EBMs have also decreased the time it takes businesses to file VAT returns from 45 to 5 hours**.[4]

The RRA has improved its administrative efficiency by cutting the cost of tax collection from 3.5% of total revenue in 2010 to 2.7% in 2018. The lower collection costs can be attributed to increased administrative efficiency, especially on the use of technology in filing returns and other major tax operations. RRA reports that e-filing rates exceeded 99% for most tax types, with some like PAYE recording 100%.

Key lessons
FROM RWANDA'S TAX DIGITALIZATION JOURNEY

Strong government support – RRA has had strong support from the Ministry of Finance and Economic Planning and the Office of the President and has successfully translated this support into increased compliance by mandating use of new systems and processes. Although effective in Rwanda, this centralized approach may not be replicable in all environments, despite government support and alignment typically being a prerequisite for tax authorities to fully achieve their digitalization objectives.

Collaboration with the private sector – RRA and the Rwandan government have collaborated with the private sector to create commercially viable delivery models for tax digitalization. In 2014, the government, through the Rwanda Development Board, entered into a 25-year revenue-sharing contract with Rwanda Online Platform Ltd (ROPL) to design and operate Irembo – a portal to access all government services.

An agile approach to software implementation – RRA has prioritized software adaptability – often through a process of constructive trial and error – to keep pace with the ever-evolving tax environment.

Recommendations
TO DRIVE FURTHER PROGRESS

Managing organizational changes: recruit, train, and retain top talent. RRA has developed incentives to improve recruitment, training, and retention of both digital and non-digital staff needed to deliver successful reforms. However, additional innovative staffing models should be explored, such as offering staff secondary opportunities with other government departments or working with the private sector to bring in new talent, including on a temporary basis.

Communicate with taxpayers: increase communication about the importance of tax compliance and accountability. These communications could include awareness campaigns through digital and print media or face-to-face activities across communities to address barriers of literacy, geography, and access.

Data-driven organization: make more and better use of data insights to increase collection and compliance. For example, systematically identify false reporting on EBMs through comparison with a database of 'true' (VAT-compliant) transactions.

Be user-centric: increase investment in tax services for small and micro-businesses. Accommodate varying levels of information technology (IT) literacy and infrastructure with a strong focus on gender inclusion.

THE BIGGER PICTURE: TAX DIGITIZATION'S
USD 300 BILLION
DIVIDEND FOR EMERGING ECONOMIES

This paper is the result of a broader study commissioned by the Better Than Cash Alliance to analyze the wider potential of digital payments across emerging economies – a study that delivered the landmark finding that digitizing tax payments and related processes can raise an additional USD 300 billion in government revenues annually in emerging and developing countries. This value is equivalent to almost one-third of the USD 1 trillion funding gap, which has put Sustainable Development Goals at severe risk.

The study included detailed case studies and comparative analysis of steps taken by other tax digitalization leaders, specifically in Mexico and Indonesia, along with Rwanda. Both the broader study and this paper were motivated by a spirit of knowledge-sharing and continuous improvement for the benefit of people, prosperity, and planet. It is the authors' hope that they can serve as both a catalyst and a guide for other countries as they pursue their tax digitalization journeys.

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COUNTRY CONTEXT

Rwanda has experienced substantial economic growth in the past two decades. The fastest-growing sectors in this timeframe were information and communications technology (ICT), tourism and hospitality, and arts and entertainment. Agriculture, retail, and construction made the largest absolute contributions to GDP growth over the same period.[5] A key driver of this impressive growth has been an improving business environment, as evidenced by Rwanda's 38th position in the World Bank's *Ease of Doing Business* rankings for 2020, the second-highest ranking for a Sub-Saharan African country after Mauritius.[6] The *Ease of Doing Business* report also ranked Rwanda 38th in its *Paying Taxes* category, a rise of 22 positions since 2010, when the country's tax digitalization process was still nascent.

Sustained economic growth has lifted more than an estimated 1 million people out of poverty since 2001.[7] Agriculture, retail, and construction account for more than 60% of employment. Subsistence agriculture remains widespread, engaging 45% of Rwandan adults, including many workers who also hold employment in other sectors.[8]

An estimated 92% of enterprises operate in the informal sector, which accounts for 90% of total employment.[9] This very high level of informality poses a major challenge in collecting taxes and effectively implementing fiscal policy.

**SMEs account for the vast majority of economic activity.** Micro-enterprises (1–4 workers) represent 92% of all businesses, small enterprises (4–30 workers) represent 7%, medium enterprises (31–100 workers) represent 1%, and large companies (100+ workers) represent only 0.2%.

Access to technology continues to grow, driving greater digital payments. According to the Rwanda Utilities Regulatory Agency (RURA), as of 2018, more than 5 million citizens (46.4% of the population) used the internet – a rise of 25% from the previous year. This increase was mainly attributable to rising mobile phone use, with penetration reaching 78.1% in 2018.[10]

According to the World Bank's 2017 *Global Findex Database,* 39% of people over the age of 15 had made or received digital payments in the previous year, up from 27% in 2014. The report also noted that 31% of Rwandans had mobile money accounts in 2017, up from 18% in 2014.[11] Point-of-sale (PoS) machines also increased, with the number of traditional PoS devices up by 7% between 2017 and 2018, and the value of PoS machine transactions growing from RWF 57 billion (USD 60.67 million) to RWF 80 billion (USD 85.15 million) over the same period.[12]

METRIC	OVERALL
Population	12.2 million (2017)[13]
Adult population	6.7 million
Country income category	Low-income
Average annual growth rate of the economy (Real GDP) 2008–2018	7.5%
% employment in formal economy	10.2%[14]
% of adults with a financial account	68%[15]
% of adults with a mobile money account	77.1%[16]
Telecom subscriptions	9,226,721[17]
Internet users	5.5 million[18]
Adult literacy rates	72.1% (2017)[19]

FIGURE 1
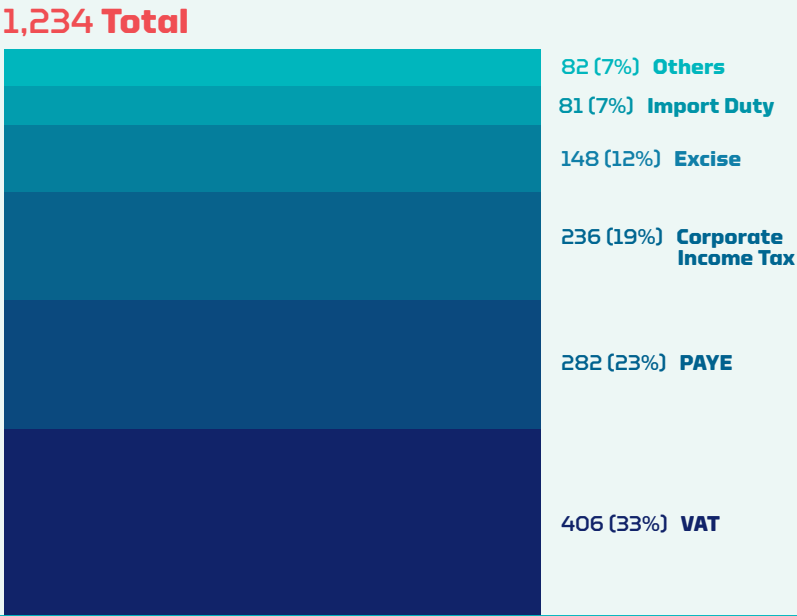## Breakdown of Rwanda's Mobile Money Accounts
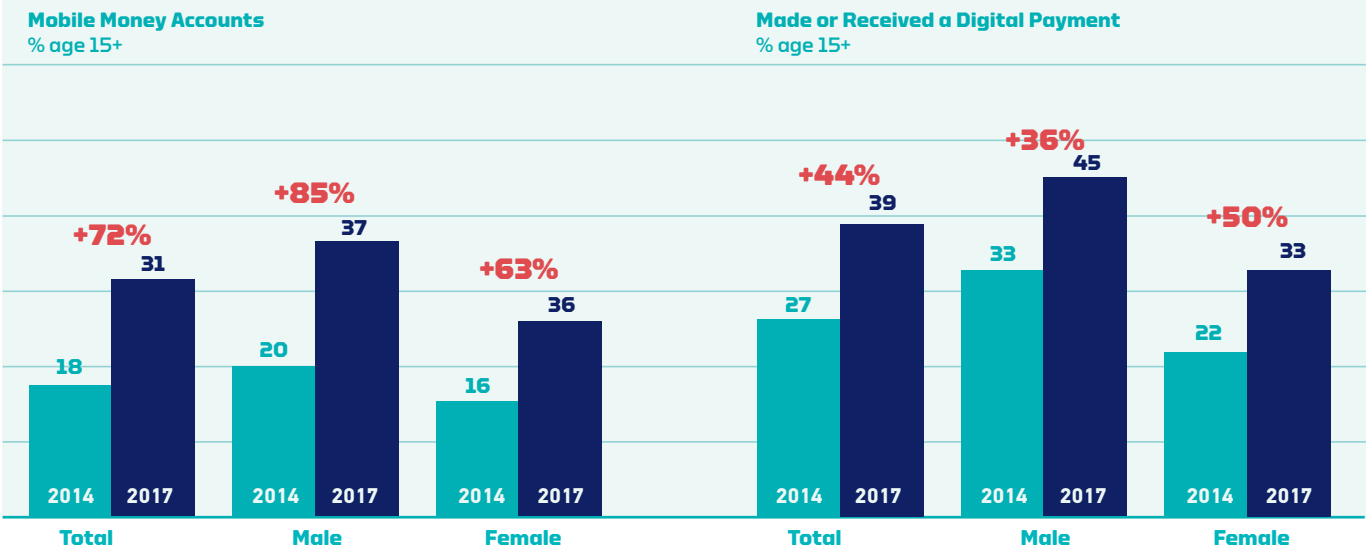
Rwanda has significantly narrowed the financial and digital gender equality gap. However, more work is needed to narrow the gender gap in the adoption of digital products and services. According to the Rwandan Gender Monitoring Office, the gender gap for financial inclusion is relatively small – 87% of women are financially included compared to 91% of men. However, men's adoption of financial products and services is consistently ahead of women's, especially with regards to formal financial services – 63% of women are formally served compared to 74% of men. The gender gap in mobile phone access is also relatively small – 84% of women have access to mobile phones compared to 88% of men. However, the adoption of mobile money services is just 33% among women compared to 44% among men.[20]

TAX LANDSCAPE

The Rwanda Revenue Authority (RRA) is the national entity responsible for all tax collection in the country. Since 1997, it has operated as an independent body in close collaboration with the Ministry of Finance and Economic Planning. Unlike in many other countries, all tax is collected centrally, with no responsibilities held at regional or local levels. RRA collaborates closely with other government organizations, such as the Rwanda Development Board (RDB), to optimize tax collection. The RRA's ambition is "to become a world-class, efficient, and modern revenue agency, fully financing national needs."[21] Additionally, Irembo, a public–private partnership (PPP), collects non-fiscal local taxes and some fiscal taxes (including land taxes), then transfers the funds to RRA.

The VAT is the main source of Rwanda's tax revenue – RWF 406 million (USD 0.43 million), or 33% of total revenue collected, followed by PAYE taxes – RWF 282 million (USD 0.3 million), or 23% of total revenue collected, and corporate income taxes (CIT) – RWF 236 million (USD 0.25 million), or 19% of total revenue collected.[22]
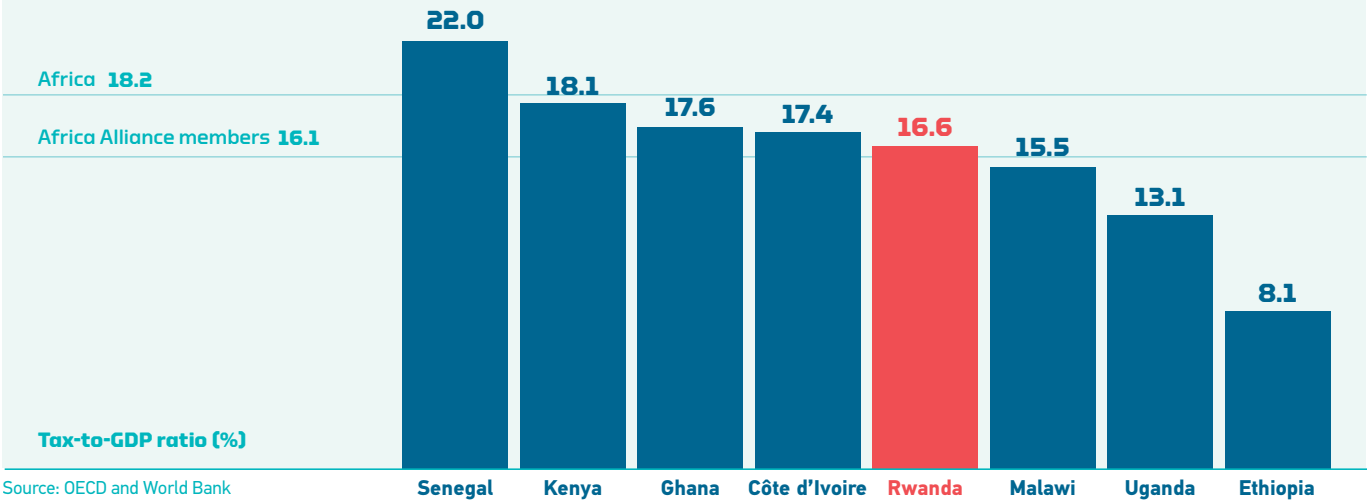
Since 2004, Rwanda has improved its tax-to-GDP ratio by 4.5% to 16.6%. This ratio is slightly higher than other African member countries of the Better Than Cash Alliance, of which the average is 16.1%. However, it is still below the average of 18.2% for Africa overall, suggesting there is work to be done to broaden the tax base and improve the efficiency of tax collection.

FIGURE 2

Breakdown of Rwanda's tax revenue by tax type in 2017/2018
RWF billion, (%)

1,234 Total

82 (7%) **Others**
81 (7%) **Import Duty**
148 (12%) **Excise**
236 (19%) **Corporate Income Tax**
282 (23%) **PAYE**
406 (33%) **VAT**

Source: RRA, Annual Activity Report, 2017/2018

FIGURE 3

Tax-to-GDP ratio (%) for African member countries of the Better Than Cash Alliance
(No data available for Benin, Sierra Leone, or Liberia)

Africa **18.2**

Africa Alliance members **16.1**

Tax-to-GDP ratio (%)

Senegal	Kenya	Ghana	Côte d'Ivoire	Rwanda	Malawi	Uganda	Ethiopia
22.0	18.1	17.6	17.4	16.6	15.5	13.1	8.1

Source: OECD and World Bank (Ethiopia and Malawi), 2016

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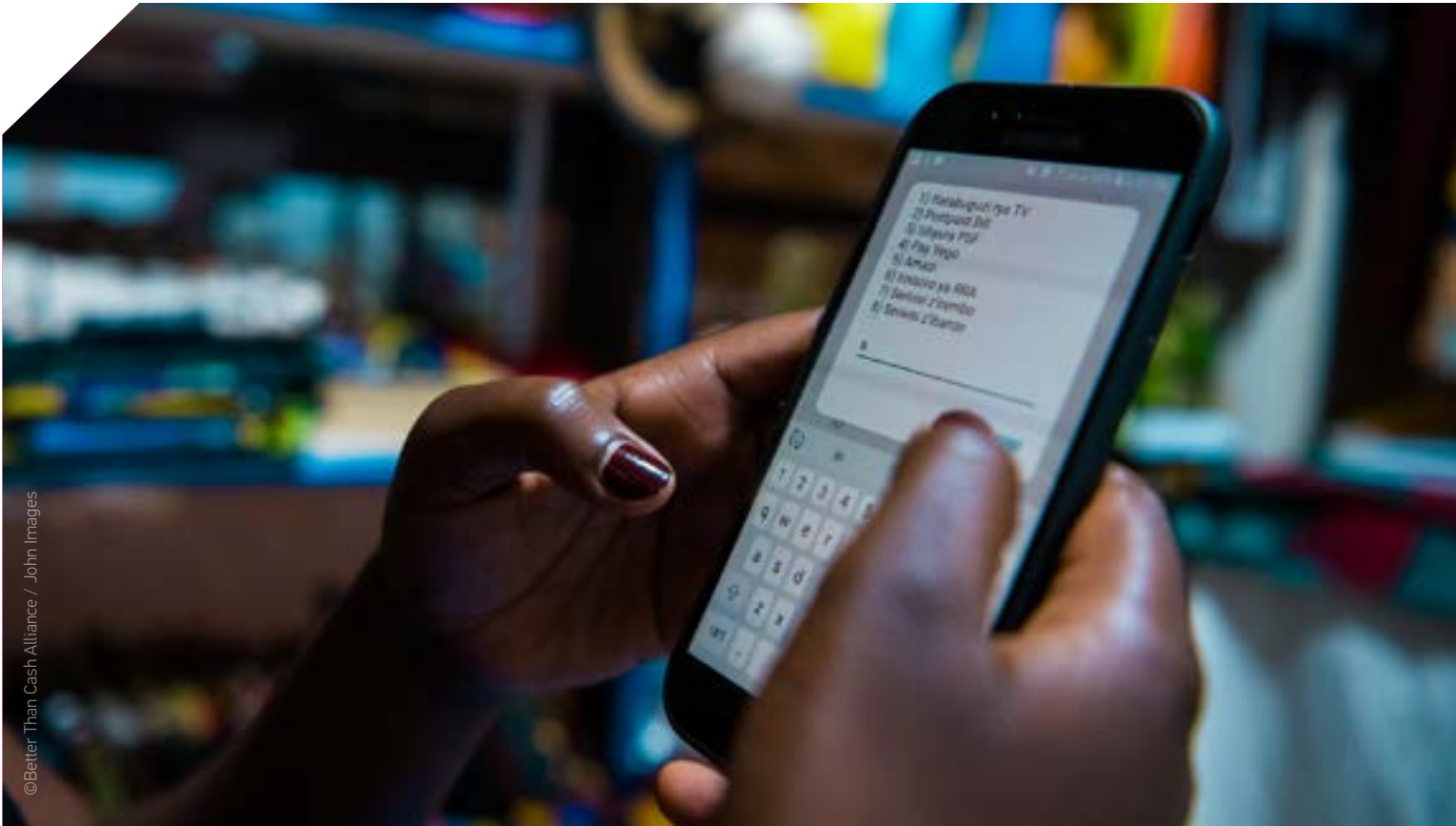
TAX CHALLENGES

There are a number of factors causing Rwanda's tax-to-GDP to be lower than the average across African countries, including:

- A highly informal economy, with just 10.2% of the adult population formally employed.[23]
- A relatively narrow tax base that included only 172,988 registered taxpayers as of end June 2018.[24]
- A low tax compliance culture – the RRA reports many cases of taxpayers falsely lowering their taxable base to evade taxes and some VAT-registered taxpayers are still reluctant to use electronic billing machines.
- Overstretched public prosecutors with a heavy backlog of criminal cases – this results in tax fraud cases being neglected and contributes to a perception among taxpayers that non-compliance will not be prosecuted or penalized.
- Public prosecutors with limited expertise in tax matters, leading to significant errors in the prosecution of some complex tax fraud cases.

Additionally, the RRA faces a number of internal challenges, including:

- Limited capacity to successfully perform complex tasks because of difficulty in attracting and retaining highly skilled and experienced staff.
- Constrained monitoring and evaluation, and persistent delays in recovering tax arrears as a result of insufficient data.

Multinational digital companies entering the Rwandan economy have added to the complexity of RRA's administrative tasks. The government works closely with the OECD's Base Erosion and Profit Sharing (BEPS) unit to address the challenges posed by the emergence of companies like Airbnb. Together, they are reviewing domestic tax laws to ensure effective provisions are in place for taxing digital multinational businesses. As a new member and recent host of OECD's *Global Forum on Transparency and Exchange of Information for Tax Purposes in Africa*, Rwanda is currently undergoing an intensive induction program. The program is supporting Rwanda's intended implementation of Automatic Exchange of Information (AEOI), which involves the systematic and periodic transmission of 'bulk' taxpayer information by the source country to the residence country concerning various categories of income (e.g. dividends, interest, etc.). It can provide timely information on non-compliance where tax has been evaded either on an investment return or the underlying capital sum, even where tax administrations have had no previous indications of non-compliance.

RWANDA'S DIGITAL TAX JOURNEY

Rwanda's tax digitalization efforts include several recent innovations such as the Irembo platform – a 'one-stop-shop' for Rwandan citizens using government services. In 2000, the government launched *Vision 2020* – a plan to make digitalization a core enabler of its tax ambitions. Since that time, RRA has continued to improve its systems, methods, organization, and staff capabilities in an effort to increase capacity and better serve taxpayers.

In its Action Plan 2018/19, the RRA prioritized five areas, all of which directly or indirectly involve digitalization. These five areas are: (i) improving tax compliance; (ii) upgrading VAT administration; (iii) widening the tax base; (iv) improving the provision of taxpayer services; and (v) strengthening internal capacity and coordination. Alongside other reforms, such as the discontinuance of the 3% flat CIT rate, the RRA identified several digital interventions to achieve its objectives, including automating data matching, updating electronic billing machine (EBM) software, and developing the digital capabilities of internal staff.

The RRA is planning further improvements to its digital tax system.[25] For example, RRA aims to pre-populate tax returns for PAYE and VAT to improve user experience and lower the administrative burden on taxpayers. RRA also plans to enable mobile access to taxpayers' accounts (through an online platform entitled *My RRA*), build an online 'Frequently Asked Questions' (FAQ) portal and use data science processes to analyze supply chains, which will enable RRA to detect unregistered taxpayers and automate personalized SMS reminders.

1 **Reform: Reduce percentage of cases subjected to audits.**

Description: The "automated audit case" selection process was implemented in 2017 by RRA to efficiently select audit cases in a more transparent way. This process assesses taxpayer data against a combination of the four core taxpayer obligations:
1. Registration risk rules.
2. Filing risk rules.
3. Accurate reporting risk rules.
4. Payment risk rules.

Impact: This has greatly enhanced transparency and efficiency in the tax audit case selection and administration processes, ensuring that only truly risky cases are subjected to audits.

2 **Reform: Reduce the time taken to pay VAT from 45 hours per year to 5 hours.**

Description: The time to comply with VAT payment obligations used to take 45 hours for taxpayers, increasing the cost of doing business. Introduction of an EBM costs between US$ 300 and 500, and VAT-registered taxpayers had to bear the cost of those gadgets. However, the Government of Rwanda has now made it possible for businesses to acquire the EBM software at no cost.

Impact: The RRA introduced online services, which have helped the Government of Rwanda to leverage on the existing e-Tax filing and EBM2 modality to reduce the time taken to pay VAT.

3 **Reform: Implement single unified declaration of taxes – combining PAYE, pension, maternity leave scheme and medical contributions.**

Description: RRA is implementing a single unified declaration form that combines PAYE, pension, maternity leave and medical insurance scheme contributions, which can be completed online via RRA's e-Tax portal.

Impact: The single unified declaration was launched officially on 20 July 2018, and is very important to taxpayers/contributors because it reduces the workload of filling out four separate annexes. The time taken to process the declaration for PAYE, pension, medical and maternity leave contributions has been reduced significantly.

TABLE 1
Timeline of major steps in RRA's digitalization journey

YEAR	TAX DIGITALIZATION STEPS
2004	Introduced licensed, off-the-shelf software to support data management for taxpayers and facilitate tax return processing, enforcement, and auditing[26]
	Introduced the UNCTAD Automated System for Customs Data (ASYCUDA++), a customs operations and data system widely used among developing countries, allowing for automation of functions and greater control over core processes while improving data collection, management, and reporting[27]
2011	Introduced e-filing and e-payment intended to eliminate the exchange of cash between taxpayers and tax officers, thereby accelerating the transition to a cashless economy
2012	Issued the Electronic Single Window – a system that allows firms to provide import and export information online. This system expedites the information flow between trading firms and the government by eliminating redundancies in the submission of information at different entry points[28]
2013	Created a mobile application for tax filing and payment using feature phones to overcome limited connectivity and digital literacy among taxpayers[29]
2013	Mandated the use of EBMs by formal businesses with revenues above a minimum threshold (RWF 20 million, USD 21,288 annually) to increase tax compliance and collect information for VAT collection[30]
2014	Entered a 25-year public–private partnership with Rwanda Online Platform Limited (ROPL) to build the Irembo platform with the aim of fast-tracking the delivery of public services through digitizing person-to-government (P2G) payments
2015	Launched Irembo digital payment services[31]
2017	Developed an upgrade for EBM software (EBM 2.0), enabling it to be installed in commercial computers for free and eliminating the high costs of buying these machines for businesses
2019	Launched a live chat feature to support taxpayers, accessible through the RRA website[32]

FIGURE 4
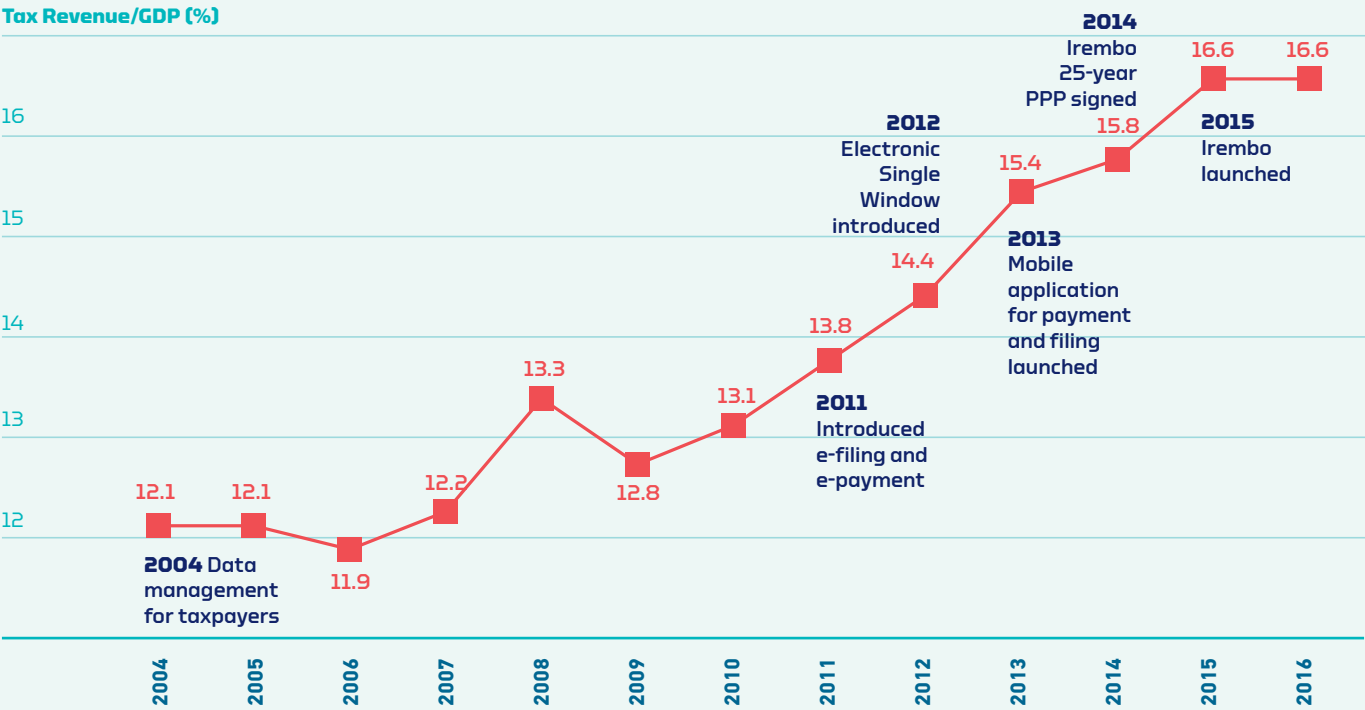## Timeline of major steps in RRA's digitalization journey

TABLE 2
State of Rwanda's digital tax system[33]
GREEN = COMPLETE   ORANGE = IN PROGRESS   RED = NO ACTIVITY

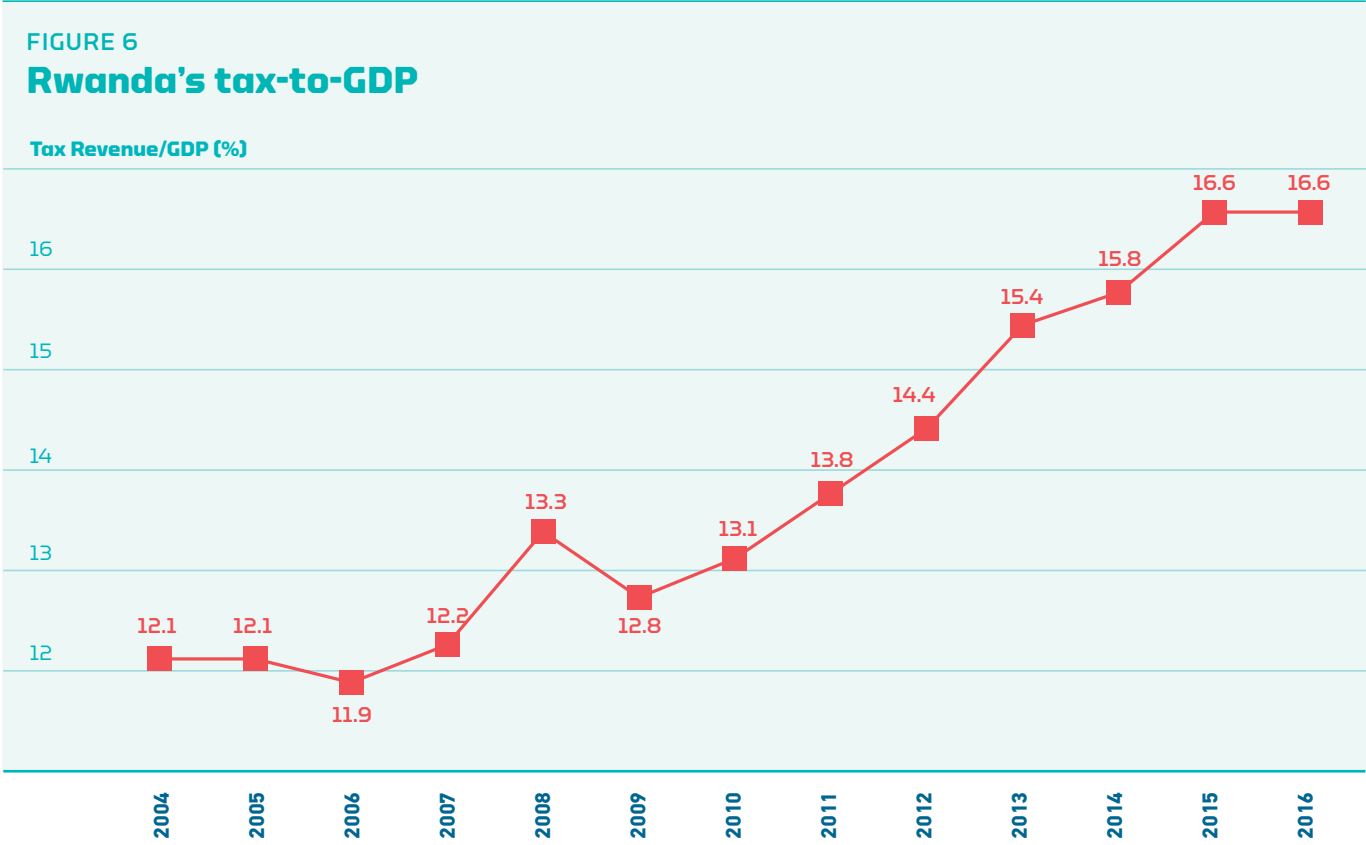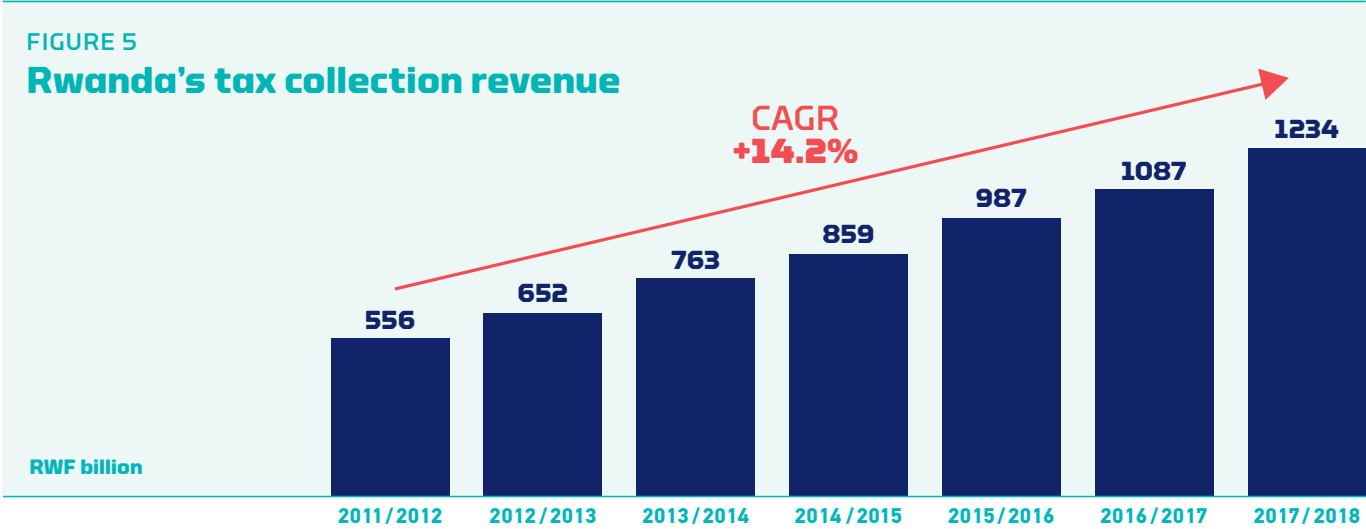| PARAMETERS[34]	MATURITY	OBSERVATIONS
Digitalized stages in the tax cycle		
Registration	ORANGE	In-person requirement remains
E-invoicing	GREEN	Yes
E-accounting	RED	No
Electronic filing of tax returns	GREEN	Yes
Digital payment of taxes	GREEN	Yes
Electronic interaction with tax authorities on specific issues regarding audit, complaints, and issues surrounding tax returns	GREEN	Yes
Electronic communication with tax authorities regarding general queries	GREEN	Yes, through online chat services and hotlines
Functionality of software and tools implemented by tax authorities		
Standardization of data gathering	GREEN	Yes, beginning with EBM data
Exchange of information between tax authorities (local, regional, federal) or other government agencies	GREEN	Yes. There are also Double Taxation Agreements with East African countries
Exchange of information at the international level	ORANGE	The government of Rwanda is currently in the process of signing international agreements. RRA was to be certified in 2019
Reconciliation of historical data	GREEN	Yes
Data analytics		
Pre-population of tax return forms	RED	No
Automatic generation of calculation and penalties	GREEN	Yes
Generation of outliers and compliance risk management	GREEN	Tax returns are cross-checked, especially on VAT inputs and outputs that have gone through the sales invoicing system's EBM
Audit trails with external data	RED	No
Audit trails with internal data	GREEN	Yes

DIGITAL TAX IMPACT

Tax digitalization has been implemented in conjunction with a range of other reforms. Collectively, these reforms have increased revenue and reduced the administrative burden on taxpayers. Although it is difficult to measure their exact impact, tax digitalization and other reforms have been key enablers of Rwanda's improved economic performance.

Government

In 2018, Rwanda collected RWF 1.2 trillion (USD 1.3 billion), achieving nominal average growth in collections of approximately 14% over the preceding seven years. This growth raised the contribution of taxes to the national budget from 45.5% in 2014 to 58.3% in 2018, thereby reducing the country's dependence on foreign aid.[35]

In the 12 years from 2004, when the tax digitalization journey started, to 2016, Rwanda improved its tax-to-GDP ratio by 4.5 percentage points to 16.6%.

Digitalization has supported improved tax collection performance in a variety of ways:

- Between 2011 – when e-filing and e-payments were introduced – and 2018, the number of registered taxpayers almost doubled, rising from 144,000 to 242,000. Newly registered taxpayers contributed an additional RWF 9.6 billion, USD 10.21 million (0.7% of total revenue) in the 2017/18 fiscal year. This growth was driven in part by a reduction in the compliance burden for businesses,[36] and by the use of data analytics to identify potential taxpayers without accounts.[37]

- According to a 2018 USAID report, improved taxpayer education and assistance brought more of the informal sector into the tax base. According to the country's National Institute of Statistics, the informal sector produced about 46% of GDP in 2011 but was mostly untaxed. In 2006, PIT revenue on SMEs amounted to 0.81% of GDP. **By 2016, SMEs contributed 1.81% of GDP in PIT/PAYE, almost matching the contribution of larger companies and accounting for half of the overall increase in PIT revenues in that year.**[38]

- A pilot program that sent personalized SMS reminders to taxpayers increased revenue by RWF ~7.3 billion, USD 7.77 million (0.5% of total revenue), according to RRA.

- **Since their introduction in 2013, EBMs have reduced fraudulent VAT claims by 25–35%.** This has been accomplished through data matching, which enables output and input invoices to be reconciled, thus ensuring the same transaction values are being reported.

FIGURE 5
Rwanda's tax collection revenue

CAGR +14.2%

RWF billion

2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018
556	652	763	859	987	1087	1234

FIGURE 6
Rwanda's tax-to-GDP

Tax Revenue/GDP (%)

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
12.1	12.1	11.9	12.2	13.3	12.8	13.1	13.8	14.4	15.4	15.8	16.6	16.6

Rwanda improved its administrative efficiency by decreasing the cost of collection from 3.5% of total revenue in 2010 to 2.7% in 2018. This improvement has been driven in part by automation, which has allowed RRA to reduce staff costs. Overall, **Rwanda has reduced its cost to collect USD 100 in revenue from USD 3.01 in 2009 to USD 2.96 in 2016**; however, this is significantly lower in other African countries, indicating there is still room for improvement in Rwanda. Namely, Botswana's cost to collect USD 100 is just USD 0.88. Lesotho's cost is USD 1.99 per USD 100, and Mauritius' cost is USD 1.81 per USD 100.[39]

Taxpayers

Large and medium-sized businesses reported satisfaction with Rwanda's tax digitalization reforms, pointing to time savings and increased transparency as key benefits. The World Bank's *Ease of Doing Business* report estimated that the average time to file corporate taxes in Rwanda was 91 hours per year, compared to an average of 280.6 hours per year in Sub-Saharan Africa as a whole and an average of 158.8 hours per year among OECD countries.[40] The RRA is working to make further improvements on this front, including its recent commitment to reduce the VAT refund process to 30 days and to clear a backlog of approximately RWF 45 billion (USD 47.89 million) owed in refunds to taxpayers in 2018. Other improvements have included:

- **Reduced time to file VAT returns** from 45 hours to 5 hours through the introduction of EBMs.[41]

- **An easier, faster, and safer process for taxpayers to file and pay their taxes online.** In fiscal year 2016/17, 97% of large taxpayers, 96% of medium taxpayers, and 61% of small taxpayers paid their taxes online.[42]

- **RRA has greater oversight of their operations** and transparency of tax administration.

- **Improved customer service both online and over the phone.** Taxpayers interviewed[43] for this paper reported that online information is convenient to access, and customer calls are picked up in 2 minutes as opposed to 20 minutes, as previously.

"We're very happy about filing and paying our taxes 100% digitally. It's convenient, saves us time, and it's safe since we don't have to take big amounts of money to the bank. Filing and paying our taxes digitally also helps us avoid any conflict with the government, since the platform makes the payment automatic."

Lionel Maniriho of Babyl Health Rwanda

BOX 1
Sharon Umunyana and Harriet Hakiza, AC Group Limited

AC Group Limited is a technology company which has played a key role in modernizing Rwanda's transportation system by making it cashless through its Tap&Go payment cards. Sharon Umunyana, the AC Group Sales Manager, recalls that public bus companies in Rwanda previously faced revenue leakage, as well as slower service as customers waited for change after payment. AC Group's cashless payment system helped make public transportation more efficient and, on some routes, enabled bus companies to increase revenue by over 40%. This system how now been implemented on all public buses in Kigali and is expanding to other parts of the country. Over 1.2 million Tap&Go cards have been sold in Kigali.

AC Group has grown from 5 employees in 2015 to 40 permanent employees and over 120 part-time employees today. By improving their service (such as through implementation of cashless payment), the company hopes to continue to grow in Rwanda and Cameroon and eventually enter other countries.

Harriet Hakiza, AC Group's Senior Finance Manager, believes that tax digitalization has made it much easier and more efficient for businesses to comply with their tax obligations, while also providing taxpayers with access to all of their payment information. Ms. Hakiza described the system as easy and direct, and noted that taxes can now be paid digitally using the e-Tax portal in less than a minute. In the same vein, she noted that "as a taxpayer, AC Group immediately receives a digital receipt as proof of payment. We have digital access to our payment history, without having to keep multiple receipts on hand, which could easily get damaged or lost."

However, many SMEs are not as satisfied as larger businesses. Many SMEs have reported challenges in finding information online and a number physically visited the RRA for guidance in fear of reportedly high fines for not correctly complying with their tax obligations. Additionally, many SMEs with revenues above RWF 20 million (USD 22,000) reported struggling with the costs of EBMs (up to RWF 187,891, or USD 200) and additional training for staff. Going forward, SMEs would value improvements to the digitalized tax system, including more user-friendly online resources and SMS notifications regarding potential fines.

BOX 2
Gloria Mutoni, African Collections Limited

Gloria Mutoni owns and runs African Collections Limited, a small business in Kigali that sells African print clothing with the help of one employee. Ms. Mutoni's business model involves making clothes to order, rather than selling pre-made clothes. She also sells local souvenirs such as hand-woven baskets that she buys from suppliers in rural areas. She is working towards expanding into other business ventures and hopes to one day move into a bigger office.

Ms. Mutoni recalls that despite finding it easy to register her business, she had access to very little information about the taxation process, and as a result took a long time to understand the tax system.

The taxation process was made much easier for Ms. Mutoni when she adopted e-declarations, noting that "filing taxes digitally is as easy as drinking water." With e-declarations, she can now use her phone to declare her business revenues. As a result, she no longer needs to leave her store to pay her taxes or spend time on paperwork and worry about losing important documents, as she did when using the paper-based tax filing process previously.

Ms. Mutoni also said she was comfortable using mobile money, noting that "mobile money is very useful to pay suppliers who work in villages far from Kigali. They get paid instantly for their beautiful hand-made baskets and bags." However, she also noted that she still pays her taxes physically at the bank because she feels safer having a physical receipt for auditing purposes.

Ms. Mutoni believes that to reap the full benefits of tax digitalization, "taxpayers should receive more and better information to file and pay their taxes digitally."

BOX 3
The impact of tax digitalization for businesswomen in Rwanda

Businesswomen interviewed for this report identified a number of benefits to tax digitalization. Firstly, digital tax payments have reduced travel burdens and thus helped overcome social barriers in rural areas where women are often expected to remain in their town. Digital payments also allow more time for women to balance work and domestic activities. Female entrepreneurs in the fashion sector said that digital tax payments reduced the burden of tax compliance and improved their digital literacy, thus encouraging women to start formal businesses.

However, some businesswomen also identified barriers to paying taxes digitally, including insufficient knowledge of the tax process, a lack of internet connectivity in some areas and limited access to mobile technology. They suggested that RRA provide more training targeted toward women, especially in rural areas, along with improved digital infrastructure and greater digital access for women.

HIGHLIGHTS FROM RWANDA'S DIGITALIZATION JOURNEY

The RRA, with strong support from the Office of the President and the Ministry of Finance and Economic Planning, has invested heavily in digitalizing the tax system. RRA has taken a centralized approach and leveraged its support from the government to drive compliance by mandating use of new digital systems and processes. Although this approach is not replicable in all environments, much can be learned from Rwanda's digitalization efforts.

The following section provides insights from all aspects of Rwanda's tax digitalization process. While every country's digital tax trajectory will be unique in some ways, entities in other countries engaged in tax digitalization can learn from Rwanda's successes and challenges.
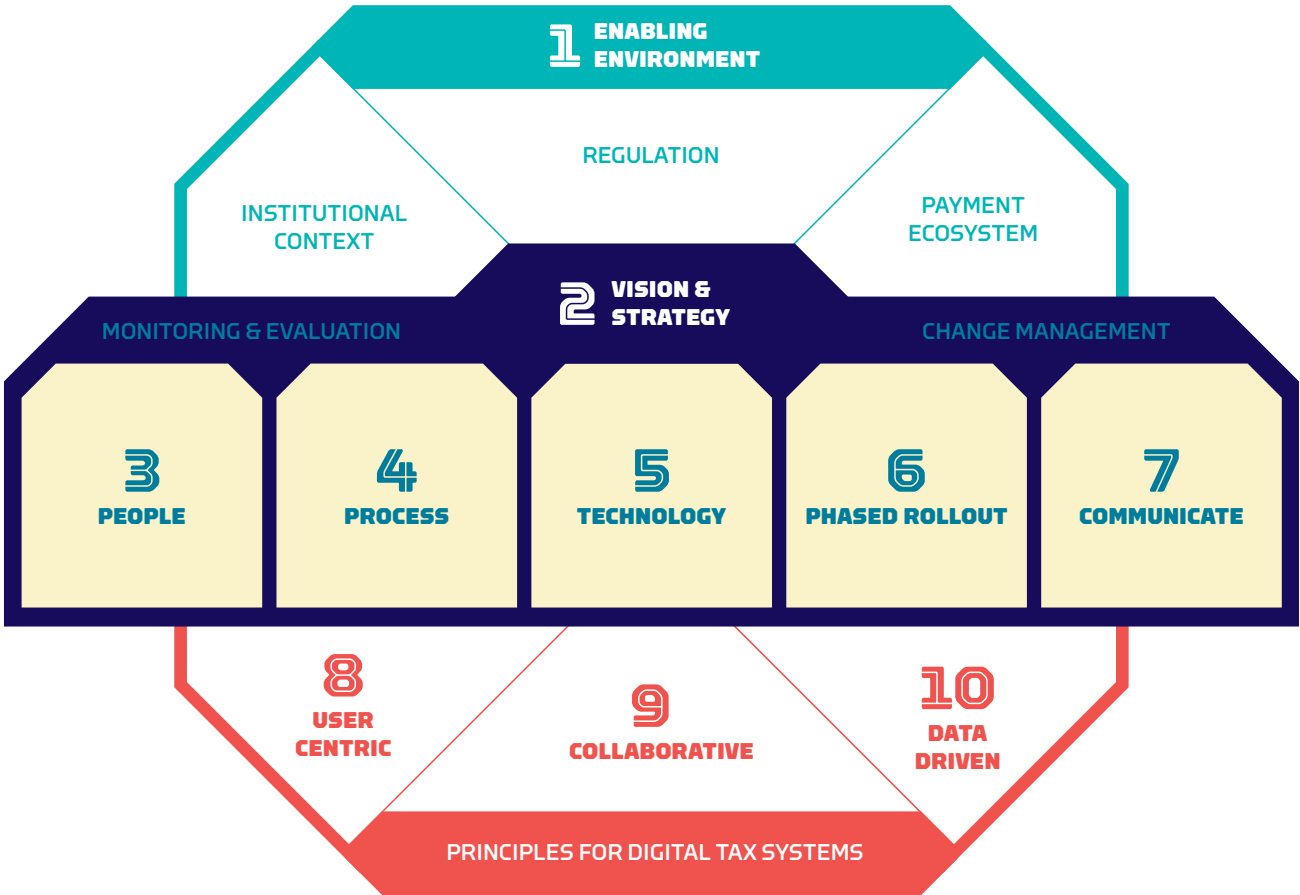
Enabling environment

The creation of RRA as a semi-autonomous entity from the Ministry of Finance (MoF) enabled large-scale and rapid tax digitalization. Historically, MoF consisted of two separate departments: one in charge of customs duties and the other focused on excise taxes. The departments did not share information, office space, or a central database – an organizational fragmentation that made it difficult to build a comprehensive picture of any one taxpayer's affairs. The heads of the two departments reported directly and exclusively to the finance minister, creating scope for political interference in decision-making.

In 1997, the two departments were combined into a semi-autonomous entity, the RRA, which now enjoys meaningful independence from MoF. Its Commissioner-General is appointed for a five-year term by Presidential Order with Senate approval and reports to an independent, eight-member board of directors. To ensure proper coordination between MoF and RRA, and to reduce the potential for political interference, a non-political Permanent Secretary is appointed as the Deputy Chair of the RRA board. Other board members include public sector actors, such as the Governor of the Central Bank, and prominent members of the private sector working in fields such as accounting, law, or economics. This institutional arrangement allows RRA to:[44]

- Determine its own salaries, job descriptions, and job requirements and to adopt more-flexible rules for appointing or terminating employees.
- Partially self-finance by keeping 3% of the revenues it collects to help fund its operations.
- Engage in independent decision-making with less political interference.
- Assemble comprehensive profiles of individual taxpayers while protecting privacy and track compliance for individual taxpayers using an integrated payment data ecosystem.

Rwanda's Integrated Payments Processing System (RIPPS) has allowed for efficient and reliable digital transfer of funds and has enabled effective digitalization of tax and customs payments. By providing mechanisms for clearing and settling interbank electronic payments, RIPPS supports development of innovations that have seen very high adoption levels in Rwanda, such as Automatic Teller Machines (ATMs) and mobile money. Additionally, as it is linked to the East African Payment System (EAPS) and Regional Payment and Settlement System (REPSS), RIPPS also enables improved cross-border payments within the East African Community and the Common Market of Eastern and Southern Africa (COMESA). This capability was enhanced in 2006, when significant public and private investments were made in technology infrastructure, including widespread fiber-optic cable rollout in Kigali. Shortly thereafter, the government expanded fiber-optic connectivity throughout the country.

Between 2011 and 2015, digital financial services expanded rapidly, with internet banking and mobile banking transactions increasing by 75%

and 21%, respectively.[45] With most digital payments now interoperable – allowing funds to flow across platforms and providers – RRA requires that banks transfer tax payments from their RRA accounts to the National Bank of Rwanda's RRA account within two working days. RRA employs a tailored Application Programing Interface (API) to integrate digital payments with mobile operators. Now, 92.6% of small and medium taxpayers and 96.2% of large taxpayers pay their taxes through digital means.

Vision and strategy

Since 2000, Rwanda has pursued tax digitalization as part of its ambitious and long-term development plan - Vision 2020. The plan's primary near-term objective explicitly called for RRA "to reduce [aid] dependency [by developing] effective strategies to expand the tax base."[46] Additionally, the plan established ICT as central to the national infrastructure development strategy and one of three cross-cutting policy issues: (i) Gender Equality, (ii) Natural Resources, Environment, and Climate Change and (iii) Science, Technology, and ICT.

High-level political support from both the Presidency and the Ministry of Finance and Economic Planning has been a key success factor in Rwanda's tax digitalization efforts. Government support has been crucial in building a strong consensus among policymakers and civil servants around the need for digitalization, and ensured sufficient resources. It has also reduced resistance to change among civil servants and allowed for prioritization of digitalization efforts within the wide range of Rwanda's policy imperatives.

As part of an overarching strategy for tax digitalization, RRA established a Planning and Research Unit and a Reform and Modernization Committee to drive change and monitor progress.[47] In the early 2000s, the Planning and Research Unit began measuring progress against key performance indicators. RRA required each of its departments to develop an annual performance plan based on specific targets, which included requirements to:

- Define the department's responsibilities.
- Provide a strengths, weaknesses, opportunities, and threats (SWOT) analysis.
- Set departmental objectives and priorities.
- Set detailing performance metrics and targets.

The Reform and Modernization Committee works alongside the Planning and Research Unit to evaluate the performance of new digital components and make operational recommendations to improve the design and implementation of tax digitalization. This evaluation capacity has revealed a need to further streamline business processes, build internal human resource capacity and develop a digital central database, and launch a sustained public education campaign to encourage a national taxpaying culture.

Technology

RRA has prioritized software adaptability - often through a process of constructive trial and error - to keep pace with the ever-evolving tax environment. Early in its digitalization efforts, RRA tested technology solutions built in-house. Recognizing its IT limitations, it soon moved to trialing off-the-shelf licensed software. However, much of this software was found to be too rigid, with license costs that were considered prohibitive. As a result, RRA transitioned toward more tailored and flexible solutions, specifically for its e-Tax initiative. It contracted a third-party software vendor, selected from an open and competitive bid process. This vendor gave RRA access to the source code for its software so RRA could continuously modify it to adapt to changing laws and taxpayers' feedback.

Specifications were designed in-house to ensure solutions were tailored to the Rwandan context. Although RRA reported some cultural and logistical challenges in working with the international third-party contractor, they regard the implementation of e-Tax as a success.

In an effort to increase VAT revenue, RRA introduced electronic billing machines (EBMs) for businesses; however, the resulting 5.4% gain in tax revenue was lower than expected. The lower-than-expected adoption was largely a result of the high cost of EBM equipment, at RWF 234,864 (USD 250). In response, RRA has now developed EBM 2.0 – software that can be downloaded for free onto smartphones and is expected to drive much higher uptake.

With the advent of new technology, RRA has implemented measures to protect data privacy. RRA does not share the identity or personal details of taxpayers with any third party unless required to do so by a court order. When sharing aggregated taxpayer data with other government stakeholders, individual taxpayer information is anonymized. However, some government stakeholders remain concerned that mobile payments and communications made by way of unstructured supplementary service data (USSD)[48] were not encrypted and could be at risk.[49] The Rwanda Utilities Regulatory Authority now monitors real-time mobile money transactions to identify and control abnormal activity and to ensure quality service for the end-user.

Develop digitally fit processes

RRA's e-Tax project coordinator at RRA, Fred Karara, notes that "simplicity is a core principle to reduce the tax compliance burden for taxpayers and drive satisfaction and compliance up." The development of online and mobile e-filing has reduced the burden for businesses of meeting their tax obligations. RRA also recently integrated declarations for PAYE and social security contributions, further reducing businesses' time commitment for filing. Moreover, SMEs are not required to pay VAT and can either pay a flat tax or a turnover tax based on their revenues, with no document submission required. Simplification of this type has been effective in driving voluntary compliance and self-reporting.

Proactively manage organizational change

RRA's digitalization strategy required organizational changes to streamline operations and provide more user-friendly services. In the early 2000s, RRA's operations were subdivided according to tax types, with separate offices for income taxes (including PIT and CIT), sales taxes (replaced by VAT taxes in 2001), and auditing. However, this structure fragmented the taxpayer experience, requiring them to visit multiple offices to meet their obligations. Additionally, siloed working groups impeded RRA's ability to build a comprehensive picture of any individual taxpayer's compliance record and status.

In 2002, under a 'one-stop-shop approach', RRA departments were restructured by taxpayer type. RRA's head office and its four branches in Kigali – as well as each of the four provincial offices, 30 district offices, and 140 small sector offices – started offering all services for all tax types. The domestic tax department was reorganized under a new framework that created one office for large taxpayers and a separate division focused on small and medium-sized taxpayers.[50] Additionally, RRA's IT department was modernized to provide cross-departmental support to all areas of the organization. This approach enabled RRA to concentrate staff with digital expertise in one department, prioritize IT support across the entire organization and ensure consistency in software development and maintenance across different tax processes.[51]

These steps were aligned with a growing global consensus – backed by organizations like the IMF – that reflected a recognition that people in difference circumstances and at different income levels had different needs. As Richard Dada, Head of the Small and Medium Taxpayers noted, "Large taxpayers don't ask questions like, 'How do I declare or file my taxes?' whereas that is indeed a problem for smaller taxpayers."[52]

To avoid staff being made redundant when processes were automated, RRA retrained and redeployed staff extensively. To avoid large-scale redundancies, RRA retrained tax officers whose duties were replaced by automation and assigned them to higher value-added tasks. For example, some cashiers who previously handled cash tax payments were employed in 'taxpayer recruiting.' To support digitalization and improve service delivery, RRA created a training unit to develop in-house IT expertise. A team of 12 full-time trainers built curricula and developed training material. Among other activities, this team trained and certified staff to the International Computer Driving License (ICDL) standards.

> "Several governments from Africa, and beyond, have come to Rwanda to learn about our business model. We always tell them the same: one of our key success factors is making digital the only option to pay for government services."
>
> **According to Chief Operating Officer of Irembo, Pierre Kayitana.**

Implement a phased rollout

Rwanda has taken a strategic and incremental approach to mandating the use of digital tax components, which has helped drive rapid and widespread adoption. RRA initially tests most newly digitalized processes with a few large taxpayers, then gradually extends the process to medium-sized taxpayers, and then to small taxpayers. Once such processes are proven and reliable, they are made compulsory for all. This approach is made possible by a strongly supportive central government. As such, it may not be replicable in other countries – particularly where tax processes include more decentralization.

The rollout of e-invoicing provides an example of this incremental approach. Starting in 2013, the rollout built up incrementally, with more than 3943 taxpaying firms having adopted EBMs 18 months post-launch. This represented 77.8% of all VAT-registered firms at the time.[53] After successfully piloting the system among large taxpayers, the RRA introduced e-filing and e-payment to all taxpayers in 2012.[54] Broadly speaking, this approach has delivered strong results in Rwanda; however, it should be noted that mandating the use of tax components also presents inequities and adverse consequences, such that those who are not digitally literate or do not have internet access will be penalized – which should be anticipated and addressed by policymakers.

Rwanda has high levels of access and registration in digital tax components; however, levels of active use have not always followed suit. Since their rollout, the active use of EBMs, and therefore issuance of VAT e-invoices, has been a challenge. By way of example, RRA undertook a small-scale exercise – whereby 'secret shoppers' visited EBM-active retail locations to measure EBM use. The exercise showed that, when not explicitly requested, stores issued EBM receipts to the secret shoppers only about 20% of the time. However, this increased to 63% when the secret shoppers asked for receipts, and to 94% when tax administration officers sat with shopkeepers during the transaction.[55] This strongly suggests that RRA could increase ongoing use by, for example, incentivizing customers to ask for a receipt.

RRA has introduced take-up incentives to increase the use of e-invoicing and digital payments. For example, RRA initiated a tax lottery, Tombola Na EBM, to encourage consumers to ask for receipts from retailers and thereby increase VAT compliance. To participate, consumers ask merchants to include their mobile phone numbers in the EBM receipt. RRA then randomly distributes prizes to participating consumers, including TVs, phones, and computers.

In 2015, in response to low volumes of digital tax payment,[56] RRA introduced fees on in-person tax payments. While it is free to make tax payments by online bank transfer (i.e. via direct debit), taxpayers must pay a small commission (RWF 350, or USD 0.37) on tax payments by mobile devices, which goes to the mobile operator that enabled the transaction.[57] Taxpayers must pay a larger commission (around RWF 800, or USD 0.85) when paying taxes by in-person bank transfer at a bank branch. As well as incentivizing digital tax payment, this larger fee reflects the labor cost of a bank teller handling the transaction.

Improve communications with taxpayers

Strategic communication with taxpayers has been a crucial component of the RRA's digitalization strategy. With the help of the African Tax Administration Forum (ATAF), RRA cultivated its relationship with the media through discussions on the media's role in publicizing and explaining tax issues and educating taxpayers about their obligations.[58] RRA has paid for 30-minute weekly radio and television shows that feature discussions with tax experts and advice about how businesses and individuals can most easily comply with their tax obligations. During tax-filing season, the media regularly airs tax-related advertisements, radio jingles, and explainers before prime-time radio and TV news.[59] RRA is expanding tax education programs across the country, including seminars on e-Tax filing and payment, public lectures on EBM awareness and tax dialogues with taxpayers. During the 2016/17 financial year, such programs were conducted with taxpayers and key players, such as opinion leaders, provincial representatives, and religious leaders.[60]

RRA has also invested significantly in its online services, focusing efforts on creating a more user-friendly experience for taxpayers. RRA moved many services online, including provision of tax clearance certificates and registration/deregistration.

The RRA has also embarked on research projects in partnership with the African Tax Administration Forum (ATAF) and the International Centre for Tax and Development (ICTD) to drive tax compliance. Several experiments conducted between January and March 2016 assessed the efficacy of other digital channels of communication in improving taxpayer compliance, specifically letters, SMS text messages, and emails. The results showed that these relatively inexpensive digital communication strategies were effective. Later adoption of these formats contributed almost RWF 7 billion (USD 9 million) in additional revenue.[61]

Be data-driven

RRA's data-driven approach to digitalization has produced early benefits, including the identification of around RWF 262 billion (USD 0.28 billion) in tax evasion. RRA and the Rwanda Development Board (RDB) assigned companies unique ID numbers to use for government-related processes, which has proved to be an important initiative. Newly established businesses can now register at the RDB in less than one day. Once they receive their ID number, they are asked to register with the RRA, which then identifies them for every taxpaying purpose. Under the previous system, businesses had multiple ID numbers, causing administrative mistakes that could lead to fines and delays. Also, it was extremely difficult for RRA to cross-check or analyze data to validate compliance. With the help of RRA's Business Intelligence System, which cross-checks across multiple data sources to check if entries are valid, newly registered taxpayers contributed an additional RWF 9.6 billion (USD 10.21 million) in the 2017/18 fiscal year.[62] Performing information crosschecks with the Rwanda Social Security Board (RSSB) enabled RRA to identify more than 200 companies (with over 1200 employees) that were paying social security contributions without paying the associated PAYE taxes – a total evasion of around RWF 262 billion (USD 0.28 billion). RRA's Corporate Risk Department used a similar data-matching methodology to identify high-risk taxpayers and develop an audit plan to ensure the correct tax amounts are being collected. As outlined in the 'Conclusions and recommendations' section, RRA can and should maximize the benefits of data collection by continuing to develop its data analytics capabilities.

Be user-centric

Focusing on taxpayers' needs during the design phase of digitalization has been a key success. Given the limitations of internet connectivity in rural areas, RRA conceived a mobile tax declaration and payment application called M-declaration. Launched in 2013, M-declaration was customized to meet the needs of small entrepreneurs with an annual turnover of RWF 200–500 million (USD 0.21–0.53 million). The app can be used with feature phones, to which more than 80% of the adult population has access. The menu of actions on the application is provided in both English and Kinyarwanda. Payments are enabled by mobile money, and once users are familiar with the app, a whole session can be executed in less than a minute. Although some users have reported difficulty accessing the payment function by way of the USSD system, there are signs the app is seeing substantial adoption: preliminary data for 2018 suggest that nearly half of all tax returns filed by individual taxpayers were submitted through mobile phones.[63]

RRA also adopted an online tax platform called e-Tax, tailored to taxpayers' needs for one simple and accessible tool to meet their tax obligations. The platform centralizes tax processes (e-filing, tax payment, and digital claims)[64] in a unified account that provides the taxpayer's tax-related information and sets out their obligations. Taxpayers do not need to install any complex or costly software to use e-Tax; it can be accessed online for free using their identification credentials, such as passport or national ID.

Collaborate

RRA and the Rwandan government have worked with the private sector to create commercially viable delivery models for tax digitalization. In 2012, the government founded Rwanda Online Platform Limited (ROPL) to enable and manage digital P2G payments. In 2014, through the Rwanda Development Board, the government entered a 25-year revenue-sharing contract with ROPL to design and operate Irembo – a portal to all government services.

In 2014, Irembo hired CrimsonLogic to build the backbone technology for a 'one-stop-shop' for Rwandese citizens using government services. Although Irembo was initially 100% publicly owned, the plan was to gradually privatize the organization. It is currently 30% privately owned. For the initial investment in hardware, software development, and other operational expenses, Irembo entered into a RWF 18.78 billion (USD 20 million) loan with private sector lender(s). In this way, the program did not require an upfront investment by the government and this reduced financial risk.

The Irembo platform allows for more than 100 types of payment to the government, including services such as expediting birth certificates. It offers payment options for some 'non-fiscal taxes' (such as, land tax), but most taxes (including VAT, CIT, and PAYE) must be paid directly to RRA, without Irembo's intermediation. Cash payments are only authorized at Irembo-certified banks, eliminating cash handling by tax officers. Since Irembo was introduced, the share of P2G payments made in cash has decreased from roughly 80% to less than 20%, delivering additional benefits of much-improved transparency and reduced leakage of tax payments.

To implement the platform, Irembo and the government entered into a detailed long-term engagement contract with mutual obligations and prescribed penalties for non-compliance with the terms of the agreement. For example, any paper-based service launched on Irembo must be phased out within 12 months, while government departments whose operations have been replaced by Irembo must also be phased out within 12 months. Irembo receives up to 31% of the service fees for services for which a fee is charged.

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Conclusions

Rwanda has accelerated its tax digitalization program over the past decade and has significant ambitions for future expansion. Rwanda has successfully digitalized a wide range of tax processes, including e-filing, e-invoicing through EBMs, automated audit selection, and digital tax payments. Digitalization remains a strategic priority for RRA, as evidenced by its ambition to introduce pre-population of PAYE and VAT tax returns and to enable mobile access to taxpayer accounts (through 'My RRA'), among other initiatives.

Tax digitalization has positively impacted governments, large businesses, and SMEs. Case studies suggest that tax digitalization has been an important driver of Rwanda's fast growth in tax collection (12% compounded annually, since 2011). Digitalization has also allowed RRA to re-assign tax officers to higher value-added tasks, including automating internal processes such as audit selection and identifying tax evasion. Both larger businesses and SMEs have benefited from the reduced compliance time and increased transparency offered by digitalization. Taxpayers' experiences could be further improved by access to training and information on digital payments, as well as further technical developments with the mobile application.

A clear vision, practical implementation, and a focus on user needs have driven the success of Rwanda's tax digitalization program. The long-term vision for digital transformation, outlined in Vision 2020, ensures high-level support and institutional coordination for tax digitalization. The RRA's robust procurement strategy and its requirement that solutions be unified, flexible, and simple has allowed for effective implementation. Finally, Rwanda prioritizes rapid adoption of digital products by taxpayers. To achieve this, it generally starts by testing new digitalized processes with large taxpayers, then rolls them out nationwide, and once the concept had been proven, mandates their adoption.

Recommendations

As RRA continues to develop its digital tax system, this report recommends three areas of focus:

1 **Recruit, train, and retain staff with digital and non-digital expertise.** This is a common challenge for government institutions. The ICT sector in Rwanda has been growing at roughly 13% annually since 2001,[65] so ICT expertise is in high demand. Additionally, the private sector often offers higher salaries than does the public sector. Once capable staff are recruited and trained, retention is also difficult, as expert ICT professionals become more attractive in the labor market. RRA has acknowledged this challenge and put incentives in place to improve recruitment and retention. However, there would be substantial benefit in exploring innovative staffing models, such as working with other government departments and private sector partners to attract new staff, even if temporarily. Businesses interviewed for this report noted that both technical and regulatory issues were not easily resolved by tax officers who attended them, so additional training for taxpayer-facing officers would help them offer better services and higher rates of resolution.

2 **Make more and better use of data to increase collection and compliance.** By applying its data-driven approach to EBMs, RRA could improve the tax compliance benefits offered by EBMs. Issues of false reporting could be systematically identified through comparisons with a database of 'true' (VAT-compliant) transactions. Fake or inaccurate receipts that misreport transaction information (or do not include legitimate buyers) could be identified through automated comparisons of purchaser and supplier transactions. RRA has already prioritized acquiring data analysis capabilities to improve big data management going forward. To process increased data, the RRA should continue to invest in its computing and storage capacity. Taxpayers have reported that digital payments systems often crash at times of peak use, in particular around key deadlines in the tax compliance process. Given that fines for late payments are above 50% of initial tax obligations, some SMEs prefer to minimize the risk of being sanctioned for technical issues and make their tax payments in person at a bank. This reduces digital adoption and leaves most of the benefits of digitalization unrealized, for taxpayers, RRA, and the government.

3 **Increase investment in tax services for SMEs to accommodate their varying levels of infrastructure and IT literacy, with particular focus on gender inclusion.** It is understandable that the RRA initially focused digitalization efforts on larger businesses that contribute more to total tax revenue and are more capable of quickly adapting to new systems. However, to create a more inclusive tax system, it will be important to design services that meet the needs of all taxpayers. Rwanda has seen notable improvement in revenue collection from SMEs, but some such businesses – many of which are run by women – find it difficult to locate guidance on which taxes and forms are applicable to them. Whereas larger firms report high satisfaction in their interactions with RRA, smaller firms noted long delays in communication. Many taxpayers interviewed said the best way to get a quick response from RRA was to go directly to its offices, a time and cost investment that many lower-income taxpayers are unable to make. These challenges illustrate the degree to which digitalization has been designed primarily for larger businesses. Investing in understanding the needs and pain-points of SMEs would greatly benefit taxpayers, RRA, and the government, including through greater formalization of businesses, compliance, and total revenue.

For service providers looking to engage with RRA, this report recommends exploring opportunities to:

4 **Support RRA by educating taxpayers about the importance of tax compliance, as well as by initiatives that increase the tax literacy of lower income taxpayers.** This could include compliance awareness campaigns run through digital and traditional media or face-to-face activities in the community. There may also be opportunities to offer online or traditional tax literacy training for SMEs.

ANNEXES

Comparative case study countries

COUNTRY CONTEXT	RWANDA	INDONESIA	MEXICO
Population	12 million	268 million	124 million
Adult population	7 million	186 million	90 million
Country income category	Low-income	Lower-middle income	Upper-middle income
Annual growth rate of the economy (Real GDP)	7.5% (2008–2018)	5.5% (2008–2018)	2.1% (2000–2018)
% employment in the formal economy	10%	30%	40%
Gender Gap Index	0.822 (rank 4/144)	0.691 (rank 84/144)	0.691 (rank 81/144)
% adult financial account	68%	49%	37%
% adult internet users	80%	76%	82%
TAX LANDSCAPE			
Entity studied	Rwanda Revenue Authority (RRA)	Directorate General Taxes (Direktorat Jenderal Pajak, DGT)	Tax Administration Service (Servicio Administración Tributaria, SAT)
Revenues collected by entity	All taxes	VAT, CIT, PIT, and stamp duties	VAT, CIT, PIT, and special taxes
Degree of autonomy	Semi-autonomous from MoF	Part of the MoF	Semi-autonomous from SHCP
Tax-to-GDP	16.6%	12%	16%
DIGITALIZATION OF TAX SYSTEM			
Digitalization efforts started in	2004	2001	1995
Registration digitalized	No	Yes	Partial
E-invoicing	Yes	Yes	Yes
E-accounting	No	No	Yes
Electronic filing of tax returns	Yes	Yes	Yes
Digital payment of taxes	Yes	Partial	Partial
Specific electronic interaction with TA	Yes	No	Yes
General electronic interaction with TA	Yes	Yes	Yes

Digitalization across the tax collection process

Tax digitalization involves several tax processes and tax types. Each country's path will vary in terms of the order and extent of digitalization for individual processes. For instance, Mexico enabled digitalized tax payments in 2002, almost a decade before introducing e-invoicing in 2011 (SAT 2018).[66] Rwanda requires e-invoices to be sent within a month of the transaction, Spain requires daily invoice submissions, and the Hungarian revenue authority requires 'live' reporting of e-invoices.[67] In the city of Kananga in the Democratic Republic of Congo, property tax was the first digitalized tax, while many other countries have started by digitalizing VAT.[68]

To identify the opportunities and potential risks of digitalization, it is important to understand the main steps involved. The framework below provides a high-level tax collection process applicable to a wide range of countries. Of course, it should be noted there is no uniform solution that will automatically deliver optimal results in every country or jurisdiction; as always, best practices and common approaches should be considered in the context of domestic conditions and adapted to local circumstances as needed.

FIGURE 7
High-level tax collection process
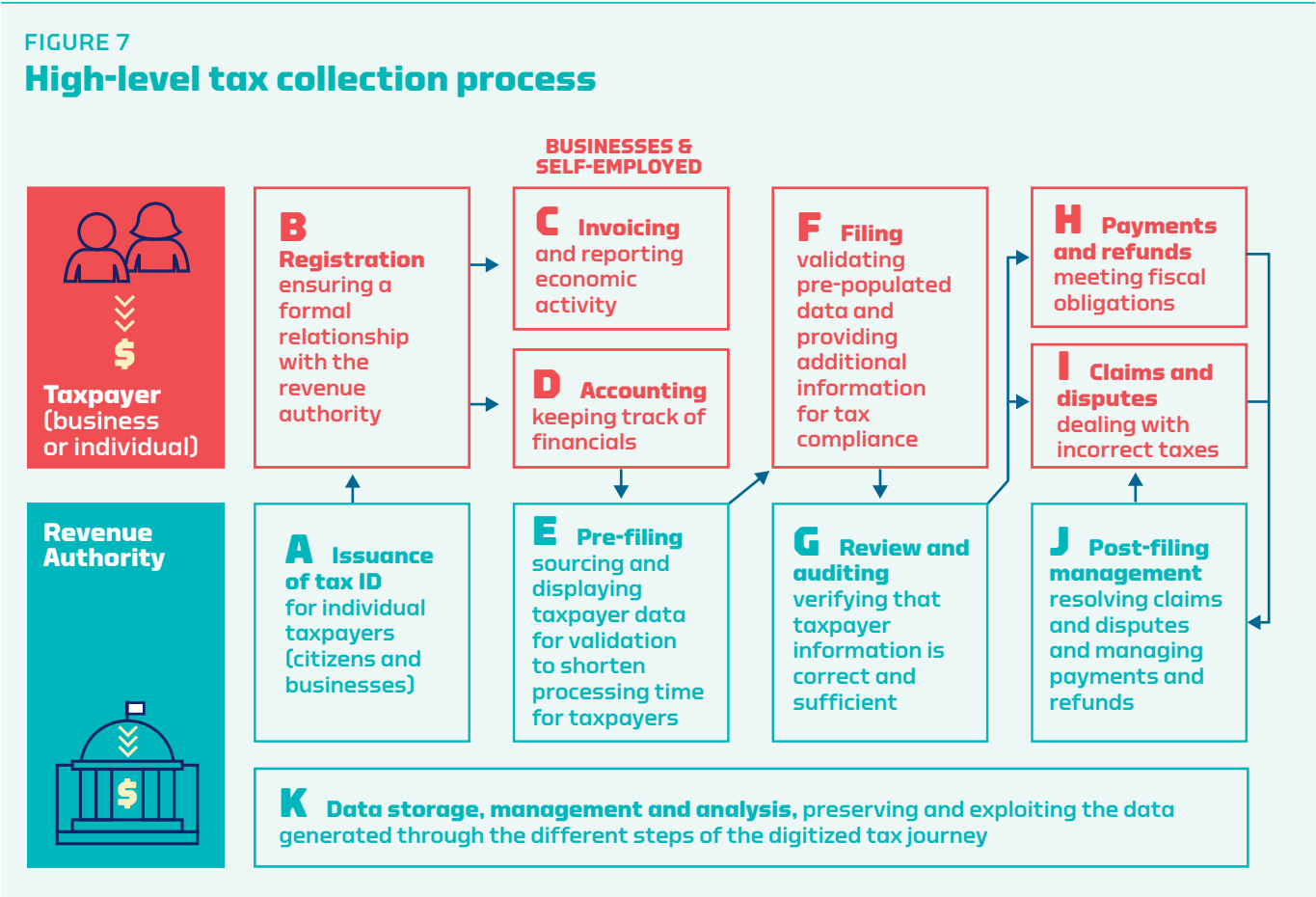
A Issuance of tax ID
Issuing a tax ID, whether to a citizen, business, or other organization, is the first step to establishing a formal relationship between the taxpayer and the revenue authority. Importantly, the tax ID is used in all tax processes and for all tax types.

Digital tax ID automates the process of issuing a tax ID, reducing mistakes, increasing security (i.e. by replacing paper files), and allowing for automated ID matching.

B Registration
When registering with the revenue authority, taxpayers provide all the necessary information to formalize their tax status.

At registration, several digital identification methods might be adopted, including the e-signature, the e-password, and the e-stamp for businesses. These tools allow taxpayers to identify themselves online and comply with their tax obligations digitally. In countries with limited digital infrastructure and capabilities, e-signatures might be excessively complex, so online registration and e-password settings may be preferable.[69]

C Invoicing
Invoicing is critical for taxes, such as value-added tax (VAT) and corporate income tax (CIT), which target businesses and people who are self-employed.

The e-invoice is an electronic file that contains tax information of a commercial transaction involving the sale of goods and services. Prior to e-invoices, this record was created by means of a paper invoice. The invoice is generated electronically and transmitted in real-time by the taxpayer to the tax administration.

E-invoicing digitally notifies authorities of economic transactions. In this way, it can reduce the time for authorities and businesses to process invoices. It also enables businesses to classify types of invoices (e.g. using alphanumeric online codes).[70] E-invoicing can reduce the likelihood of corruption by boosting transparency, eliminating cash transactions, and automating internal processes. In countries like Mexico, companies can issue their own e-invoices or use third-party providers for such services.

D Accounting
Revenue authorities require accounting reports from businesses to properly calculate their CIT obligations, among other taxes.

Electronic accounting is often introduced with three goals: (i) to provide better information to tax authorities, (ii) to improve internal knowledge for businesses, and (iii) to improve management of internal resources. E-accounting makes information immediately available to auditors and thereby allows for faster and more frequent audits.[71] Tax authorities may use e-accounting to increase information requirements and reporting frequency for businesses.

E Pre-filing
Pre-filing returns can provide substantial benefits but requires extensive collaboration with third parties.[72] Third-party agents can provide relevant data about taxpayers (e.g. firms can provide salary information for employees). This information can then be used to pre-populate tax forms. Pre-filing is particularly popular and effective for personal income tax (PIT) because it dramatically reduces the time needed for individuals to file their tax returns.

Digitalization allows for automatic pre-population. It can reduce the administrative time and cost of pre-population while minimizing the likelihood of mistakes.

F Filing

By filing tax returns, taxpayers provide the required information for tax compliance and, if applicable, validate their pre-populated forms.

E-filing allows taxpayers to provide the information requested online. Digital accounts can be developed in online portals for taxpayers to review and meet their obligations.

G Review and auditing

Tax authorities confirm the tax obligations of taxpayers by reviewing and auditing tax returns.

Digitalization allows for an algorithmic selection of which tax returns to audit. Senegal is currently experimenting with a data-driven selection mechanism to identify which taxpayers to audit.[73] Additionally, digitalized reviews may allow for automated alarms (reminders) to be sent to specific groups of taxpayers, including those identified as high-risk by data-driven selection mechanisms.[74]

H Payments and refunds

Digital payments allow taxpayers and revenue authorities to shorten processing times. Some countries have authorized credit card payments for tax collection (e.g. Mexico). Additionally, because they eliminate cash transactions, digital payments can potentially mitigate corruption and theft risk.

Digital payments are currently incipient in most low and low-middle income countries, where they represent, on average, only 16% of received tax payments.[75]

I Claims and disputes

Claims and disputes allow taxpayers and tax authorities to settle tax disagreements. Digitalized claims are submitted electronically, eliminating mailing time and allowing fluid communication between taxpayers and tax authorities.

J Post-filing management

Post-filing management refers to the work tax authorities perform after taxpayers file tax returns.

Digitalized post-filing management allows tax authorities to rapidly validate payments and automatically identify payment delays. Digitalized refunds can be automatically approved and paid back to the taxpayer digitally. Digitalized claims are generally processed and resolved faster because they can be more easily categorized and dealt with systematically.

K Data storage, management, and analysis

Data storage, data management, and data analysis are key for tax authorities to achieve the greatest impact from tax digitalization. Data storage and management must satisfy the conditions of cost-efficiency and security. Data analysis matches and validates information, and distills insights from millions of aggregated data points, making it a key component of automation.

Digitalization of key taxes

Tax digitalization can impact all types of taxes. Each digitizing step has an impact on total revenues, overall complexity, and efficiency gains. For most emerging economies, revenue collection is the top priority, so 'digitalize taxes' focuses on this objective. Some countries concentrate early efforts on VAT because it presents a substantial source of revenue.[76]

The complexity of digitalization varies between taxes, even when similar processes are being digitalized. For example, pre-population is easier for PIT than for CIT because of third-party reporting (i.e. companies can directly report employee salaries). Efficiency gains from digitalization are likely to vary between taxes, depending on the local context and existing regulations.

Africa, Latin America and the Caribbean, and Asia collect more taxes on goods and services whereas OECD countries rely more on PIT.[77] In both Africa and Latin America and the Caribbean, VAT is the largest source of tax revenue for governments, with taxes on goods and services representing roughly half of all government revenues.

Understanding the main features of each tax type can help tax authorities prioritize and orientate their digitalization journey. Figure 8 summarizes the high-level features of the most popular taxes across countries. Critically, policymakers must consider who is liable for each tax, how it is paid, which taxpayer base it affects, and with what frequency it is paid.

In addition to these general features, each tax has particular characteristics that affect its digitalization. Set out below are some of the relevant features that policymakers should recognize and incorporate into strategies when digitizing each type of tax.

FIGURE 8
Overview of the high-level features of main taxes

	VALUE-ADDED TAX	CORPORATE INCOME TAX	PERSONAL INCOME TAX	PROPERTY TAX
Who is liable?	Business	Business	Individual	Individual
How is it paid?	Withheld from businesses	Done by taxpayer	Employer for wage-earners (who then declare) / Done by self-employed	Done by taxpayer
What's the tax base?	All sales consumption	Business' profit	Workers' gross income	Property's value
What's the typical payment frequency	Monthly	Quarterly / Yearly	Monthly	Yearly

Value-added tax (VAT)

Tax digitalization can increase VAT compliance by enabling reported transactions to be matched, and by cutting the cost and time it takes to process invoices. VAT evasion can be one-sided, meaning only one party involved in a transaction reports it to the revenue authority, or two-sided, meaning both parties collude to underreport their transactions.[78] E-invoices can significantly reduce one-sided evasion as they allow for automated matching of reported transactions. To combat two-sided evasion, electronic billing machines may be introduced to record retailer sales and share the data with tax authorities.

Corporate income tax (CIT)

Digitalizing CIT can increase compliance and revenue. This can include e-filing, e-payments, and, for more advanced tax authorities, e-accounting. E-accounting has often been implemented at the latter stage of a country's tax digitalization journey. E-accounting requires that companies electronically report their full profit and loss data on a regular basis. This allows for closer monitoring by revenue authorities and thus reduces the risk of CIT evasion.

Tax digitalization enables greater international collaboration between revenue authorities and thus helps reduce corporate tax evasion. Some corporations underreport their profits in a given country by opaquely shifting part of their profits overseas. This risk has been exacerbated by the rise of the digital economy, with companies sometimes operating in countries where they have no physical presence. Greater collaboration between national revenue authorities is being advocated on many fronts to combat CIT evasion. Tax digitalization is essential for rapid and reliable communication between revenue authorities and for their utilization of available data.

Personal income tax (PIT)

Automated pre-population can be particularly effective for PIT compliance, as revenue authorities can get direct third-party reports from employers. In many countries, PIT is directly remitted by the employer every month via payroll withholdings. Then, at the end of the fiscal year, employees earning above a certain threshold are required to declare their annual income for refunds or to make additional payments. Revenue authorities can use the information provided by employers to automatically pre-populate employee tax forms. This can sharply reduce the time spent and mistakes made by individual taxpayers when filing their PIT returns.

Collecting PIT from self-employed workers can be a challenge for revenue authorities, as there is no direct third-party reporting. Tax digitalization can increase compliance among self-employed workers by reducing the time and cost of reporting their financial situation and increasing third-party reporting via e-invoicing and e-accounting among suppliers and clients.

Property tax

Property tax often represents a relatively low share of overall tax revenues, averaging 5.7% of total tax revenues in OECD countries in 2017;[79] however, its progressive nature makes it important.[80] Property tax is often the largest source of discretionary revenue for local governments. As such, it is an important measure for countries pursuing fiscal decentralization. Big data techniques that digitalize property data can help revenue authorities identify fraud and underreporting of value. Additionally, digitalized online accounts for landowners can centralize information and tax payments; the UK's Making Tax Digital initiative is an example.[81] In emerging economies, property tax digitalization efforts will see the greatest benefits when using computer-assisted mass appraisal and online billing and payment systems.

Acronym list

AAAA	Addis Ababa Action Agenda
AEOI	Automatic Exchange of Information
AGESIC	Agency for eGovernment and Information and Knowledge Society
AI	Artificial Intelligence
AMECE	Asociación Mexicana de Estánderes para el Comercio Electrónico (Mexican Association of Standards for Electronic Commerce)
APA	Advanced Pricing Agreement
API	Application Programming Interface
ASP	Application Service Providers
ASYCUD	Automated System for Customs Data
ATAF	African Tax Administration Forum
ATI	Addis Tax Initiative
ATM	Automatic Teller Machine
B2G	Business to Government
BEPS	Base Erosion and Profit Shifting
BIR	Bureau of Internal Revenue (Philippines)
BKF	Badan Kebijakan Fiskal - Fiscal Policy Agency (Indonesia)
BMGF	Bill and Melinda Gates Foundation
BPJS	Employees Social Security System
BSC	Balanced Score Card
CAGR	Compound Annual Growth Rate
CIT	Corporate Income Tax
COMESA	East African Community and the Common Market of Eastern and Southern Africa
COTS	Commercial-Off-The-Shelf
CRS	Common Reporting Standard
CSMS	Case Selection and Management System
DGII	Directorate General for Internal Taxes (El Salvador)
DGT	Tax Directorate General (Indonesia)
DJBC	Directorate General of Customs and Excise (Indonesia)
DPIDG	Division for Public Institutions and Digital Government
DRM	Domestic Resource Mobilization
DST	Digital Service Tax
EAPS	East African Payment System
EBM	Electronic Billing Machine
ECLAC	Economic Commission for Latin America and the Caribbean
EDC	Electronic Data Capture
EGDI	E-Government Development Index
ERP	Enterprise Resource Planning
eTIS	electronic Tax Information System
FAQ	Frequently Asked Questions

FATCA	Foreign Account Tax Compliance Act
FBR	Federal Board of Revenue
FDI	Foreign Direct Investment
FIMPE	Fideicomiso para extender a la sociedad los beneficios de la Infraestructura de los Medios de Pago Electrónico
FMP	Multiple Payment Forms
FY	Fiscal Year
GDP	Gross Domestic Product
GoR	Government of Rwanda
HMRC	Her Majesty's Revenue and Customs
ICAEW	Institute of Chartered Accountants in England and Wales
ICT	Information and Communications Technology
ICTD	International Centre for Tax Development
IDR	Indonesian Rupiah
IMF	International Monetary Fund
ISO	International Organization for Standardization
IT	Information Technology
ITU	International Telecommunication Union
IWAPI	Indonesian Business Women Association
KCCA	Kampala Capital City Authority (Uganda)
KPI	Key Performance Indicators
KPP	Tax Service Offices (Indonesia)
LAC	Latin America and the Caribbean
LC	Capture Lines
LIRS	Lagos State Internal Revenue Service
LMIC	Lower-Middle Income Country
MCC	Millennium Challenge Corporation
ME&L	Monitoring Education and Learning
MNC	Multinational Company
MoF	Ministry of Finance
MSE	Medium Sized Enterprises
MSME	Micro, Small & Medium Enterprise
MXN	Mexican Peso
NF-e	Nota Fiscal eletrônica
NTA	National Tax Agency (Japan)
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OSI	Online Service Index
P2G	Person-to-government
PAC	Authorized Certification Provider

PAN	Personal Account Number
PAYE	Pay-As-You-Earn
PCT	Platform for Collaboration on Tax
PIT	Personal Income Tax
PoS	Point of Sales
PPP	Public-Private Partnership
RAG	Revenue Analytics Group (Ireland)
RARP	Revenue Administration and Reform Project
RDB	Rwanda Development Board
RIPPS	Rwanda Integrated Payments Processing System
REPSS	Regional Payment and Settlement System
ROPL	Rwanda Online Platform Limited
RRA	Rwanda Revenue Authority
RSSB	Rwanda Social Security Board
RURA	Rwanda Utilities Regulatory Agency
RWF	Rwandan Franc
SAT	Tax Administration Service (Mexico)
SDG	Sustainable Development Goal
SHCP	Secretaría de Hacienda y Crédito Público (Secretariat of Finance and Public Credit—Mexico)
SMS	Short Message Service
SOE	State-owned Enterprise
SPEI	Sistema de Pagos Electrónicos Interbancario (Inter-Banking Electronic Payment System—Mexico)
SSA	Sub-Saharan Africa
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TA	Tax Administration
TADAT	Tax Administration Diagnostic Assessment Tool
TIN	Tax Identification Number
UMIC	Upper-Middle Income Country
UN	United Nations
UN DESA	United Nations Department of Economic and Social Affairs
UNISCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNIPOG	United Nations Project Office on Governance
USAID	United States Agency for International Development
USD	United States Dollar
USSD	Unstructured Supplementary Service Data
VAT	Value-Added Tax
WEF	World Economic Forum
XML	extensible markup language
ZIRMA	Zimbabwe Revenue Authority

Glossary

Automatic Exchange of Information (AEOI) is an international standard that governs how tax authorities in participating countries exchange data relating to the bank accounts and safekeeping accounts of taxpayers.

Big data is a field that focuses on ways to analyze, extract information from, or otherwise use datasets that are too large or complex for traditional data-processing application software.

Change management is a collective term for all approaches to preparing for and executing organizational change and supporting of individuals, teams, and organizations through that change.

Common reporting standard is an information standard for the Automatic Exchange of Information (AEOI). It outlines what financial account information is to be exchanged, which financial institutions are required to report, the different types of accounts and taxpayers covered, and common due diligence procedures to be followed by financial bodies.

Digital government is the production and delivery of information and services within government and between government and the public using a range of information and communication technologies (ICT).

Digitization is the process of changing from analog to digital formats.

Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business.

Fiscal cadastre is a real estate registration system that shows details of a property, including ownership, boundaries, physical conditions, land use, and value, for taxation purposes.

Phishing is the fraudulent attempt to obtain sensitive or valuable information such as usernames, passwords, and credit card details, by dishonestly presenting as a trustworthy entity in an electronic communication.

Tax expenditure is the revenue a government forgoes through the provisions of tax laws that allow (1) deductions, exclusions, exemptions, or credits on taxpayers' taxable expenditures, income, or investments, (2) deferral of tax liability, or (3) preferential tax rates.

Time poverty is a state in which individuals do not have enough time for rest and leisure after taking into account the time spent working, whether in the labor market, for domestic work, or in other activities required to maintain their livelihoods.

UX design is the process that design teams use to create products that provide meaningful and relevant experiences to users.

Interviewee list

CATEGORY	NAME	ORGANIZATION
Global	Alexander Kitain	DAI
	Andrew Zeitlin	Georgetown University
	Anne Brockmeyer	World Bank
	Beatriz Marulanda	Marulanda & Consultores
	Daniel Alvarez	World Bank
	Greg De Paepe	Independent consultant
	Jonathan Weigel	London School of Economics
	Mazhar Waseem	University of Manchester
	Pierre Bachas	World Bank
	Rex Arendsen	OECD
	Victor Thuronyi	Ex-IMF
	Vishal Gujadhur	Bill and Melinda Gates Foundation
Rwanda	Fiacre Mushimire	Rwanda Utility Regulatory Authority
	Amina Rwakunda	MINECOFIN
	Angelo Igitego	Angelo Igitego
	Antoinette Uwimana	Women for Women
	Ayanda Mngadi	One Acre Fund
	Brolin Bahizi	Blue Oceans
	Daniel Munyangeri	Earth Enable
	Denis Mukama	Rwanda Revenue Authority
	Eric Kubwumucunguzi	iTroupe Ltd
	Felix Nkundimana	Jali Partners
	Francis Bazatsinda	Volkswagen
	Fred Karara	Rwanda Revenue Authority
	Frederick Niyonzima	Bralirwa
	Gloria Mutoni	African Collection Limited
	Harriet Hakiza	AC Group
	Helle Dahl Rasmussen	Inkomoko
	Hope Abaganwa	Promota Creations
	Jean Louis Kaliningondo	RRA
	Jean Paul	MTN
	Lionel Maniraho	Babyl
	Alex Ntale	Private Sector Federation (ICT Chamber)
	Paul Frobisher Mugambwa	PwC
	Philip Gasaatura	Rwanda Development Board
	Philip Kakuru	Airtel Money
	Pierre Kayitana	Irembo

Notes

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Acknowledgments

The Better Than Cash Alliance

The Better Than Cash Alliance is a global partnership of governments, companies, and international organizations that accelerates the transition from cash to digital payments in order to advance the Sustainable Development Goals. Based at the United Nations Capital Development Fund (UNCDF), the Alliance has 75 members, works closely with other global organizations, and is an implementing partner for the G20 Global Partnership for Financial Inclusion.